













MASTER CATALOG

CAMSHAFTS • VALVE TRAIN • IGNITION

www.cranecams.com

Cams...from Beginning to End!



Genuine Crane 8620 and 9310 Steel Billet Cams... The Strongest Available!

Our famous carburized roller cams begin as 8620 or 9310 alloy steel billet bar stock. Each cam then undergoes numerous precision manufacturing operations required to produce a finished cam. You can identify a genuine Crane cam core by the distinctive copper plating between the lobes! Crane 8620 and 9310 steel billet cam cores are used by prominent racers, engine builders, and manufacturers.

Lobe-To-Lobe, Cam-To-Cam Accuracy!

Only Crane Cams delivers that famous Crane lobe-tolobe, cam-to-cam

accuracy that engine builders trust! Crane Cams are always **measurably more**

accurate because we begin with the industry's most accurate tooling and end with the industry's most accurate manufacturing... **all performed in-house**, by Crane!



Roller Cam Power With Hydraulic Cam Convenience!

The world's finest, strongest, most durable *carburized* and *induction hardened* steel billet cams and the proven power making capabilities of Crane Cams' *hydraulic roller* lobe profiles produce roller cam power with the easy maintenance of a standard hydraulic cam!

The World's Most Powerful Cam Profiles For All-Out Racing!

For more than 55 years Crane Cams have powered **winners** and **broken records!** Crane-pioneered **dual-pattern** cam lobe profiles first appeared in the 1960's, and are today's primary component in shattering drag racing's 330 mph Top Fuel barrier and the Pro/Stock 200 mph barrier! When records fall, Crane Cams make it happen!



How to Use This Catalog



About the Catalog

This catalog is organized into three separate sections. First is the Cam & Valve Train Application pages which includes all the necessary information needed to choose the right camshaft for your needs. Next is the Cam & Valve Train Buyer's Guide. The Buyer's Guide contains additional product applications and additional information not found on the regular applications pages. The final section is the Ignition and Ignition Buyer's Guide pages.

Each product section is organized in alphabetical order, and in "Make, number of cylinders, year, engine" fashion. Cam & Valve Train Applications are organized in alphabetical order, by engine make. Cam profiles ("grinds") are listed beginning with the "mildest" duration (lowest numerical duration shown at .050" cam lobe lift) through the "wildest" duration figures.

A camshaft Quick Reference Guide precedes the Cam & Valve Train Applications section. This is a listing with basic specifications of all the camshaft grinds that appear in this catalog. This provides a condensed version of the complete camshaft specification listings that appear on each page of the Engine Application section that follows.

Catalog Sections - Pages

Camshaft Quick Reference Guide - Pages 18-39

Cam & Valve Train Applications - Pages 40-283

Valve Train Buyer's Guide - Pages 284-371

Ignition - Pages 386-419

Choosing The Correct Cam

All Crane Cams are organized in typical "Make, number of cylinders, year, engine" fashion, and according to the type of lifter used... *Hydraulic, Hydraulic Roller, Mechanical* (Sometimes called "solid" or "flat tappet"), and *Mechanical Roller*. Cam profiles ("grinds") are listed beginning with the mildest duration through the most radical in each lifter type.

Each left page begins with the **Application** column. This column gives basic application information. In the next column is the **Cam Series** and **Grind Number**. Next is the **RPM Power Range**, and then the cam **Part Number**. "Cam Only" cams usually have a suffix (last) digit "1" in the part number. Cam & Lifter Kits usually have a "2" digit suffix. Application provides additional information about the camshaft. If the idle quality is other than stock, it is also noted in this column. **Cam specs data** such as **valve lift, duration** and **lobe separation** is shown at the far-right of each cam listing. To choose a street performance cam refer to "**Choosing The Right Cam**", and "**Getting Information**", found on pages 13 and 14-15. Note the part number of the cam you select.

For the latest *all-out race cam profiles* or *custom grind services* contact us at: **866-388-5120**, **FAX: 386-236-9983**. Our hours are normal business hours Monday - Friday, Eastern Daylight Time.

Choose the correct valve train components

You can find these by reading right, across the page. For detailed info and applications on *Valve Train Components* see the *Buyers Guide* section, pages 284-371.

Choosing The Correct Ignition

Beginning on page 386 is the Ignition section where you will find all of the technical information needed to choose the correct Ignition components for your application.

Product Emissions Codes

Product Emissions Codes For California Air Resources Board (CARB) Regulations

The product Emissions Code is designed to aid in determining the correct application of emissions related motor vehicle components. Please use our Master Catalog to be sure that purchases comply with all emission laws.



Product bearing this product identification code has been granted a California Air Resources Board (CARB) exemption ("EO" number), or is a direct or consolidated replacement part. It is 50-state legal, per the manufacturer's application guide.



The manufacturer of the product bearing this identification code represents that it has not been found, nor is it believed to be, unlawful for use under provisions of the Clean Air Act, per the manufacturer's application guidelines. This product is not legal for sale or use in the State of California (or in states which have adopted California emission standards) except on pre-emission-controlled vehicles/motor vehicle engines (pre-1966 model years).



Products bearing this product identification code are legal only for off-highway use (except CA or states that have standards), or pre-emissions controlled engines (pre-1966 domestic vehicles certified to CA standards, pre-1968 domestic vehicles certified to federal standards and all pre-1968 foreign vehicles), per the manufacturer's application quide.

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Crane Cams History

Crane Cams History



Crane Cams was originally known as known as "Crane Engineering Company, Inc.", and was founded in 1953. In 1970 the original name, "Crane Engineering", was shortened to "Crane Cams, Incorporated", better defining the began buying his camshafts. The repucompany's products and market of that era.

From that very humble beginning,



Crane Cams has evolved into a manufacturing and marketing company. Amazingly, it all began in an unused corner of the company owned by the founder's father's machine shop.

The founder, a young apprentice machinist, became interested in "souping-up" his flathead Ford V-8 hot rod. Like most others, he was strongly influenced by the various "hot rodding" magazines, ordering his first cam from a California cam company's ad. The founder's machinist's training and hotrodder's ingenuity had already taught him that camshaft design and accuracy exacts a critical effect on engine power. He also knew he was easily capable of designing and manufacturing camshafts. What's more, he knew he could design more powerful, far more accurate and repeatable camshafts.

Although money was scarce, the young apprentice traded his way into a well-used cylindrical grinder. In rebuilding this old, used machine he quickly developed cam manufacturing and

design knowledge. His initial "home made" cams were accurately made and surprisingly more powerful than anything he'd previously purchased. Other local hot rodders soon found out, and tation of the backroom Crane cam company spread quickly across Florida and further into the Southeast. In response, Crane Engineering Company was founded, which was an impressive name for a tiny yet highly ambitious

By the mid-1950's the flathead Ford and early overhead-valve Oldsmobile and Cadillac V-8's were replaced by the powerful, compact Chevrolet 265-283 V-8 engine family. It seemed that with the early small-block Chevys came a surge of growth for all forms of auto racing. Drag strips and oval tracks suddenly appeared, not only across Florida, but the nation, and the tiny backroom cam company grew as well.

In 1960, a Georgia Tech University engineering student and weekend drag racer, Pete Robinson, bought a Crane cam for his supercharged Buick powered 1940 Ford. After success on the street and at the drags, Robinson sold the '40 and bought a dragster chassis from the Dragmaster Chassis company, in California. Pete carefully assembled a stroker crankshaft, supercharged, smallblock Chevy, and installed a Crane roller cam. Robinson's new car ran well on Atlanta area tracks and at a few NHRA Division 2 events. On a whim, he entered the "Southwind" dragster into the field at the 1961 NHRA Nationals, an Patent on a brand new roller lifter event that had previously been dominated by California based cars and driv-

A virtual unknown, Robinson's little single-engine dragster shocked the race field and the nation, winning Top Eliminator and smashing records in a major upset. Several other Crane-

cammed racers were also successful, but it was "Sneaky Pete" Robinson and Crane Cams that suddenly captured



the racing world's imagination!

Soon, word of the amazing power produced by Crane Cams reached circle track racers. This reputation attracted a number of racers and engine builders including: A.J. Foyt, Red Farmer, The Wood Brothers, Bud Moore, Bill Elliott, Junior Johnson, Dale Earnhardt, Richard Petty, Darrell Waltrip, Bobby Allison, Donnie Allison, Cale Yarborough, and David Pearson, all using Crane Cams and winning heat and feature circle track races across the South.

Crane Cams prospered greatly during the "car culture" years of the 1960's, and soon outgrew the building where the founder's father had once operated his own machine shop. In 1965, Crane Engineering purchased property and began construction on a brand new building. The firm moved into its brand new facilities in January of 1966, allowing an expansion of its product line and services. Soon Crane introduced its hallmark, gold-anodized, full-roller aluminum rockers, was granted a U.S.





Crane Cams History (continued)



design, began selling mass-produced, custom-ported, all-out racing cylinder heads, heat treated chromemoly pushrods, aluminum, steel and titanium valve spring retainers, machined steel valve locks, high-rev kits, and stud girdles. Crane's rapidly expanding product potential for performance camshafts, line was chocked full of unique and innovative items, all engineered to boost horsepower and reliability in race engines as well as street performance applications. That plus the huge success that Crane cammed racers were enjoying firmly established Crane as the industry's No. 1 cam company.

It was also during this time Crane Cams became a pioneer in the science of computerized cam lobe design. Previously, cam profile designs required lengthy, tedious mathematical exercises with a slide rule or mechanical calculator. Computer technology slashed this time and substantially increased lobe accuracy. For Crane Cams, the result was FireBall ignitions have since become the an explosion of knowledge gathered, expanded and utilized. Computerization advanced for racing and street applicaof the science of cam lobe profile design also enabled Crane's design staff to explore new possibilities in cam and valve train function. Each day brought new innovations and a tremendous amount of data that could all be applied to the design and manufacture of new, even more powerful camshafts!

As Detroit accelerated and expanded its motorsports programs, Crane Cams was tapped as a provider of cam design knowledge as well as becoming a trusted supplier to the automotive industry. Ford, American Motors and Chrysler all selected Crane Cams as their In 2009, Crane Cams was purchased by choice for a variety of racing and street performance related products and ser-

For many years Crane had purchased its steel cam cores from Universal Camshaft Company, of Muskegon, Michigan. When that company became available in 1975, Crane acquired it, thereby providing itself with new ownership, Crane Cams now has a stable, long-term source for steel cam cores. That operation was moved in 1981 to a newly constructed manufacturing center in Daytona Beach. In 1985 number of the latest CNC machining the entire company left its founding city, Hallandale, Florida, and relocated

to Daytona Beach.

In February, 1994, Crane Cams acquired Camshaft Machine Company and its plants in Michigan and Indiana. To better reflect its new market mix, the company's name was changed to Crane Technologies Group, Inc.

Seeking to return to its core cam and valve train business and its roots in the performance market, Crane sold Camshaft Machine to Federal-Mogul Corp. in early 1999.

valve train components, ignitions and electronics for the rapidly growing Harley-Davidson motorcycle market. Today, Crane Cams, Crane valve train products and Crane FireBall ignitions are among the industry's most popular for cruising, street performance and racing. Crane is also an annual participant in many of the world's largest motorcycle gatherings.

Crane Cams entered the world of electronic ignitions by acquiring Allison Electronics in 1990. The original product line was completely reengineered, updated and expanded and is now mar- improving product availability to levels keted as Crane FireBall Ignitions. industry's most technologically tions. Other products include FireBall engine controls and FireWire, a premium quality, double silicone jacketed, reactive-core line of race-proven spark plug wires.

Also, Crane's optical trigger/fiber optics distributor is approved for competition by NASCAR and used by many leading teams. Likewise, Crane ignitions are employed by top runners in ARCA, ASA, USAR and other sanctioned series. Crane's billet distributors, ignitions, coils and FireWire® spark plug wire are available for many drag racing applications. George and Ken Smith. George is well known in NHRA circles for the design and introduction of the S&S-powered Buells that have become a dominant force in the Pro Stock Motorcycle class and won the 2009 NHRA Full Throttle Points Championship for Hector Arana. Given the resources of the company's an expanded amount of state-of-the art manufacturing firepower and R&D at its beck and call. This includes a substantial centers (including automated pallet changing), the ability to produce fully

digitized camshafts using Landis CNC equipment, as well as grinding cams via traditional methods using production masters, dyno cells, Spintrons and a fully government-certified emissions lab. Quality control is aided by state-ofthe-art testing equipment such Zeiss optical and Adcole computerized devices, along with a dedicated staff that has helped to maintain the industry's highest standards since "day one."

New facilities have been set up in In 1989 Crane Cams recognized the Daytona Beach, with a large number of veteran Crane Cams employees continuing in their technical and manufacturing capacities. The engineering staff utilizes the latest in design and analytical software to continue the company tradition of developing the best possible components for each application.

> Customers can be secure in the knowledge that given George Smith's racing background (which includes studying camshaft and valve train technology under the tutelage of Harvey Crane) and penchant for perfection, the company will strive to lead the industry in quality and performance while that racers require.

With the industry's largest camshaft database, which exceeds 80,000 profiles, an impressive manufacturing capability, and an experienced tech staff ready to provide racers with race-winning valve train and ignition components.

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Crane Camshaft Series

Crane Camshaft Series

Blueprint™ Cams For Musclecars

Crane Blueprint™ musclecar cams are duplicates of popular original equipment musclecar cams from the 60's and 70's. These hydraulic and mechanical cams are computer smoothed for added performance and increased valve train life. They are an excellent choice for a true musclecar restoration where engine authenticity, correct idle quality and detail are critical to the restoration. This catalog lists our most popular Blueprint grinds, but many more are available on request. We have an extensive library of profiles, enabling us to match the correct year and horsepower, or factory part number, camshaft for your specific requirements

We also provide regrinding services for the restoration of older and antique camshafts, when outright cam cores are no longer available. Contact a Crane Technical Service representative at: 866-388-5120, FAX 386-236-9983.

Energizer™ Hydraulic

Energizer street performance cams are produce sizeable torque, HP, and RPM increases at an affordable price. Energizer cams use the same computer techniques and software that developed the world's fastest and quickest cams. These single-pattern cams have tighter lobe separations, for added torque, mid-range power, throttle response and that popular lumpy idle for non-computer controlled V-8 engines. They are available as camshaft and lifter kits, or as a camshaft only.

Emissions Legal-Computer Compatible

Crane emissions legal comshafts produce amazing increases in torque, horsepower, and throttle response while extending the rpm powerband of computer controlled performance passenger cars, 2x4 and 4x4 light trucks. Emissions legal comshafts also permit full function of stock engine control computers. Emissions legal comshafts also work well with performance "chips." Emissions legal camshaft profiles are available in both standard "flat-faced" hydraulic lifter cast-billet designs as well as Hydraulic Roller designs. Crane Emissions legal comshafts are available for GM, Ford, and Dodge Magnum® V-8 engines as well as selected GM V-6 engines.

Hydraulic, Hydraulic Roller, Mechanical Non-Roller and Mechanical Roller Cams

Most cams feature a dual-pattern lobe design, for optimum intake/exhaust flow, maximum low-end, mid-range and upper rpm power. Hydraulic cams begin at 248° advertised duration (192°/204°@.050"), .400/.427" valve lift, up through 312°/319° advertised duration (262°/270°@.050") and .636" valve lift. Many are designed to maximize the effects of power enhancing systems such as nitrous-oxide, superchargers, and turbochargers.

Whenever practical, the lobes are optimized to take full advantage of the maximum flat-faced lifter diameter of each engine family (such as .842" for most GM, .875" for Ford, and .904" for AMC/Jeep and Chrysler). This produces the best powerband without sacrificing durability, idle quality, and responsiveness. These include Crane Cams' Hydraulic Roller and Street-Roller mechanical roller cams.



Crane Camshaft Series (continued)

Hydraulic Roller Cams

Crane Hydraulic Roller cams offer the sizeable power and torque increases that are available only with roller cams, plus the low-maintenance convenience of a hydraulic cam. Hydraulic Roller cams are available for retrofit (converting earlier non-hydraulic roller cam engines), and to increase power output of engines already equipped with hydraulic roller cams. Crane Hydraulic Roller cams are produced using our own industry standard, steel billet cam cores, carburized or induction-hardened for strength and wear resistance. Hydraulic Roller cams are available as catalogued plus custom grind lobe availability.

Street-Roller Mechanical Roller Cams

Street-Roller cams are available in a variety of profiles, ground on our famous steel billet cam cores and fitted with iron distributor drive gears (where applicable). Street-Roller cam lobe profiles feature exclusive lobe ramp designs that minimize valve train noise and increase valve train durability for street driving engine applications. Street-Roller profiles are also available for nitrous-oxide systems, superchargers, and turbochargers, offering even greater horsepower and torque output for these power enhancing systems.

Saturday Night Special™ Cams For Circle Track And Drag Racing

Crane Saturday Night Specials are hydraulic and mechanical lifter cam, lifter, and valve spring kits, primarily developed for rules-limited oval track racing and ET-Bracket drag racing applications. For oval track racing they produce maximum off-the-corner torque, with strong upper-rpm horsepower to pull the straightaways. For drag racing they produce maximum torque, for starting line launch and the upper rpm power to pull through the gears. Saturday Night Special cams are available for Small-block and Big-block Chevy; 289-302-351W Ford; and 429-460 Ford V-8's. (For circle track racing we also offer many other profiles for specific track cam rules not covered by Saturday Night Specials. Contact Crane Technical Services for details. 866-388-5120).

Crane Racing Cams For All-Out Competition

Crane pioneered the use of computers for lobe profile design and dual-pattern cam profiles. With over 80,000 grind numbers in our cam library, we've designed and produced cams for drag racing, circle track, road racing, boat racing, 4x4 off-road, mud racing, truck and tractor pulling, even airboats and swamp buggies. Some of our most popular racing profiles are listed in this catalog. We also custom design and grind cams for specific race engine needs. For more information contact a Crane Technical Service rep at: 866-388-5120, FAX: 386-236-9983.

How the Cam and Valve Train Section is Organized

- Crane Cam & Valve Train Applications catalog pages are organized by "Make, Number of Cylinders, Year, Engine" fashion.
- After locating your desired "Engine" comes the type of lifter the camshaft is designed for. These begin with Standard flat-face Hydraulic Lifters, then Hydraulic Rollers, then Mechanical flat-face Lifters (also called Solids or Flat Tappets), and Mechanical Roller Lifters.
- Important information on each left-hand page is arranged in columns.
- Application

This column describes the basic usage that each cam is intended for, along with any pertinent advised component items to produce the best results.

- Camshaft Series and Grind Number
 Identifies the cam series and the cam grind number. (Grind Number is different from the cam Part Number. To order, always use the cam Part Number.)
- RPM Power Range

States the RPM range at which the cam produces *maximum torque and horsepower* (The engine will typically rev 500-1,000 RPM above the stated RPM Power Range but not at peak power levels)

Identifies the actual Part Number for this camshaft. Cams sold as Cam Only (without lifters) usually end with the numeral 1. Cam & Lifter Kits include matching Crane lifters. Their Part Numbers usually end in the numeral 2. The "Emissions Code" states the California (CARB) emissions designation for that particular cam.

Lifters

These are the lifters recommended for best durability and performance for each camshaft. Upgrade options are also conveniently listed.

Complete Cam Specifications
 Under this bar you'll find all of the cam's critical specifications. These include:
 Degrees Duration @ .050"; Advertised Degrees Duration; Degrees Lobe Separation; Open/Close @ .050 Cam Lift; Lash Hot; and Gross Lift.

• Cam Facts and Notes

More helpful information on the correct application of this cam as related to the specific engine. Also provides helpful hints to insure proper camshaft and component application and installation.

• Right Page: Matched Valve Train Products
Provides part numbers for related valve
train components and refers to the catalog
page of the Buyer's Guide catalog section
where more detailed information on the
recommended valve train components and
the wide range of optional Valve Train
Components we offer are located.



Basic Tips on Choosing the Right Cam

Cam selection accuracy begins with knowing how you intend to use the vehicle, engine and drivetrain modifications already made or planned, and the lifter type (Hydraulic, Hyd. Roller, Mechanical ("Solid" or "Flat Tappet"), or Mech. Roller you wish to use. You'll find additional information to help you choose the correct cam on **Pages 14 through 17**. We urge you to take a little extra time now in making your selection. This will insure that you make the right choice, the first time! To choose the correct cam and valve train for your engine, vehicle and application follow the steps below:

What To Look For First:

First, find your engine make, number of cylinders, year, and original engine displacement as listed in cubic inches or metric reference. (Example: Chevrolet, 1986, 350 cu. in.)

Decide Which Lifter Style:

Decide on the *lifter type* you wish to use in your engine. For convenience and ease of maintenance we recommend a hydraulic cam and lifters, either "flat-face" or hydraulic roller for most street performance and daily-driving applications.

NOTE: Passenger car engines up through 1987 model year generally used conventional hydraulic or mechanical (solid) lifters and cams. In the GM family 1988-up pass. car and 1996-up truck engines were factory equipped with hydraulic roller cams and lifters. (Light trucks (pick-up's, etc.) generally used flat-face lifters and cams up through 1995 model year.) We offer many different hydraulic roller cams, our exclusive Crane Cams hydraulic roller lifters (drop-in installation), correctlength pushrods and other valve train components for converting a flat-face lifter engine to the tremendous power benefits found with a Crane hydraulic roller cam. Look under Hydraulic Roller Retrofit Cams for specific engine details.

Determine Your Vehicle's 60 MPH Cruise RPM:

Determine your *Cruising RPM At 60 MPH* by reading Page 14 (Getting Information). Match your *Cruise RPM At 60 MPH* with the information found under *Application*) See the gear ratio/tire diameter chart on Page 15 to help you determine this RPM. Note: This is critical in making the right choice for a vehicle that is street driven. Be sure your information is accurate!

Choose Your Cam:

Use the *Cruise RPM At 60 MPH* numbers and match this RPM range with the *RPM Power Range* numbers shown on the left-hand page. Be sure to consult the *Application* info before you make your cam choice. Pay particular attention to the recommended engine *compression ratio*. Also, engines using aluminum cylinder heads dissipate heat more rapidly and can therefore use approximately +.75 (three-quarters "point") compression ratio. (Example: Iron heads, 9.0:1 c/r; Alum. heads, 9.75:1 c/r) Remember: If you are in doubt, always choose *the next milder* cam profile. Be sure to specify the Part Number when ordering!

Choose Your Valve Train Components:
The Valve Train Buyer's Guide (Pages 284 through 385) contains additional product applications and additional information not found on the regular applications pages. Be sure to consult these pages for optional products that will add even more horsepower, torque, rpm, response and reliability to your cam selection.

Getting Information

How to Determine Your Cruising RPM at 60 MPH

- 1.Hold a constant 60 MPH and check the tachometer, if so equipped. You can also hook up a test-type tachometer, providing it has a sufficient RPM range.
- 2.Using the reference chart below, locate your tire diameter (height) and rear end ratio, then read the RPM indicated.

How to Determine Your True Rear Axle Ratio

- 1. The actual ratio, or a reference code, will normally be found on either a tag attached to a bolt, or will be actually stamped into the axle housing. Your car dealer can tell you how your vehicle is marked.
- 2.Raise both rear wheels of the vehicle, with the transmission in neutral. Make sure that you support the vehicle with safety stands and block the front tires. Make a reference mark on the driveshaft and on the housing. Next, without rotating them, make a mark on both of the tires and the fenderwells. With a friend watching the driveshaft carefully, rotate both tires at the same time exactly one revolution. The number of turns the driveshaft makes indicates the ratio, i.e.,: 3½ turns = 3.5 to 1; 2¾ turns = 2.75 to 1; etc. You an also use the above procedure the next time you have your vehicle lubed at the service station.
- 3.Many vehicles are equipped with overdrive-type transmissions. If this occurs, you must multiply your rear end ratio by the final transmission ratio. EXAMPLE: You have a 3.23 rear end ratio and a .85 high gear in the transmission: $3.23 \times .85 = 2.75$ final drive ratio.

How to Determine Your Engine's Compression Ratio

- 1.If your engine has stock-type pistons, and the original cylinder heads, you should be able to locate the compression ratio by:
 - A. Checking your owner's manual.
 - B. Checking a repair or service manual such as "Chiltons" or "Motors".
 - C. Call your car dealer's parts department with the engine description or serial number.
- 2. If your engine has non-stock pistons, refer to the piston manufacturer's catalog.

NOTE: If the cylinder heads are not stock, check to see if they have the same size combustion chambers. If not, refigure the compression ratio. Milling the block or heads also affects the compression ratio. Contact a Crane Performance Consultant for additional information.



Getting Information (continued)

RPM Shown at 60 MPH (Cruise RPM)

RPM FORMULA:	MPH x Axle Ratio x 336
	Tire Diameter

	Tire Diar	meter										
Rear End Ratio	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"
2.18	1831	1690	1570	1465	1373	1293	1221	1157	1099	1046	999	955
2.50	2100	1938	1800	1680	1575	1482	1400	1326	1290	1200	1145	1096
2.74	2301	2124	1973	1841	1726	1625	1534	1454	1381	1315	1255	1201
3.08	2587	2388	2218	2070	1940	1826	1725	1634	1552	1478	1411	1350
3.23	2713	2504	2326	2170	2035	1915	1809	1714	1628	1550	1480	1416
3.50	2940	2714	2520	2352	2205	2075	1960	1857	1764	1680	1604	1534
3.73	3133	2892	2686	2507	2349	2212	2089	1979	1880	1790	1709	1635
3.90	3276	3024	2808	2621	2457	2312	2184	2069	1966	1872	1787	1709
4.10	3444	3179	2952	2755	2583	2431	2296	2175	2066	1968	1879	1797
4.56	3830	3536	3283	3064	2873	2704	2554	2419	2298	2189	2089	1998
4.88	4099	3784	3513	3279	3074	2894	2733	2589	2460	2342	2236	2139

Finding Overall Tire Diameter, RPM, MPH, or Rear Axle Ratio

MPH x Axle Ratio x 336 RPM **OVERALL TIRE DIAMETER:**

RPM: MPH x Axle Ratio x 336

Tire Diameter

RPM x Overall Diameter MPH:

Axle Ratio x 336

Axle Ratio: RPM x Tire Diameter MPH x 336

Advanced Tips to Choose the Proper Camshaft

Although pages 14 and 15 in this catalog outline the very basic steps in selecting the best camshaft for a particular application, we can certainly add to the criteria needed for the best possible results. For general street (or marine) applications, the following will help provide an enhanced guideline.

Exactly what engine is it?

This sounds really obvious, but a lot of folks aren't really knowledgeable on what they're working with. For example, "I've got a smallblock Chevrolet." It could be a 1957-87 powerplant that was originally equipped with a flat faced lifter camshaft, or it could be a 1987-96 style engine that came with a hydraulic roller camshaft. Each basic engine requires a different style camshaft. Similar choices can also occurs with the evolution of big block Chevrolets, small block Fords, small block Mopars, and many others. In the 1970's General Motors exchanged the Buick, Oldsmobile, and Pontiac bodies and engines, with some folks not understanding that the Buick 455, Oldsmobile 455, and Pontiac 455 V-8s are all totally different engines. Any information that can be obtained to verify which engine that the customer has, will help make the correct choice the first time.

What cubic inch displacement is the engine?

A smaller engine will usually require a shorter duration camshaft than a larger engine, given all other factors being equal.

What compression ratio is the the engine?

An answer of "stock" is not really sufficient, as compression ratios of most engines changed during their production runs, due to differing horsepower ratings, emissions concerns, the vehicle that it was originally installed in, etc. A basic generalization that higher compression ratio engines can use camshafts with larger (more radical) duration figures will normally apply.

What cylinder heads do you have?

Iron or aluminum, stock or or ported, standard combustion chamber size or milled? These factors are also critical. Aluminum cylinder heads dissipate heat more readily, enabling them to use slightly milder camshafts for best torque characteristics. A good approximation is that going from iron heads to aluminum heads is like lowering the compression ratio 0.75 (i.e.: a 9.25:1 engine with iron heads will have similar characteristics to a 10.00:1 engine with aluminum heads). Installing heads with smaller combustion chamers will raise the compression ratio, so don't forget to take that into account. High compression combined with too mild a camshaft will cause problems with detonation, and reducing the ignition timing to compensate for this will usually hurt the torque and horsepower everywhere throughout the power band.

What intake manifold is on it?

In carbureted applications, a dual plane manifold will favor low-end and mid-range power, with a single plane unit being good for upper RPM usage. If you've got a single plane manifold on a relatively mild street machine, you may want a milder cam to pick up the bottomend torque.

Do you have a supercharger/turbocharger/nitrous oxide?

All of these enhancements will greatly influence the camshaft recommendation. Supercharged combinations tend to have slightly lower compression ratios, with slightly milder camshafts on wide lobe separation. Turborcharged engines might have slightly lower compression ratios (or not, if an intercooler is used), with a mild cam used to minimize overlap area. Heavy NOX applications might need a longer exhaust duration with a wide lobe separation in order to relieve the greater exhaust heat that's generated.

Section Continued





Advanced Tips to Choose the Proper Camshaft (continued)

What carburetor/throttle body are you using?

The larger units favor upper-end performance, so a proper match here is essential to put the power into your intended RPM operating range.

What's your cranking compression?

With the advent and widespread usage of the cylinder leakdown checkers, most folks have forgotten about the compression gauge. This is still a very valuable tool to verify your cylinder pressure, as it will illustrate the effects of a camshaft (or compression ratio) change, which a leakdown tester won't. Higher pressures will give an indication of how much ignition timing that you can run, what octane gasoline that's required to prevent detonation, and help to provide a tuning baseline for varying atmospheric conditions.

Headers or stock exhaust manifolds?

A good exhaust system can be really beneficial in most any application. Going to really large diameter systems in a mild application can hurt the torque curve, so don't get carried away there. In V-8 situations, a crossover pipe is advised for dual exhaust systems.

What transmission do you have?

Manual vs. automatic, how many gears, additional stall speed in the converter? This will help determine how broad the power curve needs to be, with milder cams traditionally having better torque and drivability over a wider RPM range.

What's the rear end ratio and rear tire diameter?

This will provide the basic operating and cruising RPM of the vehicle, one of the most critical portions of the camshaft selection process. Each of our grinds lists a basic operating band to help in the selection.

How much does the vehicle weigh?

Heavier cars may need milder camshafts with wider torque bands for best results.

What altitude will this engine normally be used at?

An engine at sea level will normally use a more radical camshaft than one at 5,000 feet (we're back to the compression gauge/cylinder pressure factor again).

What idle quality and drivability factor are you looking for?

This is the one area where the customer's individual desires can influence overall choices. If a radical idle is wanted with no concern for vacuum readings, go with the higher duration/narrower lobe separation options. If a smooth idle with lots of low-end torque is the choice, use the shorter duration/wider lobe separation cam.

All of this adds up to formulating a workable combination to produce the best overall performance that's needed to get the job done. We see combinations every day that are put together with little thought to the overall picture. Too much compression ratio, in too heavy a car, and a single plane intake manifold, with low numerical rear end ratios: no camshaft will be able to make up for a drastic mismatch of components. If possible, try to help the customer obtain the correct components from the beginning of his project. This will produce the best results, with time and money being saved by not having to repurchase items that were poorly chosen the first time.

This is a listing with basic specifications of all the camshaft grinds that appear in this catalog. It is arranged alphabetically by manufacturer, then by engine type, going from smaller to larger displacements, then by year. The camshafts are then grouped by lifter configuration: Hydraulic Lifter; Hydraulic Roller Lifter; Mechanical Lifter; Roller Lifter. Finally arranged by duration at .050" cam lift ranging from the mildest (shortest duration) to the most radical (greatest duration).

This provides a condensed version of the complete camshaft specification listings that appear on each page of the Engine Application section that follows. If you're sure of what camshaft specifications you need, want to easily browse our catalog offerings, or just want to verify the specs of a Crane camshaft that you have, this should meet your needs. Additional application information and cam timing specs are on the Engine Application pages 40 through 283, along with the recommended components for each one.

Specifications of all of the other camshafts that we have ever produced, including every one of our custom grinds are available from our Customer Service and Technical Service staff at 866-388-5120.

			Duration	n@ .050"	Adverti	sed Duration		Valve La	sh	Gross Va	lve Lift
Grind Number	Part Number	RPM Power Range	Int.	Exh.	Int.	Exh.	Lobe Sep.	Int.	Exh.	Int.	Exh.
American Motors/Je	ep 6 Cylind	der 64-05 - 199	9-232-2	243 (4.0	L)-258	(4.2L) cu	.in.				
Hydraulic Lifter Cams	shafts										
H-192/2667-2S-10	750501	800-4200	192	204	248	260	110	.000	.000	.427	.456
H-260-2	753901	1200-4800	204	216	260	272	112	.000	.000	.456	.484
H-272-2	753941	1800-5400	216	228	272	284	112	.000	.000	.484	.512
H-222/3200-2-8	750591	2600-6200	222	232	294	304	108	.000	.000	.512	.538
Mechanical Lifter Car	mshafts										
F-228/3334-2-12	751101	2200-6000	228	238	264	274	112	.028	.030	.533	.555
F-238/3467-2-8	751121	2800-6600	238	248	274	284	108	.028	.030	.555	.576
American Motors/Je		91 - 290-304	343-36	0 (5.9L)	-390-4	01 cu.in.					
Hydraulic Lifter Cams	shafts										
H-192/2667-2S-10	860501	800-4200	192	204	248	260	110	.000	.000	.427	.456
H-260-2	863901	1200-4800	204	216	260	272	112	.000	.000	.456	.484
H-260-2	863902	1200-4800	204	216	260	272	112	.000	.000	.456	.484
H-272-2	863941	1800-5400	216	228	272	284	112	.000	.000	.484	.512
H-272-2	863942	1800-5400	216	228	272	284	112	.000	.000	.484	.512
H-288-2	864441	2400-6000	226	230	288	292	112	.000	.000	.488	.496
H-288-2	864442	2400-6000	226	230	288	292	112	.000	.000	.488	.496
H-232/310-8	860641	2800-6200	232	232	312	312	108	.000	.000	.496	.496
H-302-2	864561	3000-6600	232	242	302	312	112	.000	.000	.538	.563
H-242/3520-2-12	860661	3400-7000	242	252	314	324	112	.000	.000	.563	.589
H-252/3680-2-10	860681	4000-7200	252	262	324	334	110	.000	.000	.589	.614
Hydraulic Roller Cam											
HR-208/3313-2S-12	869501	1000-5200	208	216	264	272	112	.000	.000	.530	.530
HR-216/325-2S-12	869511	1600-5600	216	224	278	286	112	.000	.000	.520	.542
HR-224/339-2S-12	869521	2000-6000	224	232	286	294	112	.000	.000	.542	.563
HR-232/352-2S-10	869531	2600-6600	232	240	294	302	110	.000	.000	.563	.584
HR-244/372-2S-12	869541	3200-7000	244	256	306	318	112	.000	.000	.595	.595
Mechanical Lifter Car											
F-238/3200-2-12	861201	2800-6400	238	248	300	310	112	.022	.022	.512	.533
F-248/3334-2-12	861241	3400-7000	248	258	310	320	112	.022	.022	.533	.555
F-258/3468-8	861321	4000-7400	258	258	320	320	108	.022	.022	.555	.555
Mechanical Roller Ca											
SR-236/350-2S-10	868511	2600-6600	236	244	286	294	110	.020	.020	.560	.579
R-258/420-2S-6	868821	3800-7800	258	266	290	298	106	.020	.020	.672	.672
Buick V-8 67-76 - 40		cu.in.									
Hydraulic Lifter Cams											
H-194/250-2S-10	850501	800-4200	194	202	252	260	110	.000	.000	.400	.416
H-202/260-2S-10	850521	1200-4800	202	210	260	268	110	.000	.000	.416	.432
H-218/280-2S-12	850571	1800-5400	218	226	276	284	112	.000	.000	.448	.464
H-226/290-2S-10	850631	2200-5800	226	234	284	292	110	.000	.000	.464	.480
1385557	850421	2200-5200	226	255	312	332	115	.000	.000	.453	.482
H-242/310-2S-10	850671	2800-6600	242	250	300	308	110	.000	.000	.496	.512
H-252/348-2S-12	850701	3600-6800	252	260	322	330	112	.000	.000	.557	.576



Grind Number	Cadillac V-8 68-81-368-425-472-500 cu.in.										
		Cadillac V	′-8 68-8	1 - 368-4	125-47	72-500 cı	ı.in.				
lydraulic Lifter Ca	mshafts										
H-202/260-2S-14	1020541	1200-4800	202	210	260	268	114	.000	.000	.447	.464
H-210/270-2S-12											
H-218/280-2S-12											
1-234/300-25-12	1020041							.000	.000	.510	.333
udraulic Liftor Ca	mchafta	Cnevrolet 6	Cylinae	r 62-84	- 194-	230-250	cu.in.				
		900 4200	102	204	240	260	112	000	000	167	400
1-192/2007-23-12 1-260-2											
I-272-2											
l-234/3250-2-6											
-238/3200-2-8	201141	2800-6600	238	248	304	314	108	.022	.022	.560	.583
-248/3334-2-6	201221	3400-6800							.022		.607
-256/3634-25-8	201311	4200-7200	256	260	292	296	108	.026	.026	.636	.646
	Che	evrolet 60° V-0	6 80-94	- 173 (2	.8L)-1	89 (3.1L)	cu.in	3.4L			
I-192/2667-2S-12											
020											
1030											
1 222/3114 23 10	230321							.000	.000	.107	דכדי
lydraulic Roller Ca	mshafts	Chevrole	190 V-	0 92-02	- 202	(4.3 <i>L)</i> Cu	.111.				
HR-194/271-2-12		800-4600	194	204	250	260	112	.000	.000	.407	.429
IR-204/286-2S-12											
HR-214/325-2S-12											
HR-222/339-2S-12		2200-6000		230	284	292	112	.000	.000	.509	
HR-230/352-2S-12	1439531	2600-6400	230	234	292	296	112	.000	.000	.528	.539
Ch	nevrolet V-8 5	57-87 (also: 87	7-95 tru	cks w/st	andar	d [non-re	oller1 hv	drauli	c lifters) -	
	262-26	7 (4.4L)-283	302-305	(5.0L)-	307-32	27-350 (5.7L)-4(00 cu.ii	n.	,	
	mshafts										
2010											
1-248-2											
1-248-2											
020 896929					234	204					
160 H10					260	260					
60 H10											
030											
l-260-2											.454
I-260-2			204	216		272		.000			.454
-256-2								.000			
-256-2	113502										
266 H10											
266 H10											
2040											
1-266-2 H-266-2											
7-262-2 7-262-2											
Z-262-2											
272 H10											
272 H10											.454
2050	114142	1800-5600	216	228	272	284	112	.000	.000	.454	.480
H-272-2	113941	1800-5600	216	228	272	284	112	000	000	454	480

Section Continued

228 228 272

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.000

216 216

H-272-2 H-272-2 113941 113942 1800-5600

1800-5600



.480

.454

Grind Number	Part Number	RPM Power Range	Duratio	on@ .050" Exh.	Adverti Int.	sed Duration Exh.	Lobe Sep	Valve La . Int.	sh Exh.	Gross Va Int.	ılve Lift Exh.
	Chevrolet V-8 5 262-26	7-87 (also: 8	7-95 tru	ıcks w/s	tandar	d [non-ro	ller] h	ydrauli	c lifters) -	
	262-26	7 (4.ÀL)-283	-302-30	5 (5.0L)	-307-32	<u> 27-350 (5</u>	.7 <u>L)</u> -4	<u>00 cu.ir</u>	1.		
Hydraulic Lifter		1000 5400	240	240	274	274	106	000	200	450	450
274 H06 274 H06	10017 100172	1800-5400 1800-5400	218 218	218 218	274 274	274 274	106 106	.000	.000	.450 .450	.450 .450
274 H06	110172	1800-5400	218	218	274	274	106	.000	.000	.450	.450
Z-268-2	113521	1800-5800	218	230	268	280	112	.000	.000	.459	.486
Z-268-2	113522	1800-5800	218	230	268	280	112	.000	.000	.459	.486
278 H10	10013	2000-5800	222	222	278	278	110	.000	.000	.467	.467
278 H10	100132	2000-5800	222	222	278	278	110	.000	.000	.467	.467
3863151	967601	2000-5600	222	222	204	204	114	.000	.000	.447	.447
H-284 H-278-2	114201 113801	2200-6000 2200-6200	222 222	222 234	284 278	284 290	114 114	.000	.000	.450 .467	.450 .494
H-278-2	113802	2200-6200	222	234	278	290	114	.000	.000	.467	.494
Z-274-2	113531	2200-6400	224	230	274	280	110	.000	.000	.473	.486
Z-274-2	113532	2200-6400	224	230	274	280	110	.000	.000	.473	.486
282 H06	10008	2400-6200	226	226	282	282	106	.000	.000	.470	.470
282 H06	100082	2400-6200	226	226	282	282	106	.000	.000	.470	.470
282 H06	110082	2400-6200	226	226	282	282	106	.000	.000	.470	.470
H-288-2 H-288-2	113821 113822	2600-6400 2600-6400	226 226	234 234	288 288	296 296	114 114	.000	.000	.458 .458	.473 .473
H-228/320-6	110551	2800-6400	228	234	284	296	106	.000	.000	.480	.480
284 H12	10007	2800-6200	228	228	284	284	112	.000	.000	.480	.480
284 H12	100072	2800-6200	228	228	284	284	112	.000	.000	.480	.480
H-228/3200-14	110601	3000-6400	228	228	284	284	114	.000	.000	.480	.480
H-228/260-2S-7	110251	2800-6000	228	232	288	292	107	.000	.000	.390	.410
H-228/3200-2S-6	110591	2800-6400	228	234	284	290	106	.000	.000	.480	.494
H-228/3200-25-6 286 H06	110592 10018	2800-6400 3000-6400	228 230	234 230	284 286	290 286	106 106	.000	.000	.480 .465	.494 .465
286 H06	100182	3000-6400	230	230	286	286	106	.000	.000	.465	.465
H-230/318-12	110501	3000-6600	230	230	290	290	112	.000	.000	.477	.477
H-232/260-251-6	110271	3000-6400	232	236	292	296	106	.000	.000	.390	.410
H-232/2732-6	110301	3000-6400	232	232	290	290	106	.000	.000	.410	.410
H-296-2	114561	3000-6600	234	242	296	304	110	.000	.000	.473	.488
H-236/260-251-6	110291	3200-6600	236	242	296	302	106	.000	.000	.390	.410
Z-286-2 Z-286-2	113541 113542	3000-6800 3000-6800	236 236	244 244	286 286	294 294	110 110	.000	.000	.491 .491	.491 .491
H-238/3347-6	110651	3200-6600	238	238	294	294	106	.000	.000	.502	.502
H-238/3347-252-10	110521	3200-6800	238	242	294	304	110	.000	.000	.502	.520
H-238/3347-2S-6	110691	3200-6800	238	244	294	300	106	.000	.000	.502	.516
H-238/3347-2S-6	110692	3200-6800	238	244	294	300	106	.000	.000	.502	.516
H-300-2	114051	3200-7000	238	246	300	308	112	.000	.000	.480	.495
H-244/3439-6	110711	3200-6800 3400-7000	244 244	244 252	300 300	300	106 106	.000	.000	.516	.516
H-244/3439-2S-6 H-244/3439-2S-6	110741 110742	3400-7000	244	252	300	308 308	106	.000	.000	.516 .516	.525 .525
302 H06	10011	3400-7000	246	246	302	302	106	.000	.000	.500	.500
302 H06	100112	3400-7000	246	246	302	302	106	.000	.000	.500	.500
302 H06	110112	3400-7000	246	246	302	302	106	.000	.000	.500	.500
H-308-2	114571	3400-7200	246	254	308	316	112	.000	.000	.495	.510
H-252/3500-12 654-655-08 T2 0A	110541 110311	3600-7200 4200-7200	252 252	252 272	308 286	308 306	112 108	.000	.000	.525 .390	.525 .410
H-256/3500-8	114581	3800-7200	256	256	312	312	108	.000	.000	.525	.525
	r Camshafts — R		230	230	J12	J 12	100	.000	.000	.525	.525
HR-260-2-12 IG	119811	1000-5200	204	214	260	270	112	.000	.000	.429	.452
HR-210/325-2S-12.9		1400-5600	210	218	272	280	112	.000	.000	.488	.509
HR-276-2S-12 IG	119821	1600-5800	214	222	276	284	112	.000	.000	.488	.509
HR-216/339-2S-12.9		1600-5800	216	224	284	292	112	.000	.000	.509	.528
HR-284-2S-12 IG	119831	2000-6200	222	230	284	292	112	.000	.000	.509	.528
HR-222/345-2S-12.9		2000-6200	222	230	288	296	112	.000	.000	.518	.539
HR-230/352-2S1-8 IO HR-230/359-2S-12.9		2400-6400 2600-6600	230 230	238 238	292 292	300 300	108 112	.000	.000	.528 .539	.548 .558
HR-296-2S-12 IG	119841	2800-6800	234	242	292	304	112	.000	.000	.539	.558
HR-234/365-2S-12.9		2800-6800	234	242	296	304	112	.000	.000	.548	.558
HR-238/372-252-10.		3000-6800	238	242	300	304	110	.000	.000	.558	.558
HR-306-2S-10.86 IG	119651	3200-7000	240	248	306	314	110	.000	.000	.558	.558
HR-240/372-251-14.		3400-7200	240	248	306	314	114	.000	.000	.558	.558
HR-242/372-2S-12.9	0 IG 119591	3600-7200	242	250	304	312	112	.000	.000	.558	.558

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Grind Number	Part Number	RPM Power Range	Duration@ Int.	.050" Exh.	Advertised Int.	Duration Exh.	Lobe Sep.	Valve La	sh Exh.	Gross Va Int.	lve Lift Exh.
Hydraulic Roller Cams											
HR-246/372-2S-14 IG	119601	3800-7200	246	254	308	316	114	.000	.000	.558	.558
HR-250/372-2S-10.86 IG HR-252/400-2S-8 IG	119611 119711	4000-7200 4200-7200	250 252	258 256	316 322	324 326	110 108	.000	.000	.558 .600	.558 .600
HR-258/372-2S-12.86 IG	119711	4400-7200	252	266	320	328	112	.000	.000	.558	.558
Mechanical Lifter Can		1100-7200	230	200	320	320	112	.000	.000	.550	.550
3736097	110901	2000-5600	227	230	260	268	110.5	.012	.018	.393	.399
F-228/3067-2-6	110901	2400-6000	228	238	290	300	106	.022	.022	.460	.480
F-228/3067-2-10	110931	2600-6200	228	238	290	300	110	.022	.022	.460	.480
F-238/3200-14	110941	3000-6600	238	238	278	278	114	.022	.022	.480	.480
F-278-2	113841	3000-6800	238	248	278	288	114	.022	.022	.480	.500
3972182	110951	2800-6600	242	254			116	.020	.025	.459	.485
F-244/3454-2S-6	110921	3200-6800	244	252	280	288	106	.026	.026	.518	.536
F-244/3454-2S-6	110922	3200-6800	244	252	280	288	106	.026	.026	.518	.536
F-280-2	114681	3200-7000	244	252	280	288	112	.026	.026	.518	.536
F-248/3334-6 F-288-2	110961 113861	3400-7000 3400-7200	248 248	248 258	288 288	288 298	106 114	.022 .022	.022 .022	.500 .500	.500 .520
285-295-06	12003	3600-7000	250	260	285	295	106	.022	.022	.533	.555
F-252/3574-2S-6	110981	3800-7200	252	260	288	296	106	.026	.026	.536	.554
F-252/3574-2S-6	110982	3800-7200	252	260	288	296	106	.026	.026	.536	.554
F-290-2	114691	3800-7600	252	260	290	298	112	.026	.026	.536	.554
3849346	967251	4000-7000	254	254			114	.030	.030	.485	.485
F-256/340-2S-8	110971	4000-7800	256	260	288	292	108	.018	.020	.612	.578
F-256/3634-2S-5	111411	4000-7600	256	264	292	300	105	.026	.026	.545	.563
F-256/3634-2S-5	111412	4000-7600	256	264	292	300	105	.026	.026	.545	.563
3927140	968821	4200-7200	257	269	207	204	112	.024	.026	.493	.512
F-260/3694-2S-6 F-260/370-2-6	111431 111451	4400-7600 4400-7600	260 260	268 270	296 295	304 305	106 106	.026 .026	.026 .028	.554 .555	.572 .578
F-260/370-2-6	111451	4400-7600	260	270	295	305	106	.026	.028	.555	.578
F-262/340-2S-7	110991	4400-7800	262	268	294	304	100	.020	.026	.612	.572
F-300-2	114701	4600-8200	264	272	300	308	112	.026	.026	.563	.581
F-268/3814-2S-6	111501	4600-8000	268	276	304	312	106	.026	.026	.572	.590
F-268/3814-2S-6	111502	4600-8000	268	276	304	312	106	.026	.026	.572	.590
F-310	114711	4800-8200	272	272	310	310	108	.026	.026	.581	.581
F-276/3934-2S-6	111001	4800-8400	276	284	312	320	106	.026	.026	.590	.608
F-320	114721	5000-8600	280	280	320	320	108	.026	.026	.599	.599
F-280/3994-25-8	111751	5000-8800	280	288	316	324	108	.026	.026	.599	.617
Mechanical Roller Car		2200 (200	220	226	270	200	442	020	020	507	52.5
SR-228/338-2S-12 IG	118541	2200-6200	228	236	278	280	112	.020	.020	.507	.525
SR-232/350-2S-12.90 IG SR-236/350-2S-12 IG	118571 118551	2400-6600 2400-6600	232 236	240 244	286 286	294 294	112 112	.020	.020 .020	.525 .525	.543 .543
SR-240/362-2S-10.90 IG	118581	3000-7000	240	248	294	302	110	.020	.020	.543	.561
SR-240/362-2S-12.90 IG	118611	3400-7200	240	248	294	302	112	.020	.020	.543	.561
TR-242/3867-2S-6	118131	3600-7200	242	250	282	290	106	.022	.022	.580	.600
SR-244/362-2S-12 IG	118521	3400-7200	244	252	294	302	112	.020	.020	.543	.561
SR-244/362-2S-14 IG	118531	3600-7400	244	252	294	302	114	.020	.020	.543	.561
SR-248/400-2S-8 IG	118631	3600-7400	248	252	286	290	108	.020	.022	.600	.600
R-248/420-252-6	118741	3800-7400	248	256	280	288	106	.020	.020	.630	.630
SR-250/374-2S-10.90 IG SR-250/374-2S-12.90 IG	118591 118691	3800-7400 3800-7400	250 250	258 258	300 300	308 308	110 112	.020	.020 .020	.561 .561	.561 .561
R-252/420-2S-6	118751	4000-7600	252	260	284	292	106	.020	.020	.630	.630
R-252/420-25-6 SF0	118761	4000-7600	252	260	284	292	106	.020	.020	.630	.630
R-252/420-2S-10	118911	4000-7600	252	260	284	292	110	.020	.020	.630	.630
SR-252/374-2S-12 IG	118711	3800-7400	252	260	302	310	112	.020	.020	.561	.561
R-256/4301-2S-6	118971	4000-7800	256	262	284	290	106	.020	.022	.753	.753
R-256/4301-2S-6 RB RD	118811	4000-7800	256	262	284	290	106	.020	.022	.753	.753
R-256/420-251-6	118821	4000-7800	256	264	288	296	106	.020	.020	.630	.630
R-258/452-2S4-8 LRB RD SFO	118951	4000-7800	258	260	287	289	108	.020	.022	.746	.746
SR-260/400-2S-8 IG R-260/420-2S2-6	118661 118831	4000-7600 4200-8000	260 260	264 264	298 292	302 296	108 106	.020	.022 .020	.600	.600
K-260/420-252-6 294-304-08RRD.95	19145	4200-8000	260	266	292	304	106	.020	.020	.630 .670	.630 .630
R-260/4467-25-6.96	118411	4200-8200	260	268	294	306	106	.012	.020	.670	.625
R-260/4467-2S-6.96 SF0	118431	4200-8200	260	268	290	306	106	.012	.022	.670	.625
294-306-06 RRD.95	19137	4200-8000	260	270	294	306	106	.012	.030	.670	.615
295-299-06R.98	19128	4200-7800	262	266	295	299	106	.012	.012	.650	.650
383-431-08R.95 LWD RB RD R-264/420-251-6	19146 118861	4400-8400 4200-8000	264 264	268 272	294 296	298 304	108 106	.020	.022	.770 .630	.770

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olet V-8 52 262-267 shafts 118921 118941 19139 118771 118781 118871 118421 118441 118791 118881 118881 118321	7-87 (also: 87 7 (4.4L)-283-3 4200-8200 4200-8200 4400-8000 4400-8000 4400-8000 4400-8200 4400-8200 4400-8200 4400-8200	264 264 264 264 264 264 268 268	272 272 272 273 268 268 272	296 296 298 296	304 304 311	110 110 110 106	.020 .020 .012	.020 .020	.630 .630	.630 .630
shafts 118921 118941 19139 118771 118781 118871 118421 118441 118791 118881 118321	4200-8200 4200-8200 4400-8000 4400-8000 4400-8000 4600-8200 4400-8200 4400-8200 4400-8200	264 264 264 264 264 268 268	272 272 273 268 268	296 296 298 296	304 304 311	110 110 106	.020 .020	.020 .020	.630	
118921 118941 19139 118771 118781 118871 118421 118441 118791 118881 118321	4200-8200 4400-8000 4400-8000 4400-8000 4600-8200 4400-8200 4400-8200 4400-8200	264 264 264 264 268 268	272 273 268 268	296 298 296	304 311	110 106	.020	.020	.630	
118941 19139 118771 118781 118871 118421 118441 118791 118881 118321	4200-8200 4400-8000 4400-8000 4400-8000 4600-8200 4400-8200 4400-8200 4400-8200	264 264 264 264 268 268	272 273 268 268	296 298 296	304 311	110 106	.020	.020	.630	
19139 118771 118781 118871 118421 118441 118791 118881 118321	4400-8000 4400-8000 4400-8000 4600-8200 4400-8200 4400-8200 4400-8200	264 264 264 268 268	273 268 268	298 296	311	106				
118771 118781 118871 118421 118441 118791 118881 118321	4400-8000 4400-8000 4600-8200 4400-8200 4400-8200 4400-8200	264 264 268 268	268 268	296				.030	.670	.615
118781 118871 118421 118441 118791 118881 118321	4400-8000 4600-8200 4400-8200 4400-8200 4400-8200	264 268 268	268		300	108	.020	.022	.745	.745
118871 118421 118441 118791 118881 118321	4600-8200 4400-8200 4400-8200 4400-8200	268 268		296	300	108	.020	.022	.745	.745
118421 118441 118791 118881 118321	4400-8200 4400-8200 4400-8200	268		300	304	107	.020	.020	.630	.630
118441 118791 118881 118321	4400-8200 4400-8200		276	298	314	106	.012	.022	.670	.625
118791 118881 118321	4400-8200	268	276	298	314	106	.012	.022	.670	.625
118881 118321		268	272	297	301	107	.020	.022	.746	.746
118321	4400-8200	270	276	302	308	106	.020	.020	.630	.630
	4400-8200	272	282	312	322	110	.026	.026	.650	.641
. 1000	4400-8200	272	282	312	322	110	.026	.026	.650	.641
118291	4600-8200	272	280	302	310	106	.020	.014	.770	.715
118801	4600-8200	274	282	305	313	106	.020	.022	.681	.681
118891	4600-8400	276	284	308	316	106	.020	.020	.630	.630
118991	6000-9800	276	292	306	326	114	.020	.026	.927	.720
118961	4800-8400	278	284	307	313	106	.020	.022	.746	.746
118901	5000-8600	280	284	312	316	108	.020	.020	.630	.630
118361	5000-8600	280	284	320	324	108	.026	.026	.675	.641
118381	5000-8600	282	290	316	324	110	.035	.030	.715	.688
118451	6000-9400	282	290	316	324	112	.035	.030	.786	.757
118461	6000-9400	282	290	316	324	112	.035	.030	.786	.757
118491	6000-9600	282	290	312	330	113	.020	.030	.825	.776
118471	6000-9800	286	294	320	328	112	.035	.030	.786	.757
118481	6000-9800	286	294	320	328	112	.035	.030	.786	.757
	Chevrolet V-	R 87-97 .	- 305 (5 <i>01</i>)-3	50 (5 71)	cu in				
nafts	Cheviolet)		J.UL, J.	30 (3.7 L)	cuiiii				
104201	500-4200	184	194	246	256	106	.000	.000	.384	.407
104204	500-4400	184			266	108	.000	.000	.384	.429
104211	800-4600	194		256	266		.000	.000	.407	.429
104221	1200-5200	204	214	260	270	116	.000	.000	.429	.452
104225	1400-5400	208	214	264	270	112	.000	.000	.438	.452
104224	1800-5800	214	220	270	276	112	.000	.000	.452	.465
Chevrol	et V-8 87-99 -	305 (5.0	1/)-35	0 (5.71)	cu.in. (e	xcent 5	71 151	()		
afts		303 (3.0	, L) 33	0 (J.7 L)	cuilli (C.	neept 3	, L LJ I			
109811	1000-5200	204	214	260	270	112	.000	.000	.429	.452
109851	1000-5200	206	214	268	276	112	.000	.000	.479	.498
109821	1600-5800	214	222	276	284	112	.000	.000	.488	.509
109671	1600-5800	216	224	284	292	112	.000	.000	.509	.528
109861	1800-6000	218	226	280	288	112	.000	.000	.498	.518
109831	2000-6200	222	230	284	292	112	.000	.000	.509	.528
109871		224			294	114				.539
109661	2600-6600	230	238	292	300	112	.000	.000	.539	.558
109841	2800-6800	234	242	296	304	112	.000	.000	.539	.558
109691	2800-6800	234	242	296	304	112	.000	.000	.548	.558
										.558
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	2200 6200	228	236	270	280	112	020	020	507	.525
										.543
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								.020	.543	.561
efts.	nevroiet v-8 !	92-96 - 3	U5 (5.	UL)-35() (5./L) (u.in. Li	l			
	1500-5700	210	224	272	286	112	000	000	479	.518
			218	280			.000	.000		.498
	118901 118361 118361 118381 118451 118461 118491 118471 118481 **Cafts** 104201 104204 104211 104225 104224 **Chevrological State of the Company of the Co	118901 5000-8600 118361 5000-8600 118381 5000-8600 118451 6000-9400 118491 6000-9400 118491 6000-9800 118471 6000-9800 118481 6000-9800 Chevrolet V-8 104201 500-4200 104204 500-4400 104211 800-4600 104221 1200-5200 104225 1400-5400 104224 1800-5800 Chevrolet V-8 87-99 - Cafts 109811 1000-5200 109821 1600-5800 109821 1600-5800 109831 2000-6200 109831 2000-6200 109831 2000-6200 109831 2000-6200 109831 2000-6200 109831 2800-6800 109661 2800-6800 109691 2800-6800 109691 2800-6800 109651 3200-7200 Shafts 108541 2200-6200 108551 2400-6600 108551 3400-7200 Chevrolet V-8 9	118901 5000-8600 280 118361 5000-8600 280 118381 5000-8600 282 118451 6000-9400 282 118461 6000-9400 282 118471 6000-9800 286 118481 6000-9800 286 118481 6000-9800 286 118481 6000-9800 286 118481 6000-9800 286 118481 6000-9800 286 118481 6000-9800 286 118481 6000-9800 286 118481 6000-9800 286 118481 6000-9800 286 118481 6000-9800 286 118481 6000-9800 286 118481 104201 500-4400 184 104204 500-4400 194 104221 1200-5200 204 104225 1400-5400 208 104224 1800-5800 214 109851 1000-5200 206 109821 1600-5800 214 109851 1000-5200 206 109821 1600-5800 216 109821 1600-5800 216 109831 2000-6200 222 109871 2200-6400 224 109661 2600-6600 230 109841 2800-6800 234 109691 2800-6800 234 109691 2800-6800 234 109651 3200-7200 240 108551 2400-6600 236 108571 2400-6600 236 108571 2400-6600 236 108571 2400-6600 236 108551 3400-7200 244 108521 3400-7200 244 108521 3400-7200 244 108521 3400-7200 244 108521 3400-7200 244 108521 3400-7200 244 108521 3400-7200 244 108521 3400-7200 244 108521 3400-7200 244 108521 3400-7200 246 108521 340	118901 5000-8600 280 284 118361 5000-8600 280 284 118381 5000-8600 282 290 118451 6000-9400 282 290 118451 6000-9400 282 290 118491 6000-9600 282 290 118471 6000-9800 286 294 118481 6000-9800 286 294 118481 6000-9800 286 294 118481 6000-9800 286 294 118481 6000-9800 286 294 118481 6000-9800 286 294 118481 6000-9800 286 294 118481 6000-9800 286 294 118481 6000-9800 286 294 118481 6000-9800 286 294 104201 500-4400 184 204 104204 500-4400 184 204 104211 800-4600 194 204 104221 1200-5200 204 214 104225 1400-5400 208 214 220 104224 1800-5800 214 220 109851 1000-5200 206 214 109851 1000-5200 206 214 109821 1600-5800 214 222 109671 1600-5800 216 224 109861 1800-6000 218 226 109831 2000-6200 222 230 109871 2200-6400 224 232 109661 2600-6600 230 238 236 109861 2800-6800 234 242 240 109691 2800-6800 234 242 240 109651 3200-7200 240 244 55 56651 3200-7200 240 244 55 5665	118901 5000-8600 280 284 312 118361 5000-8600 280 284 320 118381 5000-8600 282 290 316 118451 6000-9400 282 290 316 118461 6000-9600 282 290 316 118491 6000-9600 282 290 312 118471 6000-9800 286 294 320 118481 6000-9800 286 294 320 118481 6000-9800 286 294 320 118481 6000-9800 286 294 320 118481 6000-9800 286 294 320 118481 6000-9800 286 294 320 118481 6000-9800 286 294 320 118481 6000-9800 286 294 320 118481 6000-9800 286 294 320 118481 6000-9800 286 294 320 104201 500-4200 184 204 246 104204 500-4400 184 204 246 104211 800-4600 194 204 256 104221 1200-5200 204 214 260 104225 1400-5400 208 214 220 270 104225 1400-5400 208 214 220 270 104224 1800-5800 214 220 270 104224 1800-5800 214 220 270 109851 1000-5200 206 214 268 109851 1000-5200 206 214 268 109851 1000-5200 216 224 284 109861 1800-6000 218 226 280 109831 2000-6200 222 230 284 109861 1800-6000 218 226 280 109831 2000-6200 222 230 238 292 109841 2800-6800 234 242 296 109691 2800-6800 234 242 296 109691 2800-6800 234 242 296 109651 3200-7200 240 244 302 shafts 10851 2400-6600 236 244 286 10851 3400-7200 240 248 294 108521 3400-7200 240 248 294 108521 3400-7200 244 252 294 108521 3400-7200 244 252 294 108521 3400-7200 244 252 294 108521 3400-7200 244 252 294 108521 3400-7200 244 252 294 108521 3400-7200 244 252 294 108521 3400-7200 244 252 294 108227 1500-5700 210 224 272 272 272 272 272 272 272 272 273	118901 5000-8600 280 284 312 316 118361 5000-8600 280 284 320 324 118381 5000-8600 282 290 316 324 118451 6000-9400 282 290 316 324 118491 6000-9600 282 290 316 324 118491 6000-9600 286 294 320 328 118481 6000-9800 286 294 320 328 118481 6000-9800 286 294 320 328 118481 6000-9800 286 294 320 328 118481 6000-9800 286 294 320 328 118481 6000-9800 286 294 320 328 118481 6000-9800 286 294 320 328 118481 6000-9800 286 294 320 328 118481 6000-9800 286 294 320 328 118481 6000-9800 286 294 320 328 118481 6000-9800 286 294 320 328 118421 104201 500-4200 184 194 246 256 104201 500-4400 184 204 246 266 104211 800-4600 194 204 256 266 104221 1200-5200 204 214 260 270 104225 1400-5400 208 214 264 270 104224 1800-5800 214 220 270 276 104224 1800-5800 214 220 270 276 109851 1000-5200 206 214 268 276 109851 1000-5200 206 214 268 276 109861 1800-6800 214 222 276 284 109671 1600-5800 216 224 284 292 109871 2200-6400 222 230 238 292 300 109841 2800-6800 234 242 296 304 109651 3200-7200 240 244 302 306 108571 2400-6600 232 240 246 296 304 109651 3200-7200 240 244 286 294 108551 2400-6600 236 244 286 294 108551 2400-6600 236 244 286 294 108551 2400-6600 236 244 286 294 108551 2400-6600 236 244 286 294 108551 2400-6600 236 244 286 294 108551 2400-6600 236 244 286 294 108551 2400-6600 236 244 286 294 108551 2400-6600 236 244 286 294 108551 2400-6600 236 244 286 294 108551 2400-6600 236 244 286 294 108551 3400-7200 240 248 294 302 108551 3400-7200 244 252 294 302 108551 3400-7200 240 248 294 302 1	118901 5000-8600 280 284 312 316 108 118361 5000-8600 280 284 320 324 108 118361 5000-8600 282 290 316 324 110 118451 6000-9400 282 290 316 324 112 118461 6000-9400 282 290 316 324 112 118491 6000-9800 286 294 320 328 112 118491 6000-9800 286 294 320 328 112 118481 6000-9800 286 294 320 328 112 118481 6000-9800 286 294 320 328 112 118481 6000-9800 286 294 320 328 112 118481 6000-9800 286 294 320 328 112 104201 500-4200 184 194 246 256 106 104204 500-4400 184 204 246 266 108 104211 120-5200 204 214 260 270 116 104225 1400-5400 208 214 260 270 116 104225 1400-5400 208 214 260 270 112 104224 1800-5800 214 220 270 276 112 109821 1600-5800 214 220 270 276 112 109851 1000-5200 204 214 268 276 112 109861 1800-6000 218 226 280 288 112 109871 1600-5800 216 224 284 292 112 1098811 2000-6200 222 230 284 292 112 1098811 2000-6200 222 230 284 292 112 1098811 2000-6200 218 226 280 288 112 109891 2600-6600 234 242 296 304 112 109861 3200-7200 240 244 302 306 110 109861 3200-7200 240 244 246 296 304 112 109691 2800-6800 234 242 296 304 112 109651 3200-7200 240 248 294 302 112 108571 2400-6600 236 236 244 286 294 112 108571 2400-6600 236 236 244 286 294 112 108571 2400-6600 236 244 286 294 112 108571 2400-6600 236 244 286 294 112 108571 2400-6600 236 244 286 294 112 108571 2400-6600 236 244 286 294 112 108571 2400-6600 236 244 286 294 302 112 Chevrolet V-8 92-96 - 305 (5.0L)-350 (5.7L) cu.in. LT (afts)	118901 5000-8600 280 284 312 316 108 .026 118361 5000-8600 280 284 320 324 108 .026 118361 5000-8600 282 290 316 324 110 .035 118451 6000-9400 282 290 316 324 112 .035 118461 6000-9600 282 290 316 324 112 .035 118471 6000-9800 286 294 320 328 112 .035 118481 6000-9800 286 294 320 328 112 .035 118481 6000-9800 286 294 320 328 112 .035 118481 6000-9800 286 294 320 328 112 .035	11890 5000-8600 280 284 312 316 108 .020 .026 118361 5000-8600 280 284 320 324 108 .026 .026 118361 5000-8600 282 290 316 324 112 .035 .030 118451 6000-9400 282 290 316 324 112 .035 .030 118461 6000-9400 282 290 316 324 112 .035 .030 118471 6000-9600 282 290 312 330 113 .020 .030 118471 6000-9800 286 294 320 328 112 .035 .030 118481 6000-9800 286 294 320 328 112 .035 .030 118481 6000-9800 286 294 320 328 112 .035 .030 118481 6000-9800 286 294 320 328 112 .035 .030 118491 6000-9800 286 294 320 328 112 .035 .030 118401 6000-9800 286 294 320 328 112 .035 .030 118401 6000-9800 286 294 320 328 112 .035 .030 118401 6000-9800 286 294 320 328 112 .035 .030 118401 6000-9800 286 294 320 328 112 .035 .030 118401 6000-9800 286 294 320 328 112 .035 .030 104211 800-4600 184 204 246 266 108 .000 .000 104211 800-4600 194 204 256 266 111 .000 .000 104211 800-4600 194 204 256 266 111 .000 .000 104221 1200-5200 204 214 260 270 116 .000 .000 104224 1800-5800 214 220 270 276 112 .000 .000 104224 1800-5800 214 220 270 276 112 .000 .000 109851 1000-5200 206 214 268 276 112 .000 .000 109851 1600-5800 214 222 276 284 112 .000 .000 109861 1800-600 218 226 280 288 112 .000 .000 109861 1800-600 218 226 280 288 112 .000 .000 109861 1800-600 234 224 226 280 288 112 .000 .000 109871 2200-6400 224 232 286 294 114 .000 .000 109861 2600-6600 230 238 292 300 112 .000 .000 109851 2400-6600 234 242 296 304 112 .000 .000 109851 2400-6600 236 244 286 294 112 .020 .020 108551 2400-6600 236 244	11890

Duration@.050"

Advertised Duration

Gross Valve Lift

Valve Lash



Grind Number	Part Number	RPM Power Range	Duratio Int.	n@ .050" Exh.	Adverti Int.	sed Duration Exh.	Lobe Sep.	Valve La Int.	ash Exh.	Gross Va Int.	alve Lift Exh.
Chevrolet V-8 97	7-13 (also 00			000 620	00) - 1 8						156
ydraulic Roller Cam		-13 VOITEC 4000	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	000, 020	(U) - 1 .0	7.7 - 7.7 (J 4 0) - 0.	U-0.2L	LJI, LJZ	, LJJ/L/2	L, LJU
HR-206/294-2S-14.55	1449511	1400-5500	206	214	270	278	114	.000	.000	.500	.500
HR-210/3241-2S-14 4A	1449041	1800-6000	210	218	272	280	114	.000	.000	.551	.551
HR-210/3241-2S-16 2A	1449051	1600-6000	210	218	272	280	116	.000	.000	.551	.551
HR-216/3241-15	1449061	2200-6300	216	216	278	278	115	.000	.000	.551	.551
HR-216/344-2S1-16 3A	1449071	1900-6000	216	222	277	283	116	.000	.000	.585	.585
HR-216/3241-2S-15	1449561	2000-6500	216	224	278	286	115	.000	.000	.551	.551
HR-216/344-2S-14	1449081	2200-6500	216	224	277	285	114	.000	.000	.585	.585
HR-220/3241-251-14	1449011	2400-6500	220	224	282	286	114	.000	.000	.551	.551
HR-222/3241-2S-15 3A	1449091	2300-6800	222	228	284	290	115	.000	.000	.551	.551
HR-224/3241-14	1449591	2300-6500	224	224	286	286	114	.000	.000	.551	.551
HR-224/3241-2S-14 2A	1449101	2200-6500	224	228	286	290	114	.000	.000	.551	.551
HR-224/347-2S-14 4A HR-224/347-2S1-15 4A	1449111 1449121	2300-6500 2400-6500	224 224	228 232	280 280	283 287	114 115	.000	.000	.590 .590	.590 .590
HR-228/353-13 4A	1449131	2700-6500	228	232	290	290	113	.000	.000	.600	.600
HR-228/3241-2S-12	1449141	2700-6500	228	232	290	290	112	.000	.000	.551	.551
HR-228/353-2S1-12	1449601	2400-6500	228	232	290	294	112	.000	.000	.600	.600
HR-228/353-2S1-14 2A	1449151	2400-6500	228	232	290	294	114	.000	.000	.600	.600
HR-228/347-2S-15 0A	1449161	2400-6500	228	236	283	291	115	.000	.000	.590	.590
HR-232/353-2SR-17 2A	1449171	2600-6400	232	228	294	290	117	.000	.000	.600	.600
HR-232/353-2S1-12 4A	1449181	2900-6500	232	236	294	298	112	.000	.000	.600	.600
HR-232/3241-2S1-17 3A	1449191	2600-6600	232	240	294	302	117	.000	.000	.551	.551
HR-232/353-2S-10 0A	1449201	2900-6600	232	240	294	302	110	.000	.000	.600	.600
HR-236/347-2S-14 0A	1449211	3000-6800	236	240	291	295	114	.000	.000	.590	.590
HR-236/353-2S-12	1449611	3000-6800	236	240	298	302	112	.000	.000	.600	.600
HR-236/347-2S1-15	1449221	2800-6800	236	244	291	299	115	.000	.000	.590	.590
HR-236/353-2-10 0A	1449231	3200-6800	236	246	298	308	110	.000	.000	.600	.600
HR-240/353-2SR-14	1449241	3300-7000	240	236	302	298	114	.000	.000	.600	.600
HR-240/353-2S-14 4A	1449251	3000-7000	240	246	302	308	114	.000	.000	.600	.600
HR-246/367-2-14	1449261	3200-7200	246	256	303	313	114	.000	.000	.624	.624
lechanical Roller Ca	ımshafts										
R-240/3821-2S-10	1448051	3500-7500	240	244	269	273	110	.020	.022	.649	.649
R-242/353-2S-14	1448011	3300-7500	242	248	273	279	114	.020	.022	.600	.600
R-244/382-2S-10	1448061	3600-7600	244	248	273	277	110	.020	.022	.649	.649
R-248/353-2S-10 0A	1448021	3600-7600	248	260	279	292	110	.020	.022	.600	.600
R-262/395-2S-8	1448031	3800-7800	262	268	296	302	108	.020	.022	.671	.671
R-276/420-2-14	1448041	4600-8800	276	286	308	318	114	.020	.020	.714	.714
		Ch	evrolet	V-8 06-	-13 - 7.0	OL LS7					
lydraulic Roller Can	rshafts										
HR-220/3333-2S1-14 4A	2039271	2100-6400	220	238	281	299	114	.000	.000	.600	.600
HR-224/347-2S2-12 4A	2039281	2600-6800	224	244	280	299	112	.000	.000	.625	.625
HR-224/347-2S2-15 4A	2039291	2300-6800	224	244	280	299	115	.000	.000	.625	.625
HR-228/367-2S1-12 4A	2039341	2800-7000	228	246	285	303	112	.000	.000	.661	.661
	Chevrolet	V-8 07-13 6.2	L LS3/L	92/Vort	tec 6.2 ı	with thre	e bolt t	imina	aear		
lydraulic Roller Can								9	-, 		
HR-216/347-2S-13 4A	2019371	2000-6000	216	232	272	289	113	.000	.000	.590	.624
HR-220/347-2S-13 4A	2019381	2200-6400	220	236	276	293	113	.000	.000	.590	.624
HR-226/367-2S1-14	2019391	2600-6000	226	240	283	240	114	.000	.000	.624	.624

Grind Number	Part Number	RPM Power Range	Duration	@ .050" Exh.	Advertis Int.	ed Duration Exh.	Lobe Sep.	Valve La Int.	sh Exh.	Gross Va Int.	lve Lift Exh.
		Chevrol	let V-8 58-6	i 5 - 348- 4	109-427 (Z-	11) cu.in.					
Hydraulic Lifter Cams											
H-200/2717-2-10	150061	800-4400	200	210	264	274	110	.000	.000	.475	.502
H-218/300-25-12 H-224/3090-2-12	150291 150301	1800-5400 2200-6000	218 224	230 234	288 294	300 304	112 112	.000	.000	.525 .541	.543 .569
H-230/3101-2S-14	150301	2800-6400	230	234	292	296	114	.000	.000	.543	.551
H-236/325-2-10	150171	3000-6600	236	246	296	306	110	.000	.000	.569	.588
Hydraulic Roller Cam		etrofit									
HR-218/332-2S-10	159511	1600-5600	218	226	280	288	110	.000	.000	.581	.604
HR-224/319-25-10	159521	2000-6000	224	230	280	286	110	.000	.000	.558	.574
HR-230/352-2S-12	159531	2600-6600	230	234	292	296	112	.000	.000	.616	.628
Mechanical Lifter Car											
F-228/3067-2-10	150811	2500-5800	228	238	268	278	110	.022	.022	.537	.560
3796077 3830690	150421 150431	3000-6200 3200-6500	234 237	234 241	280 274	280 281	116.5 113.5	.018 .022	.022 .030	.434 .504	.434 .515
3837735	150431	3800-7200	257	250	274	296	113.5	.022	.030	.555	.555
F-256/3412-2-10	151341	3800-7200	256	266	292	302	110.5	.026	.026	.597	.617
Mechanical Roller Ca		3000 . 200								,	
SR-236/350-2S-12	158511	2600-5800	236	244	286	294	112	.020	.020	.613	.634
SR-244/362-2S-10	158171	3000-6200	244	252	294	302	110	.020	.020	.634	.655
SR-252/374-2S-12	158711	3400-6800	252	260	302	310	112	.020	.020	.655	.655
		Chevro	let V-8 67-	95 - 396-	402-427-4	54 cu.in.					
Hydraulic Lifter Cams											
H-248-2	133971	600-4200	192	204	248	260	110	.000	.000	.453	.484
2020 260 H10	134112 10303	800-4400 1000-4500	202 204	210 204	262 260	270 260	110 110	.000	.000	.468 .484	.485 .484
260 H10	10303	1000-4500	204	204	260	260	110	.000	.000	.484	.484
H-260-2	133901	1000-4800	204	216	260	272	112	.000	.000	.484	.515
H-260-2	133902	1000-4800	204	216	260	272	112	.000	.000	.484	.515
266 H10	10304	1200-4800	210	210	266	266	110	.000	.000	.499	.499
266 H10	103042	1200-4800	210	210	266	266	110	.000	.000	.499	.499
2030	133931	1200-5000	210	218	266	274	114	.000	.000	.485	.502
2030 3883986	134122 969391	1200-5000 1200-4600	210 214	218 218	266	274	114 115	.000	.000	.485 .461	.502 .480
272 H10	10305	1400-5000	214	216	272	272	110	.000	.000	.515	.515
272 H10	103052	1400-5000	216	216	272	272	110	.000	.000	.515	.515
H-272-2	133941	1600-5400	216	228	272	284	112	.000	.000	.515	.510
H-272-2	133942	1600-5400	216	228	272	284	112	.000	.000	.515	.510
H-222/3114-251-8	130201	1800-5600	222	234	278	290	108	.000	.000	.529	.525
H-278-2	133801	2000-5800	222	234	278	290	114	.000	.000	.529	.525
H-278-2 282 H08	133802 10307	2000-5800 2200-5600	222 226	234 226	278 282	290 282	114 108	.000	.000	.529 .533	.525 .533
282 H08	10307	2200-5600	226	226	282	282	108	.000	.000	.533	.533
282 H08	133072	2200-5600	226	226	282	282	108	.000	.000	.533	.533
H-286-2	134241	2400-6200	226	236	286	296	112	.000	.000	.534	.553
H-286-2	134242	2400-6200	226	236	286	296	112	.000	.000	.534	.553
284 H12	10306	2800-6200	228	228	284	284	112	.000	.000	.544	.544
H-228/312-2S-14 T1.2 H-230/318-2-10	132561 130211	2800-6600	228 230	236 240	298 290	306 300	114	.000	.000	.530	.551
H-236/325-2-10	134551	3000-6600 3000-6600	236	246	296	306	110 110	.000	.000	.541 .553	.559 .571
H-236/325-2-10	134552	3000-6600	236	246	296	306	110	.000	.000	.553	.571
H-296-2	134561	3000-6800	236	246	296	306	114	.000	.000	.553	.571
294-304 H14	10313	3200-6800	238	248	294	304	114	.000	.000	.569	.595
H-240/329-2S-12	130221	3000-6800	240	246	300	306	112	.000	.000	.559	.571
H-242/322-2-14	130231	3200-7000	242	252	322	332	114	.000	.000	.547	.566
328 H08 328 H08	133101 133102	3400-6800 3400-6800	246 246	246 246	328 328	328 328	108 108	.000	.000	.567 .567	.567 .567
H-306-2	134571	3400-0000	246	254	306	314	112	.000	.000	.571	.585
H-248/3500-2S-14	130241	3600-7000	248	256	304	312	114	.000	.000	.595	.595
H-254/344-2S-14	130721	3800-7200	254	262	314	322	114	.000	.000	.585	.600
H-262/353-2S-14	130731	4000-7200	262	270	322	330	114	.000	.000	.600	.615

Section Continued



Grind Number	Part Number	RPM Power Range	Duration@ Int.	Exh.	Int.	sed Duration Exh.	Lobe Sep.	Valve La Int.	sh Exh.	Gross Va Int.	lve Lift Exh.
Hydraulic Roller Cams	shafts — Ra		let V-8 67-9)5 - 396-4	02-427-4	54 cu.in.					
HR-204/286-2-12 IG	139601	800-4600	204	214	260	270	112	.000	.000	.486	.512
ZHR-276-2S-10 IG	139001	1200-5000	214	222	276	284	110	.000	.000	.553	.576
HR-214/325-2S-12 IG	139351	1200-5200	214	222	276	284	112	.000	.000	.553	.576
HR-218/3001-2S-14 IG	139611	1400-5200	218	224	278	284	114	.000	.000	.510	.510
HR-222/339-25-10 IG ZHR-288-25-12 IG	139761 139011	1600-5400 1800-5600	222 226	230 234	284 288	292 296	110 112	.000	.000	.576 .587	.598 .610
HR-230/352-2S1-14 IG	139771	2000-5800	230	236	292	298	114	.000	.000	.598	.610
ZHR-296-2S-12 IG	139021	2200-6000	234	242	296	304	112	.000	.000	.610	.632
HR-236/359-2S-14 IG	139671	2200-6000	236	244	298	306	114	.000	.000	.610	.632
HR-240/365-2S-12 IG	139681	2600-6200	240	248	302	310	112	.000	.000	.621	.632
HR-244/372-25-10 IG	139781	2800-6200	244	256	306	318	110	.000	.000	.632	.632
HR-306-2S-14 IG HR-246/400-2S-14 IG	139651 139791	3000-6400 3200-6400	244 246	256 254	306 316	318 324	114 114	.000	.000	.632 .680	.632 .680
HR-248/372-2S-10 IG	139801	3000-6400	248	256	310	318	110	.000	.000	.632	.632
HR-248/372-25-14 IG	139691	3200-6400	248	256	310	318	114	.000	.000	.632	.632
HR-250/400-2S1-14 IG	139811	3200-6400	250	258	320	328	114	.000	.000	.680	.680
HR-254/400-2S-14 IG	139701	3400-6600	254	262	324	332	114	.000	.000	.680	.680
HR-256/372-2S-10 IG	139821	3400-6600	256	264	318	326	110	.000	.000	.632	.632
HR-318-2S-14 IG HR-258/4001-2S-14 IG	139661 139831	3600-6600	256 258	264 266	318 328	326 336	114 114	.000	.000	.632 .680	.632 .680
HR-258/4001-25-14 IG HR-262/400-252-14 IG	139831	3600-6600 3800-6600	258	266	328	336	114	.000	.000	.680	.680
HR-262/400-251-14 IG	139711	3800-6600	262	270	332	340	114	.000	.000	.680	.680
HR-264/420-2S-15 IG	139861	4000-6800	264	272	328	336	115	.000	.000	.714	.714
HR-270/400-2S-14 IG	139851	4400-6800	270	282	340	347	114	.000	.000	.680	.680
Mechanical Lifter Can											
F-238/3200-2-8	131101	2600-6200	238	248	300	310	108	.022	.022	.544	.566
F-304-2	133841	2800-6600	238	248	304	314	114	.022	.022	.544	.567
3863143 F-244/3454-2S-8	969961 131111	3000-6400 3200-6600	242 244	242 252	280	288	114 108	.024 .026	.028 .026	.520 .587	.520 .608
F-244/3454-2S-14	131121	3400-6800	244	252	280	288	114	.026	.026	.587	.608
F-314-2	134781	3400-7000	248	258	314	324	110	.022	.022	.567	.590
F-314-2	134782	3400-7000	248	258	314	324	110	.022	.022	.567	.590
F-252/3574-2S-8	131131	3600-7000	252	260	288	296	108	.026	.026	.608	.628
F-252/3574-2S-14 F-326-2	131271 134261	3600-7200 3800-7400	252 252	260 262	288 326	296 336	114 110	.026 .022	.026 .024	.608 .554	.628 .554
F-256/3634-2S-8	131311	4000-7400	256	264	292	300	108	.022	.024	.618	.638
F-290-2	134691	4000-7500	256	266	290	300	110	.026	.026	.580	.600
F-290-2	134692	4000-7500	256	266	290	300	110	.026	.026	.580	.600
F-260/3694-2S-8	131441	4200-7600	260	268	296	304	108	.026	.026	.628	.648
F-260/3694-2S-14	131281	4200-7800	260	268	296	304	114	.026	.026	.628	.648
3959180 3925535	131141 968561	4400-7200 4400-7200	262 264	272 269			110 112	.024 .024	.026 .026	.575 .560	.615 .580
F-310-2	134761	4400-7200	266	276	310	320	110	.024	.026	.600	.620
F-310-2	134762	4400-7800	266	276	310	320	110	.026	.026	.600	.620
F-266/3528-2-14	131151	4400-8000	266	276	302	312	114	.026	.026	.600	.620
F-268/3814-25-8	131541	4600-7800	268	276	304	312	108	.026	.026	.648	.669
F-270/3867-2S-10 F-316-2	131161 134771	4600-8000 4800-8000	270 272	276 280	300 316	312 324	110 110	.012 .026	.026 .026	.657 .659	.620 .679
F-272/3874-2S-14	131291	4600-8200	272	280	308	316	114	.026	.026	.659	.679
F-276/3934-2S-8	131641	4800-8200	276	284	312	320	108	.026	.026	.669	.689
F-276/3934-2S-8 SF0	131171	4800-8200	276	284	312	320	108	.026	.026	.669	.689
F-280/3994-2S-10	131761	5000-8400	280	288	316	324	110	.026	.026	.679	.699
F-280/3994-25-14 Mechanical Roller Car	131181 mshafts	5200-8400	280	288	316	324	114	.026	.026	.679	.699
SR-238/350-2S-12 IG	138551	2800-6600	238	246	288	296	112	.020	.020	.595	.615
SR-246/362-2S-10 IG	138601	3000-6800	236	254	200	304	110	.020	.020	.615	.636
SR-246/362-2S-14 IG	138781	3200-6800	246	254	296	304	114	.020	.020	.615	.636
R-246/420-2-14 IG	138141	3200-7000	246	256	278	288	114	.020	.020	.714	.714
R-250/420-2S-10	138871	3200-7000	250	258	282	290	110	.020	.020	.714	.714
SR-254/374-2S-12 IG	138631	3400-7200	254	262	304	312	112	.020	.020	.636	.636
R-254/420-2S1-12 IG SR-254/374-2S-14 IG	138101 138791	3600-7200 3600-7200	254 254	262 262	286 304	294 312	112 114	.020 .020	.020 .020	.714 .636	.714 .636
		3800-7200	254	264	286	296	110	.020	.020	.030	.030
IR-254/420-2-10	130001										
R-254/420-2-10 R-258/420-2S1-14 IG	138881 138681	4000-7200	258	262	290	294	114	.020	.020	.714	.714

Section Continued



Grind Number	Part Number	RPM Power Range	Duration	n@ .050" Exh.	Adverti:	sed Duration Exh.	Lobe Sep.	Valve Las Int.	h Exh.	Gross Va Int.	lve Lift Exh.
dilla Nallibei	Tarthamber				402-427-4		соос эср.	iiic.	LAII.	III.	LAII.
Mechanical Roller Car	nshafts	Chevic	net v-6 07	-90 - 390-	402-427-4	574 CU.III.					
SR-262/374-2S1-14 IG	138641	4200-7400	262	270	312	320	114	.020	.020	.636	.636
R-262/420-251-14 IG	138131	4200-7600	262	270	294	302	114	.020	.020	.714	.714
R-262/420-2-6	138801	4200-7200	262	272	294	304	106	.020	.020	.714	.714
R-262/420-2-10	138811	4200-7400	262	272	294	304	110	.020	.020	.714	.714
R-268/420-25-8	138831	4400-7600	268	272	300	304	108	.020	.020	.714	.714
R-268/420-2S-8 SF0	138671	4400-7600	268	272	300	304	108	.020	.020	.714	.714
R-270/420-252-14	138661	4400-7800	270	278	302	310	114	.020	.020	.714	.714
R-272/420-251-10 R-274/4334-25-10	138841 138291	4400-7800 4600-8000	272 274	278 284	304 314	310 324	110 110	.020 .026	.020 .026	.714 .737	.714 .726
R-274/4334-25-10 SF0	138301	4600-8000	274	284	314	324	110	.026	.026	.737	.726
R-274/4334-25-14	138351	4600-8200	274	284	314	324	114	.026	.026	.737	.726
R-274/4334-2S-14 SFO	138361	4600-8200	274	284	314	324	114	.026	.026	.737	.726
R-274/5002-2S-14 SF0	138931	4600-8600	274	300	304	331	114	.020	.016	.850	.818
R-276/420-2S1-14	138451	4600-8200	276	280	308	312	114	.020	.020	.714	.714
R-276/420-251-14 IG	138461	4600-8200	276	280	308	312	114	.020	.020	.714	.714
R-278/420-25-10	138851	4600-8000	278	282	310	314	110	.020	.020	.714	.714
R-278/420-2-14 IG	138471	4600-8200	278	288	310	320	114	.020	.020	.714	.714
R-282/420-2-12 R-282/490-252-13 SF0	138861 138941	4800-8200 4800-8600	282 282	292 304	314 318	324 339	112 113	.020 .026	.020 .022	.714 .833	.714 .772
R-282/5002-2S-10 SF0	138711	5000-8200	282	286	318	339	110	.020	.022	.833 .875	.800
R-284/456-2S1-10	138591	4800-8200	284	292	324	332	110	.026	.026	.875 .775	.723
R-284/456-251-10 SFO	138701	4800-8200	284	292	324	332	110	.026	.026	.775	.723
R-284/456-2S5-14	138391	5000-8400	284	296	324	336	114	.026	.026	.775	.740
R-284/456-255-14 SFO	138401	5000-8400	284	296	324	336	114	.026	.026	.775	.740
R-286/490-2S1-14 SF0	138771	5000-8000	286	306	326	352	114	.026	.030	.833	.810
R-286/500-2S3-16 SF0	138951	5000-7600	286	298	326	348	116	.026	.030	.850	.816
R-286/5151-2S-16 SF0	138961	6000-8400	286	310	320	344	116	.024	.026	.876	.794
321-334-10R	19315	5000-8200	287	292	321	334	110	.030	.030	.723	.714
333-344-14R R-288/5002-252-12 SF0	19333 138971	5000-8400 5000-8400	287 288	297 300	333 318	344 332	114 112	.035 .020	.030 .022	.774 .850	.726 .850
R-288/515-2S2-16 SF0	138911	5000-8400	288	312	322	352	116	.020	.022	.876	.800
R-288/515-253-18 SF0	138921	5200-8400	288	316	318	348	118	.024	.022	.876	.850
R-292/5152-2S-17 SFO 55J	138981	5800-8600	292	310	322	342	117	.020	.022	.876	.850
		Chevrolet V	-8 96-00 -	454 (7.4L)	-502 (8.21	.) cu.in. Gen	VI				
Hydraulic Roller Cams	shafts	4.107.0100		10 1 (2012)	702 (8022	,					
HR-204/286-2-12 IG	168711	800-5000	204	214	260	270	112	.000	.000	.486	.512
HR-214/325-2S-12 IG	168721	1200-5000	214	220	276	282	112	.000	.000	.553	.564
HR-222/339-2S-12 IG	168781	1400-5400	222	230	284	292	112	.000	.000	.576	.598
HR-226/345-2S-12 IG	168731	1600-5600	226	236	288	298	112	.000	.000	.587	.610
HR-226/345-2S-14 IG	168791	1800-5800	226	236	288	298	114	.000	.000	.587	.610
HR-230/352-2S-12 IG HR-236/359-2S-10 IG	168761 168801	2000-5800 2200-5800	230 236	236 244	292 298	298 306	112 110	.000	.000	.598 .610	.610 .632
HR-236/359-2S-12 IG	168741	2200-3600	236	244	298	306	112	.000	.000	.610	.632
HR-240/365-2S-14 IG	168771	2600-6200	240	248	302	310	114	.000	.000	.621	.632
HR-242/372-2S-12 IG	168811	2800-6200	242	246	304	308	112	.000	.000	.632	.632
HR-244/372-2S2-14 IG	169651	3000-6400	244	256	306	318	114	.000	.000	.632	.632
HR-248/372-2S-14 IG	169691	3200-6400	248	256	310	318	114	.000	.000	.632	.632
HR-254/400-252-10 IG	168831	3400-6600	254	262	324	332	110	.000	.000	.680	.680
HR-254/400-254-14 IG	168841	3600-6800	254	262	324	332	114	.000	.000	.680	.680
HR-262/400-2S-14 IG HR-262/400-2S1-14 IG	168851 169711	3800-6800 3800-7000	262 262	264 270	332 332	326 340	114 114	.000	.000	.680 .680	.632 .680
Mechanical Roller Car		3000-7000	202	210	عدد	J + U	114	.000	.000	.000	.000
SR-238/350-25-12 IG	168551	2800-6600	238	246	288	296	112	.020	.020	.595	.615
SR-246/362-2S-10 IG	168601	3000-6800	246	254	296	304	110	.020	.020	.615	.636
SR-254/374-2S-12 IG	168631	3400-7200	254	262	304	312	112	.020	.020	.636	.636
R-254/420-2S-12 IG	168401	3600-7200	254	262	286	294	112	.020	.020	.714	.714
R-264/420-2S-10 IG	168411	4200-7400	264	270	296	302	110	.020	.020	.714	.714
R-274/4334-2S-10 IG	168291	4600-8000	274	284	314	324	110	.026	.026	.737	.726
R-274/4334-2S-14 IG	168351	4800-8200	274	284	314	324	114	.026	.026	.737	.726



c: 19 1	D (N)	DD14D D		n@ .050"	_	sed Duration		Valve La		Gross Va	
Grind Number	Part Number	RPM Power Range	Int.	Exh.	Int.	Exh.	Lobe Sep.	Int.	Exh.	Int.	Exh.
Hydraulic Pollor Cam	chafte	Chevrole	et V-8 01-0	08 - 8.1 Liti	re L18 (Vo	rtec 8100)					
Hydraulic Roller Cam HR-208/292-25-16 IG	268701	800-4600	208	214	264	270	116	.000	.000	.496	.512
HR-216/325-2S-14 IG	268711	1200-5000	214	220	276	241	114	.000	.000	.553	.564
HR-222/339-2S-12 IG	268721	1400-5400	222	230	284	292	112	.000	.000	.576	.598
HR-226/345-2S-14 IG	268731	1600-5600	226	234	288	296	114	.000	.000	.587	.610
HR-230/352-2S-14 IG	268761	1800-5800	230	236	292	298	114	.000	.000	.598	.610
HR-236/359-2S1-14 IG	268741	2200-6000	236	244	298	306	114	.000	.000	.610	.632
HR-240/365-2S-12 IG	268771	2600-6200	240	248	302	310	112	.000	.000	.621	.632
			odge Neol	n 4 cyl. 95-	05 - SOHC	4-V 2.0 Litre	?				
Hydraulic Roller Follo			100	200	242	250	100	000	000	225	215
CHR-250-25R-8	158-0010 158-0012	1000-6500 1500-6800	196 204	200 200	242 250	250 250	106 108	.000	.000	.335 .355	.315 .315
CHR-262-2SR-8	158-0014	2500-7500	216	212	262	262	108	.000	.000	.355	.345
CHR-272-2S-14	158-0016	3000-7800	226	226	272	282	114	.000	.000	.355	.345
CHR-232/400-2SR-10	158-0018	3200-8000	232	230	280	285	110	.000	.000	.400	.400
CHR-236/440-2SR-12	158-0020	3500-8500	236	230	280	285	112	.000	.000	.440	.400
		Chrysler/Dodge Ne	on, PT Cru	iser 4 cyl.	95-10 - DC	OHC 4-V 2.0 -	2.4 Litre				
Hydraulic Roller Follo	wer Camsh	afts		,							
CHR-242-6	180-0010	1000-6500	200	200	242	242	106	.000	.000	.354	.354
CHR-242-10	193-0010	1000-6500	200	200	242	242	110	.000	.000	.354	.354
CHR-246-25R-6	180-0014	1500-6800	204	196	246	238	106	.000	.000	.364	.345
CHR-246-2SR-10 CHR-246-8	193-0014	1500-6800 1500-6800	204 204	196 204	246 246	238 246	110 108	.000	.000	.364 .364	.364 .364
CHR-246-12	180-0012 193-0012	1500-6800	204	204	246	246	112	.000	.000	.364	.364
CHR-250-2SR-6	180-0015	2200-7500	208	204	250	246	106	.000	.000	.374	.364
CHR-250-2SR-6	193-0015	2200-7500	208	204	250	246	106	.000	.000	.374	.364
CHR-250-6	180-0016	2000-7200	208	208	250	250	106	.000	.000	.374	.374
CHR-250-10	193-0016	2000-7200	208	208	250	250	110	.000	.000	.374	.374
CHR-258-8	180-0018	2500-7500	216	216	258	258	108	.000	.000	.394	.394
CHR-258-12	193-0018	2500-7500	216	216	258	258	112	.000	.000	.394	.394
CHR-266-10 CHR-266-10	180-0020 193-0020	2800-7800 2800-7800	224 224	224 224	266 266	266 266	110 110	.000	.000	.413 .413	.413 .413
CHR-274-10	180-0022	3200-8000	232	232	274	274	110	.000	.000	.433	.433
CHR-274-10	193-0022	3200-8000	232	232	274	274	110	.000	.000	.433	.433
CHR-282-6	180-0024	3600-8200	240	240	282	282	106	.000	.000	.453	.453
CHR-282-6	193-0024	3600-8200	240	240	282	282	106	.000	.000	.453	.453
CHR-290-6	180-0026	4000-8600	248	248	290	290	106	.000	.000	.472	.472
CHR-290-6	193-0026	4000-8600	248	248	290	290	106	.000	.000	.472	.472
CHR-296-6 CHR-296-6	180-0028 193-0028	4400-8800 4400-8800	256 256	256 256	296 296	296 296	106 106	.000	.000	.492 .492	.492 .492
CIII-270-0	173-0020			8 51-56 - 3			100	.000	.000	. 772	.772
Hydraulic Roller Cam	shafts—Rei		i iiciiii v	0 3 1 30 3	01 221 3	77 Cu. III.					
HR-224/339-10	539521	2000-6000	224	224	286	286	110	.000	.000	.509	.509
HR-230/352-2-14	539531	2600-6600	230	240	292	302	114	.000	.000	.528	.548
HR-240/365-2S-8	539541	3200-6800	240	248	302	310	108	.000	.000	.548	.558
Mechanical Roller Ca											
SR-230/338-8	538491	2200-6200	230	230	280	280	108	.020	.020	.507	.507
SR-230/338-2S-10	538501	2200-6200	230	238	280	288	110	.020	.020	.507	.525
SR-238/350-2S-12 SR-246/362-12	538511 538521	2800-6600 3200-7000	238 246	246 246	288 296	296 296	112 112	.020 .020	.020 .020	.525 .543	.543 .543
R-278/458-10	538701	6000-8600	278	278	310	310	110	.020	.020	.687	.545
R-284/456-10	538661	6000-9900	284	284	324	324	110	.026	.026	.684	.684
R-285/410-8	538711		285	285	328	328	108	.026	.028	.615	.615
			rysler Hen	ni V-8 57 -	58 - 392 c	u.in.					
Hydraulic Roller Cam											
HR-224/339-10	549521	2000-6000	224	224	286	286	110	.000	.000	.509	.509
HR-230/352-2-14	549531	2600-6600	230	240	292	302	114	.000	.000	.528	.548
HR-240/365-2S-8	549541	3200-6800	240	248	302	310	108	.000	.000	.548	.558
Mechanical Roller Car		2200 (200	220	220	200	200	100	020	020	F07	F07
SR-230/338-8 SR-230/338-2S-10	548491 548S01	2200-6200 2200-6200	230 230	230 238	280 280	280 288	108 110	.020	.020	.507 .507	.507 .525
SR-238/3S0-2S-12	548511	2800-6600	238	238	288	288	112	.020	.020 .020	.525	.543
SR-246/362-12	548521	3200-7000	246	246	296	296	112	.020	.020	.543	.543
R-278/458-10	548701	6000-8600	278	278	310	310	110	.020	.022	.687	.687
R-284/4S6-10	548661	6000-9900	284	284	324	324	110	.026	.026	.684	.684
R-285/410-8	548711		285	285	328	328	108	.026	.028	.615	.615

			Duration	-		sed Duration		Valve La		Gross Va	
Grind Number	Part Number	RPM Power Range	Int.	Exh.	Int.	Exh.	Lobe Sep.	Int.	Exh.	Int.	Exh.
Chrysle	r-Dodge-Ply	ymouth "LA" <mark>V</mark>	/-8 64-8	7 - 273	-340-3	60 (5.9L)	and 67	7-86 31	8 (5.2L)	cu.in	
Hydraulic Lifter Can						,					
H-248-2	693971	800-4200	192	204	248	260	112	.000	.000	.400	.427
H-260-2	693901	1200-4800	204	216	260	272	112	.000	.000	.427	.454
H-260-2	693902	1200-4800	204	216	260	272	112	.000	.000	.427	.454
Z-268-2	693511	1200-5000	212	220	268	276	112	.000	.000	.459	.480
Z-268-2	693512	1200-5000	212	220	268	276	112	.000	.000	.459	.480
272 H10 272 H10	15005 150052	1800-5200 1800-5200	216 216	216 216	272 272	272 272	110 110	.000	.000	.454 .454	.454 .454
H-272-2	693941	1800-5400	216	228	272	272	112	.000	.000	.454	.434
H-272-2	693942	1800-5400	216	228	272	284	112	.000	.000	.454	.480
Z-276-2	693521	1800-5600	220	228	276	284	110	.000	.000	.480	.501
Z-276-2	693522	1800-5600	220	228	276	284	110	.000	.000	.480	.501
H-222/3200-6	690141	2200-5600	222	222	294	294	106	.000	.000	.480	.480
H-278-2	693801	2200-5800	222	234	278	290	114	.000	.000	.467	.494
H-278-2	693802	2200-5800	222	234	278	290	114	.000	.000	.467	.494
H-288-2	694301	2600-6000	226	230	288	292	110	.000	.000	.458	.465
H-288-2	694302	2600-6000	226	230	288	292	110	.000	.000	.458	.465
284 H12	15006	3000-6200	228	228	284	284	112	.000	.000	.480	.480
284 H12	150062	3000-6200	228	228	284	284	112	.000	.000	.480	.480
H-228/3200-25-8	690591	3000-6200	228	234	284	290	108	.000	.000	.480	.494
H-232/3360-6 H-302-2	690221 694561	3200-6400 3200-6800	232 232	232 242	304 302	304 312	106 114	.000	.000	.504 .504	.504 .528
H-312-2	694571	3600-7000	242	252	312	322	108	.000	.000	.528	.552
H-244/3439-6	690711	3800-7000	244	244	300	300	106	.000	.000	.516	.516
H-252/3680-2-10	690241	4400-7200	252	262	324	334	110	.000	.000	.552	.576
Hydraulic Roller Can											10.0
HR-204/286-2-12 IG	699601	800-4800	204	214	260	270	112	.000	.000	.429	.452
HR-214/325-2S-12 IG	699611	1400-5400	214	222	276	284	112	.000	.000	.488	.509
HR-222/339-2S-12 IG	699621	2000-6000	222	230	284	292	112	.000	.000	.509	.528
HR-226/345-251-10 IG	699651	2000-6000	226	230	288	292	110	.000	.000	.518	.528
HR-230/352-2S-12 IG	699631	2600-6600	230	238	292	300	112	.000	.000	.528	.548
HR-238/365-2S-8 IG	699661	2800-6800	238	246	300	308	108	.000	.000	.548	.558
HR-238/365-2S-14 IG	699641	3000-7000	238	246	300	308	114	.000	.000	.548	.558
HR-242/372-2-8 IG	699671	3200-7000	242	252	304	314	108	.000	.000	.558	.558
HR-246/372-2S-8 IG	699681	3400-7000	246	254	308	316	108	.000	.000	.558	.558
HR-252/372-2S-10 IG	699691	4000-7200	252	262	314	324	110	.000	.000	.558	.558
Mechanical Lifter Ca											
F-238/3200-2-14	691191	2600-6400	238	248	300	310	114	.022	.022	.480	.500
F-244/3454-2S-6	690921	3200-6800	244	252	280	288	106	.026	.026	.518	.536
F-248/3602-2-8 F-256/383-25-8	690911 690931	3200-7000 3600-7400	248 256	258 260	284 312	294 316	108 108	.026 .014	.026 .016	.540 .575	.560 .585
F-258/3735-2-8	691381	3600-7200	258	268	294	304	108	.026	.026	.560	.580
F-262/394-2S-10	691391	3800-7200	262	264	294	296	110	.020	.020	.591	.596
F-268/3868-2-8	691561	4000-7600	268	278	304	314	108	.026	.026	.580	.600
F-274/412-2S-8	691571	4200-8000	274	288	306	324	108	.018	.026	.618	.620
F-278/4002-8	691701	4400-8000	278	278	314	314	108	.026	.026	.600	.600
F-288/4134-8	691951	5000-8400	288	288	324	324	108	.026	.026	.620	.620
Mechanical Roller Co	amshafts										
SR-238/350-2S-12 IG	698521	2800-6600	238	246	288	296	112	.020	.020	.525	.543
SR-246/362-2S-12 IG	698531	3200-7000	246	254	283	290	112	.020	.020	.543	.561
R-256/452-2S-10	698271	3800-7800	256	268	285	297	110	.020	.022	.746	.746
R-260/420-25-8	698801	3800-7600	260	266	292	298	108	.020	.020	.630	.630
R-268/420-251-8	698821	4000-7800	268	276	300	308	108	.020	.020	.630	.630
R-272/420-2-8	698831	4200-8000	272	282	304	314	108	.020	.020	.630	.630
R-274/482-25-8 R-276/420-2-10	698281 698841	4200-8200 4400-8200	274 276	278 286	318 308	334 318	108 110	.016 .020	.030 .020	.723 .630	.735 .630
R-280/452-25-8	698291	5000-8600	280	288	309	317	108	.020	.020	.678	.678
R-284/4765-2S-8	698611	5200-9000	284	292	318	326	108	.020	.022	.715	.688
Chrysler-Dodge-	Plymouth '	<u> </u>	<u>- 86</u> -91	318 (5	5.2L) an	d 87-91 :	<u>360 (5.</u>	9L) cu.i	<u>n. (e</u> xce	<u>pt 9</u> 1 D	akota)
Hydraulic Roller Can	nshaft <u>s</u>			, ,	,		120	,	1	•	
2010	694101	800-4200	194	184	250	240	107	.000	.000	.407	.384
2020	694111	1000-4600	204	194	260	250	112	.000	.000	.429	.407
HR-204/286-2S-14	699701	1000-4800	204	208	260	250	114	.000	.000	.429	.438



Grind Number	Part Number	RPM Power Range	Duration Int.	@ .050" Exh.	Adverti Int.	sed Duratio Exh.	n Lobe Sep.	Valve I Int.	ash Exh.	Gross V Int.	alve Lift Exh.
	Chrv	sler-Dodge-P	lvmouth	Maai	num V-8	92-02	- 5.2-5.9	Litre			
Hydraulic Roller Ca											
2020	704111	800-4600	194	204	250	260	112	.000	.000	.434	.458
2030	704121	1200-5200	204	208	260	264	114	.000	.000	.458	.467
HR-208/292-2S1-10	708501	1600-5600	208	216	264	272	110	.000	.000	.467	.482
HR-214/325-2S-14	708511	1800-5800	214	220	276	282	114	.000	.000	.520	.531
HR-222/339-2S-14	708521	2200-6200	222	226	284	288	114	.000	.000	.542	.552
		Chrysler-Do	dge V-8	03-1	0 - 5.7 -	6.1 Litr	e Hemi				
Hydraulic Roller Ca	mshafts										
HR-208/297-25-16	1989491	1000-5000	208	214	268	274	116	.000	.000	.505	.505
HR-210/3236-2S-12	1989501	1200-5200	210	216	268	274	112	.000	.000	.550	.550
HR-216/3236-2S-12	1989511	1800-5800	216	222	274	280	112	.000	.000	.550	.550
HR-222/3236-2S-14	1989521	2200-6200	222	228	280	286	114	.000	.000	.550	.550

Chrysler-Dodge-Plymouth "B" V-8 58-78 - 350-361-383-400-413-426-440 cu.in. with Single Bolt Gear

Hydraulic Lifter Camshafts

We are now offering only the 68-prefix three bolt camshafts for the Chrysler-Dodge-Plymouth "B" V-8 family of engines, due their superior reliability. The three bolt camshafts can be used in engines originally equipped with single bolt camshafts if the appropriate three bolt timing chain and gear set is used.

Chrysler-Dodge-Plymouth "B" V-8 70-78 - 383-400-440 cu.in. with Three Bolt Gear

CIII y.	sici buug	e i iyiiidadii b	, , ,	70	JUJ TUU	770 Cu	·III. VVICI	IIIIEE	DUIL GE	ui	
lydraulic Lifter Cams	hafts										
H-260-2	683901	1200-4800	204	216	260	272	112	.000	.000	.427	.454
H-260-2	683902	1200-4800	204	216	260	272	112	.000	.000	.427	.454
2843564	680101	1400-5000	214	226	272	292	115	.000	.000	.447	.464
H-272-2	683941	1600-5400	216	228	272	284	112	.000	.000	.454	.480
H-272-2	683942	1600-5400	216	228	272	284	112	.000	.000	.454	.480
H-222/3114-2S-12	680321	2400-6000	222	234	278	290	112	.000	.000	.467	.494
H-278-2	683801	1800-5600	222	234	278	290	114	.000	.000	.467	.494
H-278-2	683802	1800-5600	222	234	278	290	114	.000	.000	.467	.494
H-286	684321	2200-6000	226	226	286	286	112	.000	.000	.471	.471
H-228/3200-2S-8	680591	2600-6400	228	234	284	290	108	.000	.000	.480	.494
H-302-2	684561	2800-6600	232	242	302	312	112	.000	.000	.504	.528
H-236/348-2S-12	680601	3000-6800	236	244	292	300	112	.000	.000	.522	.543
H-238/3347-6	680651	3000-6800	238	238	294	294	106	.000	.000	.502	.502
H-312-2	684571	3200-7000	242	252	312	322	112	.000	.000	.528	.552
H-242/3520-2-8	680701	3600-7200	242	252	314	324	108	.000	.000	.528	.552
H-244/362-2S-12	680711	3800-7200	244	252	300	308	112	.000	.000	.543	.564
H-248/369-2S-12	680721	4000-7200	248	256	304	312	112	.000	.000	.554	.575
H-252/3680-2-8	680761	4000-7200	252	262	324	334	108	.000	.000	.552	.576
lydraulic Roller Cams	shafts — F	Retrofit									
HR-204/286-2-12	689501	800-5200	204	214	260	270	112	.022	.022	.429	.452
HR-214/325-2S-12	689511	1400-5600	214	222	276	284	112	.000	.000	.488	.509
HR-222/339-2S-12	689521	1800-6000	222	230	284	292	112	.000	.000	.509	.528
HR-230/352-2S-12	689531	2200-6400	230	236	292	298	112	.000	.000	.528	.539
HR-234/359-2S-12	689551	2600-6600	234	242	296	304	112	.000	.000	.539	.558
HR-240/365-2S-10	689561	2800-6600	240	248	302	310	110	.000	.000	.548	.558
HR-240/365-2S-14	689541	3000-6800	240	248	302	310	114	.000	.000	.548	.558
HR-248/372-2S-14	689571	3200-7000	248	256	310	318	114	.000	.000	.558	.558
HR-254/400-2S-14	689701	3400-7000	254	262	324	332	114	.000	.000	.600	.600
<mark>lechanical Lifter Ca</mark> n	nshafts										
F-238/3467-2-12	681201	2800-6600	238	248	284	294	112	.028	.022	.520	.540
F-248/3334-2-12	681241	3200-7000	248	258	310	320	112	.022	.022	.500	.520
F-248/3600-2-8	680931	3400-7000	248	258	284	294	108	.028	.030	.540	.560
F-250/376-2S-12	680941	3600-7200	250	254	282	286	112	.020	.018	.564	.573
2402293	680201	3600-7200	256	256	304	304	112.5	.028	.032	.504	.504
F-258/3468-8	681321	4000-7400	258	258	320	320	108	.022	.022	.520	.520
F-268/3868-2-8	681561	4600-7800	268	278	304	314	108	.026	.026	.580	.600
F-274/3933-8	681681	4800-8000	274	274	314	314	108	.028	.028	.590	.590
F-278/4002-8	681701	5000-8200	278	278	314	314	108	.026	.026	.600	.600
F-280/430-10	681721	5000-8400	280	280	320	320	110	.018	.018	.645	.645
F-288/4134-6	681941	5200-8400	288	288	324	324	106	.026	.026	.620	.620

Section Continued



Grind Number	Part Number	RPM Power Range	Duratior Int.	n@ .050" Exh.	Advertis	sed Duration Exh.	Lobe Sep.	Valve Las	sh Exh.	Gross Va Int.	lve Lift Exh.
Chri	vsler-Doda	e-Plymouth "B	8″ V-8 7		383-400		<u> </u>			par	-
Mechanical Roller Ca		e rrymouth b		0 7 0 3	100	TTO CON	777	Timee	DOIL GO	.01	
SR-246/362-2S-12	688521	3200-7200	246	254	296	304	112	.020	.020	.543	.561
SR-254/374-2S-12	688531	3400-7200	254	258	304	308	112	.020	.020	.561	.561
R-260/420-2S-8	688801	3800-7600	260	268	292	300	108	.020	.020	.630	.630
R-268/420-2-8	688811	4000-7800	268	278	300	310	108	.020	.020	.630	.630
R-272/420-2-10	688821	4200-8000	272	282	304	314	110	.020	.020	.630	.630
R-274/454-2S-12	688651	4400-8200	274	278	306	310	112	.020	.022	.681	.693
R-276/420-2-10	688831	4400-8400	276	286	308	318	110	.020	.020	.630	.630
R-280/4468-8	688981	4600-8200	280	280	312	312	108	.028	.030	.670	.670
R-280/450-254-10	688681	4600-8400	280	288	320	328	114	.026	.026	.675	.638
R-282/420-2-10	688841	4800-8600	282	292	314	324	110	.020	.020	.630	.630
R-284/456-6 R-286/500-253-14	688561 688671	5000-8200 5000-8400	284 286	284 306	324 320	324 338	106 114	.026 .026	.026 .022	.684 .750	.684 .750
R-200/300-233-14	000071	3000-8400	200	300	320	330	114	.020	.022	./ 30	./30
		Chrysler-Do	dge-Ply	mouth	V-8 "He	emi 426"	66-71				
lydraulic Lifter Cam		1400 5333	242	255	20:	20.	445	06.5			
H-212/304-2-12	660091	1600-5200	212	222	284	294	112	.000	.000	.477	.486
H-232/3360-2-12	660611	2600-6000	232	242	304	314	112	.000	.000	.528	.535
H-236/348-2S-12	660621	2800-6200	236	244	292	300	112	.000	.000	.546	.550
H-244/362-25-14	660631	3200-6600	244	252	300	308	114	.000	.000	.568	.572
<i>lydraulic Roller Cam</i> HR-226/345-2S1-12			226	220	200	202	112	000	000	.542	F2F
NK-220/343-231-12	669521	2200-6200	226	230	288	292 302	112 112	.000	.000	.564	.535
	((0521	2000 0000						()()()	.000	.304	.555
HR-236/359-2S-12	669531	2600-6600	236	240	298						ECE
HR-236/359-2S-12 HR-244/372-2S-14	669541	3000-6800	244	248	306	310	114	.000	.000	.584	.565
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14											.565 .608 .608
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14	669541 669571 669561	3000-6800 3400-7000 3600-7000	244 254 262	248 258 266	306 324 332	310 328 336	114 114 114	.000 .000 .000	.000 .000 .000	.584 .628 .628	.608 .608
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ro Mechanical Lifter Ca	669541 669571 669561 Odeck TFX- mshafts	3000-6800 3400-7000 3600-7000 Chrysler-Dod 92. Brad Ande	244 254 262 Ige-Ply rson al	248 258 266 mouth uminun	306 324 332 V-8 "He n. Keith	310 328 336 mi 426" Black al	114 114 114 66-71	.000 .000 .000	.000 .000 .000	.584 .628 .628	.608 .608
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ro Mechanical Lifter Cal F-238/3200-2-12	669541 669571 669561 Odeck TFX-9 mshafts 661201	3000-6800 3400-7000 3600-7000 Chrysler-Dod 92. Brad Ande 2800-6400	244 254 262 Ige-Ply rson all	248 258 266 mouth yminun 248	306 324 332 V-8 "He n. Keith	310 328 336 mi 426" Black al	114 114 114 66-71 uminu	.000 .000 .000	.000 .000 .000	.584 .628 .628	.608 .608 nd JP-
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ro Mechanical Lifter Cal F-238/3200-2-12 F-248/3600-2-12	669541 669571 669561 Odeck TFX- mshafts	3000-6800 3400-7000 3600-7000 Chrysler-Dod 92. Brad Ande	244 254 262 Ige-Ply rson al	248 258 266 mouth uminun	306 324 332 V-8 "He n. Keith	310 328 336 mi 426" Black al	114 114 114 66-71	.000 .000 .000	.000 .000 .000	.584 .628 .628	.608 .608
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 Also: Johnson/Runchanical Lifter Cales F-238/3200-2-12 F-248/3600-2-12 F-260/391-2S-10	669541 669571 669561 Odeck TFX-4 mshafts 661201 660941 661381	3000-6800 3400-7000 3600-7000 Chrysler-Dod 92_Brad Ander 2800-6400 3600-7000	244 254 262 Ige-Ply rson all	248 258 266 mouth yminun 248 258	306 324 332 V-8 "He n. Keith 300 294	310 328 336 mi 426" Black al 310 304	114 114 114 114 66-71 uminu	.000 .000 .000 .000	.000 .000 .000 .000 .022 .030	.584 .628 .628 .628	.608 .608 nd JP- .507
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ronechanical Lifter Cales F-238/3200-2-12 F-248/3600-2-12 F-260/391-2S-10 Mechanical Roller Cales	669541 669571 669561 Odeck TFX-4 mshafts 661201 660941 661381	3000-6800 3400-7000 3600-7000 Chrysler-Dod 92_Brad Ander 2800-6400 3600-7000	244 254 262 Ige-Ply rson all	248 258 266 mouth yminun 248 258	306 324 332 V-8 "He n. Keith 300 294	310 328 336 mi 426" Black al 310 304	114 114 114 114 66-71 uminu	.000 .000 .000 .000	.000 .000 .000 .000 .022 .030	.584 .628 .628 .628	.608 .608 nd JP- .507
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ro Mechanical Lifter Ca	669541 669571 669561 Odeck TFX-5 mshafts 661201 660941 661381 umshafts	3000-6800 3400-7000 3600-7000 Chrysler-Dod 92. Brad Ander 2800-6400 3600-7000 4000-7200	244 254 262 Ige-Ply rson all 238 248 260	248 258 266 mouth iminum 248 258 264	306 324 332 V-8 "He n. Keith 300 294 292	310 328 336 mi 426" Black al 310 304 296	114 114 114 66-71 uminu 112 112 110	.000 .000 .000 .000 .000	.000 .000 .000 .000 .022 .030 .018	.584 .628 .628 .628 .502 .502 .565 .614	.608 .608 nd JP- .507 .568 .603
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ranchanical Lifter Canter Ca	669541 669571 669561 Odeck TFX-4 mshafts 661201 660941 661381 mshafts 668511	3000-6800 3400-7000 3600-7000 Chrysler-Doo 92. Brad Ander 2800-6400 3600-7000 4000-7200	244 254 262 Ige-Ply, rson all 238 248 260	248 258 266 mouth uminun 248 258 264	306 324 332 V-8 "He n. Keith 300 294 292	310 328 336 mi 426" Black al 310 304 296	114 114 114 114 66-71 uminu 112 112 110	.000 .000 .000 .000 .000 .022 .028 .018	.000 .000 .000 .000 .000 .022 .030 .018	.584 .628 .628 .628 .502 .565 .614	.608 .608 nd JP- .507 .568 .603
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ronechanical Lifter Canechanical Lifter Canechanical Lifter Canechanical Roller R	669541 669571 669561 Odeck TFX-4 mshafts 661201 660941 661381 mshafts 668511 668521	3000-6800 3400-7000 3600-7000 Chrysler-Doo 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7000 3200-7200	244 254 262 Ige-Ply, rson all 238 248 260 238 246	248 258 266 mouth uminun 248 258 264 246 254	306 324 332 V-8 "He n. Keith 300 294 292 288 296	310 328 336 mi 426" Black al. 310 304 296 296 304	114 114 114 114 116 66-71 112 112 110 112 112	.000 .000 .000 .000 .000 .022 .028 .018	.000 .000 .000 .000 .022 .030 .018	.584 .628 .628 .628 .502 .565 .614	.608 .608 .608 .608 .507 .568 .603
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ronechanical Lifter Caller C	669541 669571 669561 Odeck TFX-4 mshafts 661201 660941 661381 mshafts 668511 668521 668531	3000-6800 3400-7000 3600-7000 Chrysler-Doo 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7000 3200-7200 3600-7600	244 254 262 Ige-Ply rson ali 238 248 260 238 246 254 262 262	248 258 266 mouth uminum 248 258 264 246 254 262 266 276	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291	310 328 336 mi 426" Black al 310 304 296 296 304 312	114 114 114 114 116 66-71 112 112 110 112 112 112 112 112 112	.000 .000 .000 .000 .000 .022 .028 .018	.000 .000 .000 .000 .000 .022 .030 .018	.584 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710	.608 .608 .608 .507 .568 .603 .550 .568
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ronechanical Lifter Caller Call	669541 669571 669561 Odeck TFX-0 mshafts 661201 660941 661381 mshafts 668511 668521 668521 668531 668541 668301 668281	3000-6800 3400-7000 3600-7000 Chrysler-Doo 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7000 3200-7200 3600-7600 3800-7600 4000-7800 4400-8000	244 254 262 Ige-Ply rson ali 238 248 260 238 246 254 262 262 274	248 258 266 mouth uminum 248 258 264 246 254 262 266 276 274	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314	310 328 336 mi 426" Black al. 310 304 296 296 304 312 304 312 314	114 114 114 114 116 66-71 112 112 110 112 112 112 112 112 112 11	.000 .000 .000 .000 .000 .022 .028 .018 .020 .020 .020 .020 .020	.000 .000 .000 .000 .000 .022 .030 .018 .020 .020 .020 .020 .020 .026	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710	.608 .608 .608 .507 .568 .603 .550 .568 .608 .699
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ronechanical Lifter Caller Call	669541 669571 669561 Odeck TFX-6 mshafts 661201 660941 661381 umshafts 668511 668521 668531 668541 668301	3000-6800 3400-7000 3600-7000 Chrysler-Doo 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7200 3600-7600 3800-7600 4000-7800 4400-8000 4000-6800	244 254 262 Ige-Ply rson als 238 248 260 238 246 254 262 262 274 276	248 258 266 mouth uminum 248 258 264 246 254 262 266 276 274 282	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314 305	310 328 336 mi 426" Black al. 310 304 296 296 304 312 304 312 314 311	114 114 114 114 116 66-71 112 112 110 112 112 112 112 112 112 11	.000 .000 .000 .000 .000 .022 .028 .018 .020 .020 .020 .020 .020 .020	.000 .000 .000 .000 .000 .022 .030 .018 .020 .020 .020 .020 .026 .026	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710 .680 .848	.608 .608 .608 .507 .568 .603 .550 .568 .608 .699 .659
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 HR-262/400-2S-14 Also: Johnson/Roneller Caller C	669541 669571 669561 0deck TFX-1 mshafts 661201 660941 661381 1mshafts 668511 668521 668531 668541 668301 668281 668821 668351	3000-6800 3400-7000 3600-7000 Chrysler-Doo 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7200 3600-7600 3800-7600 4000-7800 4400-8000 4000-6800 5500-8500	244 254 262 Ige-Plys rson als 238 248 260 238 246 254 262 262 274 276 276	248 258 266 mouth minum 248 258 264 246 254 262 266 276 274 282 294	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314 305 306	310 328 336 mi 426" Black al. 310 304 296 296 304 312 304 312 314 311 324	114 114 114 114 116 66-71 112 112 110 112 112 112 112 112 112 11	.000 .000 .000 .000 .000 .022 .028 .018 .020 .020 .020 .020 .020 .020 .020	.000 .000 .000 .000 .000 .022 .030 .018 .020 .020 .020 .020 .026 .026 .022	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710 .680 .848	.608 .608 .608 .608 .507 .568 .603 .550 .568 .608 .609 .659 .821
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ronglet Caster Ca	669541 669571 669561 0deck TFX-4 mshafts 661201 660941 661381 mshafts 668511 668521 668541 668541 668281 668281 668351 668351 668351	3000-6800 3400-7000 3600-7000 Chrysler-Dood 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7000 3200-7200 3600-7600 3800-7600 4000-7800 4000-8800 5500-8500 4400-8400	244 254 262 Ige-Ply, rson all 238 248 260 238 246 254 262 262 274 276 276 284	248 258 266 mouth uminum 248 258 264 246 254 262 266 276 274 282 294 286	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314 305 306 320	310 328 336 mi 426" Black al. 310 304 296 296 304 312 304 312 314 311 324 324 324	114 114 114 114 114 116 112 112 110 112 112 112 112 112 112 113 113 113	.000 .000 .000 .000 .000 .020 .022 .028 .018 .020 .020 .020 .020 .020 .020 .020 .02	.000 .000 .000 .000 .000 .022 .030 .018 .020 .020 .020 .020 .026 .026 .022 .022	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710 .680 .848 .871 .785	.608 .608 .608 .608 .507 .568 .603 .550 .568 .608 .699 .659 .821 .798
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ridechanical Lifter Call F-238/3200-2-12 F-248/3600-2-12 F-260/391-2S-10 Mechanical Roller Call SR-238/350-2S-12 SR-266/362-2S-12 SR-262/400-2S-12 SR-262/452-2S-12 R-262/452-2S-12 R-276/5401-2S-13XBB 48D R-276/555-2S-13XBB 48D R-276/555-2S-13XBB 48D	669541 669571 669561 Odeck TFX-6 mshafts 661201 660941 661381 mshafts 668511 668521 668531 668541 668281 668281 668351 668951 668951	3000-6800 3400-7000 3600-7000 Chrysler-Dood 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7000 3200-7200 3600-7600 4000-7800 4000-7800 4000-6800 5500-8500 4400-8400 5000-8500	244 254 262 Ige-Ply, rson all 238 248 260 238 246 254 262 262 274 276 276 284 292	248 258 266 mouth uminum 248 258 264 254 262 266 276 274 282 294 286 292	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314 305 306 320 332	310 328 336 mi 426" Black al. 310 304 296 296 304 312 304 312 314 311 324 324 332	114 114 114 114 116 66-71 112 112 110 112 112 112 112 112 113 113 113 111 110	.000 .000 .000 .000 .000 .000 .022 .028 .018 .020 .020 .020 .020 .020 .020 .020 .02	.000 .000 .000 .000 .000 .022 .030 .018 .020 .020 .020 .020 .026 .026 .022 .030 .022	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710 .680 .848 .871 .785	.608 .608 .608 .608 .507 .568 .603 .550 .568 .608 .699 .659 .821 .798 .760
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ra Johnson/Johnson/Ra Johnson/Johnson/Ra Johnson/Johnso	669541 669571 669561 Odeck TFX-6 mshafts 661201 660941 661381 Imshafts 668511 668521 668541 668301 668281 668281 668351 668951 668311 668321	3000-6800 3400-7000 3600-7000 Chrysler-Doo 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7000 3200-7200 3600-7600 4000-7800 4000-7800 4000-6800 5500-8500 4400-8400 5000-8500 5500-9500	244 254 262 Ige-Ply, rson ali 238 248 260 238 246 254 262 262 274 276 276 276 284 292 292	248 258 266 mouth uminum 248 258 264 254 262 266 276 274 282 294 286 292 296	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314 305 306 320 332 332	310 328 336 mi 426" Black al 310 304 296 296 304 312 304 312 314 311 324 324 332 336	114 114 114 114 116 66-71 112 112 110 112 112 112 112 112 113 113 113 111 110 114	.000 .000 .000 .000 .000 .022 .028 .018 .020 .020 .020 .020 .020 .020 .020 .02	.000 .000 .000 .000 .000 .022 .030 .018 .020 .020 .020 .020 .026 .026 .022 .022	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710 .680 .848 .871 .785 .754	.608 .608 .608 .608 .507 .568 .603 .558 .608 .699 .659 .821 .798 .760 .730
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 HR-262/400-2S-14 Also: Johnson/Rifechanical Lifter Caller Call	669541 669571 669561 Odeck TFX-6 mshafts 661201 660941 661381 Imshafts 668511 668521 668541 668541 668281 668281 668351 668351 668351 668351 668351 668311 668321 668321	3000-6800 3400-7000 3600-7000 Chrysler-Doo 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7000 3200-7200 3600-7600 4000-7800 4000-7800 4000-8000 5500-8500 400-8400 5500-8500 5500-9500 4600-8600	244 254 262 Ige-Plytrson alt 238 248 260 238 246 254 262 274 276 276 276 284 292 292	248 258 266 mouth uminum 248 258 264 254 262 266 276 274 282 294 286 292 296 296	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314 305 306 320 332 332 332 332	310 328 336 mi 426" Black al 310 304 296 296 304 312 304 312 314 311 324 324 332 336 328	114 114 114 114 114 116 112 112 110 112 112 112 112 112 113 113 113 111 110 114 108	.000 .000 .000 .000 .000 .020 .028 .018 .020 .020 .020 .020 .020 .020 .020 .02	.000 .000 .000 .000 .000 .000 .022 .030 .020 .02	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710 .680 .848 .871 .785 .754	.608 .608 .608 .608 .507 .568 .603 .568 .608 .699 .659 .821 .760 .730
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ronechanical Lifter Caller Call	669541 669571 669561 Odeck TFX-6 mshafts 661201 660941 661381 mshafts 668511 668521 668531 668541 668301 668281 668821 668351 668351 668351 668351 668311 668321 668311 668311	3000-6800 3400-7000 3600-7000 Chrysler-Doo 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7000 3200-7200 3600-7600 4000-7800 4400-8000 4000-6800 5500-8500 4400-8400 5500-8500 4600-8600 6000-10000	244 254 262 Ige-Ply rson ali 238 248 260 238 246 254 262 262 274 276 276 284 292 292 296 296	248 258 266 mouth uminum 248 258 264 254 262 266 276 274 282 294 286 292 296 300	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314 305 306 320 332 332 332 332 332	310 328 336 mi 426" Black al 310 304 296 296 304 312 304 312 314 311 324 324 332 336 328 328	114 114 114 114 114 116 66-71 112 112 110 112 112 112 112 112 113 113 113 111 110 114 108 114	.000 .000 .000 .000 .000 .000 .022 .028 .018 .020 .020 .020 .020 .020 .020 .020 .02	.000 .000 .000 .000 .000 .000 .022 .030 .020 .02	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710 .680 .848 .871 .785 .754 .785	.608 .608 .608 .608 .507 .568 .603 .568 .608 .699 .659 .821 .798 .760 .730 .760
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 HR-262/400-2S-14 Also: Johnson/Rotechanical Lifter Cales (1978) (1	669541 669571 669561 Odeck TFX-6 mshafts 661201 660941 661381 umshafts 668511 668521 668531 668541 668301 668281 668311 668311 668311 668311 668311 668311 668311 668311 668311 668311	3000-6800 3400-7000 3600-7000 Chrysler-Doo 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7200 3000-7600 3800-7600 4000-7800 4400-800 4400-800 5500-8500 4400-8400 5000-8500 5500-9500 4600-8600 6000-10000	244 254 262 Ige-Plys rson als 238 248 260 238 246 254 262 262 274 276 276 284 292 292 292 296 296	248 258 266 mouth minum 248 258 264 246 254 262 266 274 282 294 286 292 296 300 300	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314 305 306 320 332 332 332 332 328 328 328	310 328 336 mi 426" Black al. 310 304 296 296 304 312 304 312 314 311 324 324 322 336 328 322 322	114 114 114 114 116 66-71 112 112 110 112 112 112 112 112 112 11	.000 .000 .000 .000 .000 .000 .022 .028 .018 .020 .020 .020 .020 .020 .020 .020 .02	.000 .000 .000 .000 .000 .022 .030 .018 .020 .020 .020 .026 .022 .030 .026 .026 .026 .026	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .680 .848 .871 .785 .754 .754 .750 .750	.608 .608 .608 .608 .507 .568 .603 .568 .608 .699 .659 .821 .798 .760 .730 .760 .775
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 HR-262/400-2S-14 Also: Johnson/Rotechanical Lifter Cales F-238/3200-2-12 F-248/3600-2-12 F-260/391-2S-10 Mechanical Roller Cales SR-238/350-2S-12 SR-262/40362-2S-12 SR-262/40362-2S-12 SR-262/452-2S-12 R-262/452-2S-12 R-276/5401-2S-13XBB 48D R-276/555-2S-13XBB 48D R-276/555-2S-13XBB 48D R-296/4778-8 R-296/4778-8 R-296/4778-2S-14 R-296/4778-2S-14	669541 669571 669561 0deck TFX-5 mshafts 661201 660941 661381 1mshafts 668511 668521 668531 668541 668301 668281 668351 668351 668351 668311 668321 668311 668311 668321 669101 669101	3000-6800 3400-7000 3600-7000 Chrysler-Doo 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7200 3000-7600 3800-7600 3800-7600 4400-8800 5500-8500 4400-8400 5000-8500 4600-8600 6000-10000 6000-10000 6000-9600	244 254 262 Ige-Plys rson als 238 248 260 238 246 254 262 262 274 276 276 284 292 292 292 296 296 296 296	248 258 266 mouth minum 248 258 264 246 254 262 266 276 274 282 294 286 292 296 300 300 296	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314 305 306 320 332 332 332 332 332 332 332 3332 3	310 328 336 mi 426" Black al. 310 304 296 296 304 312 304 312 314 311 324 324 332 336 328 322 336	114 114 114 114 114 116 112 112 110 112 112 112 112 112 112 113 113 113 113	.000 .000 .000 .000 .000 .000 .022 .028 .018 .020 .020 .020 .020 .020 .020 .020 .02	.000 .000 .000 .000 .000 .000 .022 .030 .018 .020 .020 .020 .026 .026 .022 .022 .030 .026 .026 .026 .026	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710 .680 .848 .871 .785 .754 .785 .750 .750	.608 .608 .608 .608 .507 .568 .603 .550 .568 .608 .699 .659 .821 .798 .760 .730 .760 .775 .775
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 HR-262/400-2S-14 Also: Johnson/Rodechanical Lifter Cales F-238/3200-2-12 F-248/3600-2-12 F-260/391-2S-10 Mechanical Roller Cales SR-238/350-2S-12 SR-262/400-2S-12 SR-262/400-2S-12 SR-262/400-2S-12 R-274/4334-8 R-276/5401-2S-13XBB 48D R-276/555-2S-13XBBA SF0 320-324-12R R-292/480-10XBB 48D R-292/480-10XBB 48D R-296/4778-8 R-296/4778-8 R-296/4778-2S-14XBBA 48D R-296/4778-2S-14XBBA 48D R-296/4778-2S-14XBBA 48D R-296/500-16	669541 669571 669561 0deck TFX-4 mshafts 661201 660941 661381 1mshafts 668511 668521 668531 668541 668301 668281 668351 668351 668351 668351 668351 668351 668351 668351 668351 668351 668351 668351 668351 668351 668351	3000-6800 3400-7000 3600-7000 Chrysler-Dood 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7000 3200-7200 3600-7600 3800-7600 4000-7800 4400-8800 5500-8500 4400-8400 5000-8500 5500-9500 4600-8600 6000-10000 6000-9600 6000-9600	244 254 262 Ige-Ply rson ali 238 248 260 238 246 254 262 274 276 276 284 292 292 296 296 296 296 296	248 258 266 mouth Iminum 248 258 264 246 254 262 266 276 274 282 294 286 292 296 300 300 296 296	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314 305 306 320 332 332 332 338 336 336	310 328 336 mi 426" Black al 310 304 296 296 304 312 304 312 314 311 324 324 332 336 328 322 336 336	114 114 114 114 114 116 112 112 110 112 112 112 112 112 112 112	.000 .000 .000 .000 .000 .000 .022 .028 .018 .020 .020 .020 .020 .020 .020 .020 .02	.000 .000 .000 .000 .000 .000 .000 .00	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710 .680 .848 .871 .785 .754 .785 .750 .750 .750	.608 .608 .608 .608 .507 .568 .603 .550 .568 .608 .659 .821 .798 .760 .726 .775 .775
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ronechanical Lifter Cales (Control of the Control of the	669541 669571 669561 Odeck TFX-4 mshafts 661201 660941 661381 mshafts 668511 668521 668541 668541 668301 668281 668351 668351 668351 668351 668351 668951 668311 668311 669101 669101 669101 669101	3000-6800 3400-7000 3600-7000 Chrysler-Dood 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7000 3200-7200 3600-7600 3800-7600 4000-7800 4000-7800 4400-8000 5500-8500 5500-8500 5500-8500 5500-8500 6000-10000 6000-10000 6000-9600 6000-9600	244 254 262 Ige-Ply rson all 238 248 260 238 246 254 262 274 276 276 284 292 292 296 296 296 296 296 296	248 258 266 mouth uminum 248 258 264 254 262 266 276 274 282 294 286 292 296 296 300 300 296 296 296	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314 305 306 320 332 332 332 328 328 328 336 336	310 328 336 mi 426" Black al. 310 304 296 296 304 312 304 312 314 311 324 324 332 336 328 322 323 336 336 336 336	114 114 114 114 114 116 112 112 110 112 112 112 112 112 112 112	.000 .000 .000 .000 .000 .000 .022 .028 .018 .020 .020 .020 .020 .020 .020 .020 .02	.000 .000 .000 .000 .000 .000 .000 .00	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710 .680 .848 .871 .785 .754 .755 .750 .750 .750 .750	.608 .608 .608 .608 .507 .568 .603 .550 .568 .608 .659 .821 .798 .760 .730 .726 .775 .775 .775
HR-236/359-2S-12 HR-244/372-2S-14 HR-254/400-2S-14 HR-262/400-2S-14 Also: Johnson/Ronechanical Lifter Cales F-238/3200-2-12 F-248/3600-2-12 F-260/391-2S-10 Mechanical Roller Cales SR-238/350-2S-12	669541 669571 669561 Odeck TFX-4 mshafts 661201 660941 661381 mshafts 668511 668521 668541 668541 668301 668281 668351 668351 668351 668351 668351 668951 668311 668311 669101 669101 669101 669101	3000-6800 3400-7000 3600-7000 Chrysler-Dood 92. Brad Ander 2800-6400 3600-7000 4000-7200 3000-7000 3200-7200 3600-7600 3800-7600 4000-7800 4400-8800 5500-8500 4400-8400 5000-8500 5500-9500 4600-8600 6000-10000 6000-9600 6000-9600	244 254 262 Ige-Ply rson ali 238 248 260 238 246 254 262 274 276 276 284 292 292 296 296 296 296 296	248 258 266 mouth Iminum 248 258 264 246 254 262 266 276 274 282 294 286 292 296 300 300 296 296	306 324 332 V-8 "He n. Keith 300 294 292 288 296 304 300 291 314 305 306 320 332 332 332 338 336 336	310 328 336 mi 426" Black al 310 304 296 296 304 312 304 312 314 311 324 324 332 336 328 322 336 336	114 114 114 114 114 116 112 112 110 112 112 112 112 112 112 112	.000 .000 .000 .000 .000 .000 .022 .028 .018 .020 .020 .020 .020 .020 .020 .020 .02	.000 .000 .000 .000 .000 .000 .000 .00	.584 .628 .628 .628 .628 .502 .565 .614 .550 .568 .587 .628 .710 .680 .848 .871 .785 .754 .785 .750 .750 .750	.608 .608 .608 .608 .507 .568 .603 .550 .568 .608 .659 .821 .798 .760 .726 .775 .775



Grind Number	Part Number	RPM Power Range	Duratio	on@ .050" Exh.	Adver	tised Duratior Exh.	ı Lobe Sep	Valve L . Int.	ash Exh.	Gross V Int.	alve Lift Exh.
	Ford 4 (v	linder 74-87	- 2300	cc (2 3	I) OHC	and 23-	87 200I	ncc Ol	НС		
Hydraulic Follower Ca		midel 7 1 07	2500	t.t. (2.5	L) OHC	una os	57 2 0 0 0	c.c. or	, C		
H-260-2	190021	1400-4600	212	220	260	268	112	.000	.000	.415	.425
H-270	194611	1400-4600	218	218	270	270	113	.000	.000	.415	.415
H-272-2	194621	1800-5200	226	234	272	280	110	.000	.000	.420	.420
H-278-2	190071	2400-5600	234	242	278	286	110	.000	.000	.460	.480
Mechanical Follower											
FOR-272-2-10	192211	2500-6000	232	242	272	282	110	.008	.008	.435	.460
FOR-300-6	192251	3200-7000	264	264	300	300	106	.010	.010	.510	.510
FOR-300-8	192221	3400-7200	264	264	300	300	108	.010	.010	.510	.510
FOR-310-2R-8	192261	4200-8200	274	264	310	300	108	.010	.010	.535	.510
FOR-310-8 FOR-320-10	192241 192231	4000-7600 4600-8400	274 284	274 284	310 320	310 320	108 110	.010 .010	.010 .010	.535 .560	.535 .560
FUN-320-10	172231	4000-0400	204	204	320	320	110	.010	.010	.300	.300
		Ford 4 Cyl	inder 8	38-98 - <u>2</u>	2300 с.	c. (2.3L)	ОНС				
Hydraulic Roller Cam											
RFOR-214/420-12	199541	1000-4200	214	214	252	252	112	.000	.000	.420	.420
RFOR-226/420-2S-12	199501	1400-4600	226	234	274	282	112	.000	.000	.420	.420
RFOR-234/450-8	199511	2000-5600	234	234	282	282	108	.000	.000	.450	.450
RFOR-242/480-8	199521	2800-6600	242	242	290	290	108	.000	.000	.480	.480
RFOR-250/510-10	199531	3200-7000	250	250	298	298	110	.000	.000	.510	.510
Mechanical Roller Car		2200 7000	252	252	20.4	204	106	010	012	F.C.0	560
RFOR-252/560-6	198091	3200-7000	252	252	284	284	106	.010	.012	.560	.560
RFOR-260/584-8 RFOR-268/608-6	198101 198131	3600-7400 4000-7800	260 268	260 268	292 300	292 300	108 106	.010 .010	.012 .012	.584 .608	.584 .608
RFOR-276/632-8	198161	4600-8400	276	276	308	308	108	.010	.012	.632	.632
III OII-270/032-0	170101	1 000-0100	270	270	300	300	100	.010	.012	.032	.032
		Ford Zetec 4	1 Cylina	ler 95-N	2 - 2.0	litre DO	HC AV				
Mechanical Lifter Can	nshafts	TOTA ECCCC	cy IIII	,,		LICIC DO					
F-210/374-2SR-10	223-0010	1000-6500	210	206	232	228	110	.008	.010	.374	.366
F-214/382-2SR-9	223-0012	2000-7000	214	210	236	232	109	.008	.010	.382	.374
F-218/390-2SR-10	223-0014	3000-8000	218	214	240	236	110	.008	.010	.390	.382
	_										
		<u>rd Duratec 4 Cy</u>	<u> Ilinder</u>	02-05 -	1.8-2.	0-2.3 Liti	re DOH	C 4V			
Mechanical Lifter Can											
F-212/354-2SR-10	224-0010	1000-6000	212	204	232	224	110	.010	.012	.374	.354
F-226/410-25R-10	224-0012	1500-6500	226	216	248	238	110	.008	.010	.410	.385
F-236/435-2SR-10	224-0014	2500-7500	236	226	258	248	110	.008	.010	.435	.410
F-246/460-2SR-10 F-256/485-2SR-10	224-0016 224-0018	3500-8000 4500-9000	246 256	236 246	268 278	258 268	110 110	.008	.010 .010	.460 .485	.435 .460
F-230/403-23N-10	224-0010	4300-9000	230	240	2/0	200	110	.000	.010	.403	.400
		Ford 6 Cyli	nder 6	5-96 - 2	40-300) (4.9L) c	u.in.				
Hydraulic Lifter Cams	hafts										
H-192/2667-2S-12	500511	800-4200	192	204	248	260	112	.000	.000	.429	.458
H-260-2	503901	1200-4600	204	216	260	272	112	.000	.000	.458	.487
H-272-2	503941	1800-5400	216	228	272	284	112	.000	.000	.487	.515
H-224/309-2-6	500211	2200-5600	224	234	288	298	106	.000	.000	.497	.523
H-238/3347-8	500641	3200-6400	238	238	294	294	108	.000	.000	.539	.539
Mechanical Lifter Can											
F-238/3200-2-10	501181	2600-6000	238	248	304	314	110	.022	.022	.515	.537
	501211	3000-6200	246	250	282	286	106	.012	.012	.578	.589
F-246/359-2S-6 F-256/3634-2S-8	501311	3600-6800								1570	.604

Duration@ .050" Advertised Duration Valve Lash Gross Valve Lift

Grind Number Part Number RPM Power Range Int. Exh. Int. Exh. Lobe Sep. Int. Exh. Int. Exh.

Ford-Mercury V-8 62-87 - 221-255 (4.2L)-260-289-302 (5.0L) cu.in. and 88-95 302 cu.in. trucks

	•		lexc. 82	-95 302	? [5.0L]	HO)					
Hydraulic Lifter Ca	mshafts										
2021	364112	800-4200	190	198	252	260	109	.000	.000	.416	.432
260 H10	13003	1200-4600	204	204	260	260	110	.000	.000	.456	.456
260 H10	130032	1200-4600	204	204	260	260	110	.000	.000	.456	.456
H-260-2	363901	1200-4800	204	216	260	272	112	.000	.000	.456	.484
H-260-2	363902	1200-4800	204	216	260	272	112	.000	.000	.456	.484
Z-256-2	363501	1200-5000	206	212	256	262	112	.000	.000	.461	.475
Z-256-2	363502	1200-5000	206	212	256	262	112	.000	.000	.461	.475
266 H10	13004	1400-4800	210	210	266	266	110	.000	.000	.469	.469
266 H10	130042	1400-4800	210	210	266	266	110	.000	.000	.469	.469
H-266-2	363931	1400-5200	210	218	266	274	114	.000	.000	.456	.472
H-266-2	363932	1400-5200	210	218	266	274	114	.000	.000	.456	.472
272 H10	13005	1600-5200	216	216	272	272	110	.000	.000	.484	.484
272 H10	130052	1600-5200	216	216	272	272	110	.000	.000	.484	.484
H-272-2	363941	1800-5400	216	228	272	284	112	.000	.000	.484	512
H-272-2	363942	1800-5400	216	228	272	284	112	.000	.000	.484	512
Z-268-2	363511	1800-5600	218	224	268	274	112	.000	.000	.490	504
Z-268-2	363512	1800-5600	218	224	268	274	112	.000	.000	.490	504
278 H10	13009	2200-5600	222	222	278	278	110	.000	.000	.498	.498
278 H10	130092	2200-5600	222	222	278	278	110	.000	.000	.498	.498
H-222/3114-2S1-6	360331	2200-5400	222	228	278	284	106	.000	.000	.498	.512
H-278-2	363801	2200-5800	222	234	278	290	114	.000	.000	.498	.527
H-278-2	363802	2200-5800	222	234	278	290	114	.000	.000	.498	.527
Z-274-2	363521	2200-6000	224	230	274	280	110	.000	.000	.504	.518
Z-274-2	363522	2200-6000	224	230	274	280	110	.000	.000	.504	.518
H-288	364381	2400-6000	226	226	288	288	108	.000	.000	.488	.488
H-288	364382	2400-6000	226	226	288	288	108	.000	.000	.488	.488
H-286-2	364551	2600-6200	226	236	286	296	110	.000	.000	.502	.520
H-286-2	364552	2600-6200	226	236	286	296	110	.000	.000	.502	.520
284 H12	13006	2800-6200	228	228	284	284	112	.000	.000	.512	.512
284 H12	130062	2800-6200	228	228	284	284	112	.000	.000	.512	.512
H-296-2	364561	3200-6800	236	240	296	300	110	.000	.000	.520	.526
H-296-2	364562	3200-6800	236	240	296	300	110	.000	.000	.520	.526
Hydraulic Roller Co	amshafts — F										
2020	364211	800-4600	198	208	260	270	112	.000	.000	.445	.470
HR-216/325-2S-12	369541	1800-5600	216	224	278	286	112	.000	.000	.520	.542
HR-224/339-2S-12	369601	2400-6400	224	232	286	294	112	.000	.000	.542	.563
Mechanical Lifter (Camshafts										
F-278-2	363841	2800-6600	238	248	278	288	114	.022	.022	.512	.533
F-280-2	364681	3200-7000	244	252	280	288	108	.026	.026	.553	.572
F-280-2	364682	3200-7000	244	252	280	288	108	.026	.026	.553	.572
F-310-2	364761	3600-7400	248	258	310	320	108	.022	.022	.533	.555
F-260/3694-6	361421	4400-7800	260	260	296	296	106	.026	.026	.591	.591
F-268/394-252-8	361591	4800-8200	268	272	304	302	108	.018	.012	.630	.640
Mechanical Roller	Camshaft <u>s</u>										
SR-238/350-2S-12	368511	2800-6600	238	246	288	296	112	.020	.020	.560	.579
SR-246/362-2S-10	368601	3400-7000	246	254	296	304	110	.020	.020	.579	.598
R-252/420-2S-8	448801	3600-7400	252	258	284	290	108	.020	.020	.672	.672
R-258/420-25-8	448831	3800-7600	258	262	290	294	108	.020	.020	.672	.672
R-262/420-253-8	448841	4200-7800	262	268	294	300	108	.020	.020	.672	.672
R-268/420-251-8	448851	4800-8200	268	272	300	304	108	.020	.020	.672	.672
IL 200/720-231-0	I COUPT	7000-0200	200	212	300	JUT	100	.020	.020	.072	.072



										Jai	110
Grind Number	Part Number	RPM Power Range	Duratio	on@ .050" Exh.	Adverti Int.	ised Duration Exh.	ı Lobe Sep	Valve La	ash Exh.	Gross Va Int.	alve Lift Exh.
		Ford-Me									
lydraulic Roller Ca	mshafts	TOTA ME	cary	70575	J.U LI	ire (302)	11.0.				
2020	444211	1000-5000	208	216	262	270	112	.000	.000	.530	.530
2020	444212	1000-5000	208	216	262	270	112	.000	.000	.530	.530
2031	444225	1400-5400	214	220	276	282	112	.000	.000	.513	.529
2031	444226	1400-5400	214	220	276	282	112	.000	.000	.513	.529
2030	444221	1400-5400	216	220	270	278	112	.000	.000	.533	.544
2030	444222	1400-5400	216	220	270	278	112	.000	.000	.533	.544
HR-216/325-2S-12	449541	1400-5400	216	224	278	286	112	.000	.000	.520	.542
2040	444231	1800-5800	220	220	282	282	110	.000	.000	.498	.498
HR-220/311-2S-14	449591	2000-6000	220	226	282	288	114	.000	.000	.529	.544
HR-220/332-252-14	449631	2000-6200	220	228	282	290	114	.000	.000	.531	.552
HR-224/339-12	449661	2200-6000	224	224	286	286	112	.000	.000	.542	.542
HR-224/339-252-12	449671	2200-6200	224	232	286	294	112	.000	.000	.576	.559
HR-224/339-2S-12 HR-226/320-2S-14	449601 449651	2400-6400 2600-6600	224 226	232 232	286 288	294 294	112 114	.000	.000	.542 .544	.563 .559
HR-228/345-2S1-14	449681	2600-6600	228	232	290	294	114	.000	.000	.552	.563
HR-228/345-2S-14	449691	2600-6600	228	236	290	298	114	.000	.000	.552	.574
HR-232/352-2S-12	449761	2800-6800	232	244	294	306	112	.000	.000	.563	.595
HR-236/359-2S-10	449641	2800-6800	236	244	298	306	110	.000	.000	.574	.595
HR-236/359-2S-14	449811	3000-7000	236	244	298	306	114	.000	.000	.574	.595
HR-240/365-251-14	449711	3200-7000	240	244	302	306	114	.000	.000	.584	.595
HR-244/372-2S-10	449581	3400-7000	244	256	306	318	110	.000	.000	.595	.595
HR-244/372-2S-12	449571	3600-7000	244	256	306	318	112	.000	.000	.595	.595
HR-252/400-2S-14	449741	3800-7200	252	260	322	330	114	.000	.000	.640	.640
Ford-Merc	urv V-8 69-9	3 - 351 (5.8L)) Windso	or and 8.	2-84 30	<i>(5.0)</i>	H.O., al:	so: 302	SVO an	d 351 S	VO
ydraulic Lifter Cai											
H-192/2667-2S-10	440501	800-4200	192	204	248	260	110	.000	.000	.427	.456
H-260-2	443901	1200-4800	204	216	260	272	112	.000	.000	.456	.484
H-260-2	443902	1200-4800	204	216	260	272	112	.000	.000	.456	.484
2030	444232	1400-5200	206	214	268	276	114	.000	.000	.448	.464
Z-256-2	443501	1200-5000	206	212	256	262	112	.000	.000	.461	.475
2-256-2	443502	1200-5000	206	212	256	262	112	.000	.000	.461	.475
272 H10	18005	1600-5200	216	216	272	272	110	.000	.000	.484	.484
272 H10 H-272-2	180052 443941	1600-5200 1800-5400	216 216	216 228	272 272	272 284	110 112	.000	.000	.484 .484	.484
H-272-2	443941	1800-5400	216	228	272	284	112	.000	.000	.484	.512 .512
7-268-2	443511	1800-5600	218	224	268	274	112	.000	.000	.490	.504
Z-268-2	443512	1800-5600	218	224	268	274	112	.000	.000	.490	.504
H-220/307-2-10	113312			230	280	290	110	.000	.000	.491	.509
	440131	2400-5800	220			270					
	440131 440211	2400-5800 2600-6000	220 222			278	110	.000	.000		.498
	440131 440211 440221		220 222 224	222 230	278 274	278 280	110 110	.000	.000	.498 .504	.498 .518
H-222/3114-10 H-224/315-2S1-10	440211 440221 440141	2600-6000 2800-6200 2800-6200	222 224 226	222 230 236	278 274 286	280 296	110 110	.000	.000	.498 .504 .502	.518 .520
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2	440211 440221 440141 444551	2600-6000 2800-6200 2800-6200 2800-6600	222 224 226 226	222 230 236 236	278 274 286 286	280 296 296	110 110 112	.000 .000	.000 .000	.498 .504 .502 .502	.518 .520 .520
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2	440211 440221 440141 444551 444552	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600	222 224 226 226 226	222 230 236 236 236	278 274 286 286 286	280 296 296 296	110 110 112 112	.000 .000 .000	.000 .000 .000	.498 .504 .502 .502 .502	.518 .520 .520 .520
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-228/3200-6	440211 440221 440141 444551 444552 440551	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6400	222 224 226 226 226 226 228	222 230 236 236 236 236 228	278 274 286 286 286 286 284	280 296 296 296 284	110 110 112 112 106	.000 .000 .000 .000	.000 .000 .000 .000	.498 .504 .502 .502 .502 .512	.518 .520 .520 .520 .512
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-228/3200-6 H-230/318-2-8	440211 440221 440141 444551 444552 440551 440151	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6400 3000-6600	222 224 226 226 226 226 228 230	222 230 236 236 236 236 228 240	278 274 286 286 286 284 290	280 296 296 296 284 300	110 110 112 112 106 108	.000 .000 .000 .000 .000	.000 .000 .000 .000 .000	.498 .504 .502 .502 .502 .512 .509	.518 .520 .520 .520 .512 .526
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-228/3200-6 H-230/318-2-8 H-234/3294-25-10	440211 440221 440141 444551 444552 440551 440151 440161	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6400 3000-6600 3200-6800	222 224 226 226 226 228 230 234	222 230 236 236 236 228 240 238	278 274 286 286 286 284 290 290	280 296 296 296 284 300 294	110 110 112 112 106 108 110	.000 .000 .000 .000 .000 .000	.000 .000 .000 .000 .000 .000	.498 .504 .502 .502 .502 .512 .509	.518 .520 .520 .520 .512 .526 .536
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-228/3200-6 H-230/318-2-8 H-234/3294-25-10 H-236/325-25-10	440211 440221 440141 444551 444552 440551 440151 440161 440171	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6400 3000-6600 3200-6800 3400-7000	222 224 226 226 226 228 230 234 236	222 230 236 236 236 228 240 238 240	278 274 286 286 286 284 290 290 290	280 296 296 296 284 300 294 300	110 110 112 112 106 108 110 110	.000 .000 .000 .000 .000 .000 .000	.000 .000 .000 .000 .000 .000 .000	.498 .504 .502 .502 .502 .512 .509 .527	.518 .520 .520 .520 .512 .526 .536 .526
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-228/3200-6 H-230/318-2-8 H-234/3294-25-10 H-236/325-25-10 H-236/325-25-14	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6400 3000-6600 3200-6800 3400-7000 3400-7200	222 224 226 226 226 228 230 234 236 236	222 230 236 236 236 228 240 238 240 240	278 274 286 286 286 284 290 290 290 296	280 296 296 296 284 300 294 300 300	110 110 112 112 106 108 110 110	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000	.498 .504 .502 .502 .502 .512 .509 .527 .520	.518 .520 .520 .520 .512 .526 .536 .526
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-228/3200-6 H-230/318-2-8 H-234/3294-25-10 H-236/325-25-10 H-236/325-25-14 H-238/3347-2-10	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6400 3000-6600 3200-6800 3400-7000 3400-7200 3400-7200	222 224 226 226 226 228 230 234 236 236 238	222 230 236 236 236 228 240 238 240 240 248	278 274 286 286 286 284 290 290 296 296 294	280 296 296 296 284 300 294 300 300 300	110 110 112 112 106 108 110 110 114	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520	.518 .520 .520 .520 .512 .526 .536 .526 .526
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-228/3200-6 H-230/318-2-8 H-234/3294-25-10 H-236/325-25-14 H-236/325-25-14 H-238/3347-2-10 H-242/310-6	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661 440241	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6600 3000-6600 3200-6800 3400-7000 3400-7200 3400-7200 3400-7200	222 224 226 226 226 228 230 234 236 236 238 242	222 230 236 236 236 228 240 238 240 240 248 242	278 274 286 286 286 284 290 290 296 296 294 300	280 296 296 296 284 300 294 300 300 304	110 110 112 112 106 108 110 110 114 110	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520 .536	.518 .520 .520 .520 .512 .526 .536 .526 .526 .560 .496
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-228/3200-6 H-230/318-2-8 H-234/3294-25-10 H-236/325-25-14 H-238/3347-2-10 H-242/310-6 H-246/3334-6	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661 440241 440181	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6400 3000-6600 3200-6800 3400-7000 3400-7200 3400-7200 3600-7200	222 224 226 226 226 228 230 234 236 236 238 242	222 230 236 236 236 228 240 238 240 240 248 242	278 274 286 286 286 284 290 290 296 296 294 300 306	280 296 296 296 284 300 294 300 300 304 300 306	110 110 112 112 106 108 110 110 111 110 106 106	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520 .536 .496	.518 .520 .520 .520 .512 .526 .536 .526 .526 .560 .496
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-228/3200-6 H-230/318-2-8 H-234/3294-25-10 H-236/325-25-14 H-238/3347-2-10 H-242/310-6 H-246/3334-6 H-246/336-25-8	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661 440241	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6600 3000-6600 3200-6800 3400-7000 3400-7200 3400-7200 3400-7200	222 224 226 226 226 228 230 234 236 236 238 242	222 230 236 236 236 228 240 238 240 240 248 242	278 274 286 286 286 284 290 290 296 296 296 294 300 306 306	280 296 296 296 284 300 294 300 300 304 300 314	110 110 112 112 106 108 110 110 114 110	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520 .536 .496 .533	.518 .520 .520 .520 .512 .526 .536 .526 .526 .549 .533
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-228/3200-6 H-230/318-2-8 H-234/3294-25-10 H-236/325-25-14 H-236/325-25-14 H-246/3334-6 H-246/3334-6 H-246/336-25-8 H-260/360-25-8	440211 440221 440141 444551 444551 440551 440151 440161 440171 440231 440661 440241 440181 440191 440201	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 3200-6600 3200-6800 3400-7200 3400-7200 3400-7200 3400-7200 3600-7200 4200-7200	222 224 226 226 226 228 230 234 236 236 238 242 246	222 230 236 236 236 228 240 238 240 240 248 242 246 254	278 274 286 286 286 284 290 290 296 296 294 300 306	280 296 296 296 284 300 294 300 300 304 300 306	110 110 112 112 106 108 110 110 1114 110 106 106 108	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520 .536 .496	.518 .520 .520 .520 .512 .526 .536 .526 .526 .560 .496
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-228/3200-6 H-230/318-2-8 H-234/3294-25-10 H-236/325-25-14 H-236/325-25-14 H-242/310-6 H-246/3334-6 H-246/336-25-8 H-260/360-25-8	440211 440221 440141 444551 444551 440551 440151 440161 440171 440231 440661 440241 440181 440191 440201	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 3200-6600 3200-6800 3400-7200 3400-7200 3400-7200 3400-7200 3600-7200 4200-7200	222 224 226 226 226 228 230 234 236 236 238 242 246	222 230 236 236 236 228 240 238 240 240 248 242 246 254	278 274 286 286 286 284 290 290 296 296 296 294 300 306 306	280 296 296 296 284 300 294 300 300 304 300 314	110 110 112 112 106 108 110 110 1114 110 106 106 108	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520 .536 .496 .533	.518 .520 .520 .520 .512 .526 .536 .526 .526 .549 .533
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-236/3200-6 H-236/325-25-10 H-236/325-25-14 H-236/325-25-14 H-246/3334-6 H-246/3334-6 H-246/336-25-8 H-260/360-25-8 Lydraulic Roller Ca	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661 440241 440181 440191 440201 mshafts — Re	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6600 3200-6800 3400-7000 3400-7200 3400-7200 3400-7200 4200-7200 etrofit 800-4800 800-4800	222 224 226 226 226 228 230 234 236 236 238 242 246 246 260	222 230 236 236 236 228 240 238 240 248 242 246 254 268	278 274 286 286 286 284 290 290 296 296 294 300 306 306 330 262 262	280 296 296 296 284 300 294 300 300 304 300 314 338	110 110 112 112 106 108 110 110 110 114 110 106 108 108 108	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520 .536 .496 .533 .538 .576	.518 .520 .520 .520 .512 .526 .526 .526 .526 .526 .526 .526 .52
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-236/3200-6 H-236/325-25-10 H-236/325-25-14 H-236/325-25-14 H-246/3334-6 H-246/3334-6 H-246/336-25-8 H-260/360-25-8 Lydraulic Roller Ca	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661 440241 440181 440191 440201 mshafts — Re 444211 444212 449541	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6600 3000-6600 3200-6800 3400-7000 3400-7200 3400-7200 3600-7200 4200-7200 etrofit 800-4800 800-4800 1400-5400	222 224 226 226 226 228 230 234 236 236 238 242 246 246 260	222 230 236 236 236 228 240 248 240 248 242 246 254 268	278 274 286 286 286 284 290 290 296 296 294 300 306 306 330 262 262 278	280 296 296 296 284 300 294 300 300 304 300 314 338	110 110 112 112 106 108 110 110 110 114 110 106 106 108 108	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520 .536 .496 .533 .538 .576	.518 .520 .520 .520 .512 .526 .536 .526 .526 .526 .533 .550 .595
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-288/3200-6 H-238/3294-25-10 H-236/325-25-10 H-236/325-25-14 H-238/3347-2-10 H-246/3334-6 H-246/3334-6 H-246/336-25-8 Hydraulic Roller Ca 1020 1020 118-216/325-25-12 118-216/325-25-12	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661 440241 440181 440191 440201 mshafts — Re 444211 444212 449541 449631	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6600 3000-6600 3200-6800 3400-7000 3400-7200 3400-7200 3800-7200 4200-7200 etrofit 800-4800 1400-5400 1600-5600	222 224 226 226 226 228 230 234 236 236 238 242 246 246 260 208 208 216 220	222 230 236 236 236 228 240 238 240 240 248 242 246 254 268 216 216 224 228	278 274 286 286 286 284 290 290 296 296 294 300 306 306 330 262 278 282	280 296 296 296 284 300 294 300 300 304 306 314 338 270 270 286 290	110 110 112 112 106 108 110 110 114 110 106 106 108 108	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .502 .512 .509 .527 .520 .536 .496 .533 .538 .576	.518 .520 .520 .520 .512 .526 .536 .526 .526 .526 .550 .595
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-286-2 H-286-8 H-230/318-2-8 H-234/3294-25-10 H-236/325-25-14 H-236/334-6 H-246/3334-6 H-246/3334-6 H-246/336-25-8 Hydraulic Roller Ca 2020 2020 HR-216/325-25-12 HR-220/332-252-14 HR-220/332-252-14	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661 440241 440181 440191 440201 mshafts — Ro 444211 444212 449541 449631 449601	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6600 3000-6600 3000-6600 3400-7000 3400-7200 3400-7200 3800-7200 4200-7200 etrofit 800-4800 1400-5400 1600-5600 1800-5800	222 224 226 226 228 230 234 236 238 242 246 260 208 208 216 220 224	222 230 236 236 236 228 240 238 240 240 248 242 246 254 268 216 216 224 228 232	278 274 286 286 286 284 290 290 296 296 294 300 306 330 306 320 262 278 282 286	280 296 296 296 284 300 294 300 304 300 304 307 308 270 270 286 290 294	110 110 112 112 106 108 110 110 114 110 106 106 108 108 112 112 112 114 112	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .502 .512 .509 .527 .520 .536 .496 .533 .538 .576	.518 .520 .520 .520 .512 .526 .536 .526 .526 .526 .526 .526 .533 .550 .595
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-286-2 H-286-8 H-234/3294-25-10 H-236/325-25-14 H-242/310-6 H-246/3334-6 H-246/3334-6 H-246/336-25-8 Hydraulic Roller Ca 2020 2020 2020 HR-216/325-25-12 HR-220/332-252-14 HR-228/345-251-14	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661 440241 440181 440191 440201 mshafts — Ro 444211 444212 449541 449631 449681	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6600 3000-6600 3000-6600 3400-7200 3400-7200 3400-7200 3400-7200 4200-7200 4200-7200 4200-7200 400-4800 1400-5400 1600-5600 1800-5800 2400-6400	222 224 226 226 226 228 230 234 236 238 242 246 260 208 208 216 220 224 228	222 230 236 236 236 228 240 238 240 240 248 242 246 254 268 216 216 222 228 232	278 274 286 286 286 284 290 290 296 294 300 306 330 262 262 278 282 286 290	280 296 296 296 284 300 294 300 304 300 304 307 308 270 270 286 290 294 294	110 110 112 112 106 108 110 110 114 110 106 106 108 108 112 112 112 114 112	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520 .536 .496 .533 .538 .576	.518 .520 .520 .520 .512 .536 .536 .526 .526 .549 .533 .550 .595
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-288/3200-6 H-236/318-2-8 H-234/3294-25-10 H-236/325-25-14 H-242/310-6 H-246/3334-6 H-246/3334-6 H-246/3334-6 H-260/360-25-8 Independent Call Control C	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661 440241 440181 440191 440201 444211 444212 449541 449631 449631 449681 449661	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6600 3000-6600 3000-6600 3400-7000 3400-7200 3400-7200 3400-7200 4200-7200 4200-7200 4200-7200 400-5400 1600-5600 1800-5800 2400-6400 2600-6600	222 224 226 226 228 230 234 236 238 242 246 246 260 208 208 216 220 224 228 232	222 230 236 236 236 228 240 238 240 248 242 246 254 268 216 216 224 228 232 232	278 274 286 286 286 284 290 290 296 294 300 306 330 262 262 278 282 286 290 294	280 296 296 296 284 300 294 300 304 300 306 314 338 270 270 286 290 294 302	110 110 112 112 106 108 110 110 114 110 106 106 108 108 112 112 112 114 112 114 112	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520 .536 .496 .533 .538 .576	.518 .520 .520 .520 .512 .536 .536 .526 .549 .533 .550 .595 .530 .530 .530 .542 .552 .563 .563
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-286-2 H-286-2 H-288/3200-6 H-236/318-2-8 H-234/3294-25-10 H-236/325-25-14 H-242/310-6 H-246/3334-6 H-246/3334-6 H-246/336-25-8 Hydraulic Roller Ca 2020 2020 HR-216/325-25-12 HR-228/345-251-14 HR-228/3352-25-14 HR-228/3352-25-14 HR-228/3352-25-12 HR-228/345-251-14 HR-238/359-25-10	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661 440241 440181 440191 440201 wshafts — Ro 444211 444212 449541 449681 449681 449661 449681 449661	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6600 3000-6600 3000-6600 3400-7200 3400-7200 3400-7200 3400-7200 4200-7200 etrofit 800-4800 800-4800 1400-5400 1600-5600 1800-5800 2400-6400 2600-6600 2800-6800	222 224 226 226 228 230 234 236 238 242 246 246 260 208 208 216 220 224 228 232 236	222 230 236 236 228 240 238 240 248 242 246 254 268 216 216 224 228 232 232 240 244	278 274 286 286 286 284 290 290 296 294 300 306 330 262 262 278 282 286 290 294 298	280 296 296 296 284 300 294 300 304 300 306 314 338 270 270 286 290 294 302 306	110 110 112 112 106 108 110 110 114 110 106 106 108 108 112 112 112 114 112 114 112 114	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520 .536 .496 .533 .538 .576	.518 .520 .520 .520 .512 .526 .536 .526 .526 .549 .533 .550 .595
H-222/3114-10 H-224/315-251-10 H-226/314-2-10 H-226/314-2-10 H-286-2 H-286-2 H-230/318-2-8 H-234/3294-25-10 H-236/325-25-14 H-238/3347-2-10 H-246/3334-6 H-246/3334-6 H-246/336-25-8 H-260/360-25-8 H-216/325-25-14 HR-224/339-25-12 HR-226/359-25-12 HR-226/359-25-14 HR-236/359-25-10 HR-236/359-25-10 HR-236/359-25-10 HR-236/359-25-10 HR-236/359-25-10 HR-240/365-251-14	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661 440241 440181 440191 440201 mshafts — Ref 444211 444212 449541 449631 449661 449661 449661 449661 449661 449661 449661 449661	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6600 3200-6800 3400-7000 3400-7200 3400-7200 3400-7200 4200-7200 4200-7200 4200-7200 4200-7200 4200-7200 2400-6600 2800-6800 3000-7000	222 224 226 226 228 230 234 236 238 242 246 246 260 208 208 216 220 224 228 232 236 236 237 247 248 249 240 240 240 240 240 240 240 240 240 240	222 230 236 236 238 240 248 240 248 242 246 254 268 216 216 224 228 232 232 240 244 244	278 274 286 286 286 284 290 290 296 296 294 300 306 306 330 262 262 278 282 286 290 294 300 306 330 330	280 296 296 296 284 300 300 300 304 300 306 314 338 270 270 286 290 294 294 302 306 306 307 308 309 309 309 309 300 300 300 300	110 110 112 112 106 108 110 110 114 110 106 106 108 108 112 112 112 114 112 114 112 114 1114	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520 .536 .496 .533 .538 .576	.518 .520 .520 .520 .512 .526 .526 .526 .526 .526 .533 .550 .595
H-222/3114-10	440211 440221 440141 444551 444552 440551 440151 440161 440171 440231 440661 440241 440181 440191 440201 wshafts — Ro 444211 444212 449541 449681 449681 449661 449681 449661	2600-6000 2800-6200 2800-6200 2800-6600 2800-6600 2800-6600 3000-6600 3000-6600 3400-7200 3400-7200 3400-7200 3400-7200 4200-7200 etrofit 800-4800 800-4800 1400-5400 1600-5600 1800-5800 2400-6400 2600-6600 2800-6800	222 224 226 226 228 230 234 236 238 242 246 246 260 208 208 216 220 224 228 232 236	222 230 236 236 228 240 238 240 248 242 246 254 268 216 216 224 228 232 232 240 244	278 274 286 286 286 284 290 290 296 294 300 306 330 262 262 278 282 286 290 294 298	280 296 296 296 284 300 294 300 304 300 306 314 338 270 270 286 290 294 302 306	110 110 112 112 106 108 110 110 114 110 106 106 108 108 112 112 112 114 112 114 112 114	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.498 .504 .502 .502 .502 .512 .509 .527 .520 .520 .536 .496 .533 .538 .576	.518 .520 .520 .520 .512 .526 .536 .526 .526 .549 .533 .550 .595

			Duration	@ .050"	Advertise	d Duration		Valve Las	sh	Gross Va	ılve Lift
Grind Number	Part Number	RPM Power Range	Int.	Exh.	Int.	Exh.	Lobe Sep.	Int.	Exh.	Int.	Exh.
Ford-Merc	ury V-8 69-93	- 351 (5.8L)	Windson	and 8.	2-84 302	? (5.0) H	.0., also	o: 302 S	SVO an	d 351 S	VO
Mechanical Lifter C	amshafts										
F-238/3200-8	441161	2800-6600	238	238	300	300	108	.022	.022	.512	.512
F-246/3467-2S2-6	440881	3200-6800	246	250	278	282	106	.012	.012	.555	.565
F-248/3334-2-8	441231	3400-7200	248	258	310	320	108	.022	.022	.533	.555
F-252/3574-2S1-10	440991	3800-7400	252	256	288	292	110	.026	.026	.572	.581
F-252/3574-2S-6	440981	3800-7200	252	260	288	296	106	.026	.026	.572	.591
F-256/3634-2S-6	441301	4000-7400	256	264	292	300	106	.026	.026	.581	.601
F-260/3694-257-6	441431	4200-7600	260	264	296	300	106	.026	.026	.591	.601
F-268/394-2S5-8	441551	4600-8000	268	272	304	308	108	.018	.018	.630	.640
F-272/400-2S-6	441591	4800-8200	272	276	308	312	106	.018	.018	.640	.650
F-276/406-2S1-8	441621	5000-8400	276	284	312	320	108	.018	.018	.650	.660
Mechanical Roller (Camshafts										
SR-230/338-2S-10	448501	2400-6400	230	238	280	288	110	.020	.020	.541	.560
TR-244/3867-2S-10	448031	3200-7000	244	252	284	292	110	.022	.022	.619	.640
SR-246/362-2S-10	448601	3400-7200	246	254	296	304	110	.020	.020	.579	.598
R-252/420-2S-8	448801	3600-7400	252	258	284	290	108	.020	.020	.672	.672
R-254/420-2S2-8	448821	3800-7600	254	258	286	290	108	.020	.020	.672	.672
SR-254/374-2S-10	448511	3800-7800	254	262	304	312	110	.020	.020	.599	.599
R-258/420-25-8	448831	4000-7600	258	262	290	294	108	.020	.020	.672	.672
R-258/420-25-10	448861	4000-7800	258	262	290	294	110	.020	.020	.672	.672
R-260/452-2S-10	448301	4000-8000	260	268	289	300	110	.020	.020	.723	.672
R-262/420-253-8	448841	4200-7800	262	268	294	300	108	.020	.020	.672	.672
SR-262/374-2S-10	448671	4400-7800	262	274	312	323	110	.020	.024	.598	.584
R-266/420-2S3-10	448871	4600-8000	266	276	298	308	110	.020	.020	.672	.672
R-266/452-2S-10	448311	4600-8200	266	276	295	306	110	.020	.022	.746	.739
R-268/420-251-8	448851	4800-8200	268	272	300	304	108	.020	.020	.672	.672
R-272/4381-2S1-8	448891	5000-8400	272	278	304	310	108	.020	.022	.701	.701
R-276/4334-2S-8	448291	5200-8400	276	284	316	284	108	.026	.026	.693	.683
R-280/452-2S-10	448881	5400-8600	280	288	310	320	110	.020	.020	.723	.672
R-284/466-2S-15	448321	5400-8800	284	296	316	336	115	.020	.030	.746	.753
R-286/456-2S1-10	448331	5200-8800	286	290	326	330	110	.026	.026	.730	.734

Ford-Mercury "Cleveland" V-8 70-82 - Boss 351-351C-351M-400 cu.in.

Hydraulic Lifter Car	mshafts										
H-192/2667-2S-14	520581	800-4200	192	204	248	260	114	.000	.000	.461	.493
H-260-2	523901	1200-4800	204	214	260	276	112	.000	.000	.493	.502
H-260-2	523902	1200-4800	204	214	260	276	112	.000	.000	.493	.502
266 H10	13303	1400-4800	210	210	266	266	110	.000	.000	.508	.508
266 H10	133032	1400-4800	210	210	266	266	110	.000	.000	.508	.508
H-266-2	523921	1500-5000	210	218	266	280	112	.000	.000	.508	.510
H-266-2	523922	1500-5000	210	218	266	280	112	.000	.000	.508	.510
272 H10	13304	1600-5200	216	216	272	272	110	.000	.000	.524	.524
272 H10	133042	1600-5200	216	216	272	272	110	.000	.000	.524	.524
H-272-2	523941	1800-5400	216	228	272	284	112	.000	.000	.524	.519
H-272-2	523942	1800-5400	216	228	272	284	112	.000	.000	.524	.519
278 H10	13313	2200-5600	222	222	278	278	110	.000	.000	.539	.539
278 H10	133132	2200-5600	222	222	278	278	110	.000	.000	.539	.539
H-278-2	523801	2200-5800	222	234	278	290	114	.000	.000	.539	.534
H-278-2	523802	2200-5800	222	234	278	290	114	.000	.000	.539	.534
H-226/314-2S-6	520341	2400-6000	226	230	286	290	106	.000	.000	.543	.550
H-288-2	524421	2400-6200	226	230	288	292	110	.000	.000	.528	.536
H-288-2	524422	2400-6200	226	230	288	292	110	.000	.000	.528	.536
284 H12	13305	2600-6400	228	228	284	284	112	.000	.000	.554	.554
284 H12	133052	2600-6400	228	228	284	284	112	.000	.000	.554	.554
H-292-2	524551	2800-6600	230	234	292	296	114	.000	.000	.536	.545
H-238/3347-10	520641	3200-6800	238	238	294	294	110	.000	.000	.579	.579
H-250/340-2S-10	520651	3600-7200	250	254	310	314	110	.000	.000	.588	.595

Section Continued





Grind Number	Part Number	RPM Power Range	Duration@ Int.	.050" Exh.	Advertised Int.	d Duration Exh.	Lobe Sep.	Valve Lasi Int.	n Exh.	Gross Va Int.	lve Lift Exh.
Hydraulic Roller Can		etrofit									
HR-216/325-2S-12	529541	1600-5600	216	224	278	286	112	.000	.000	.562	.586
HR-224/339-2S-12	529551	2000-6000	224	232	286	294	112	.000	.000	.586	.609
HR-228/345-2S-12	529801	2500-6500	228	232	290	294	112	.000	.000	.597	.609
HR-232/352-2S-10	529821	2600-6800	232	236	294	298	110	.000	.000	.609	.621
HR-236/359-2S-12	529811	3000-7000	236	240	298	302	112	.000	.000	.621	.631
HR-240/365-2S-10	529831	3200-7200	240	244	302	306	110	.000	.000	.631	.644
Mechanical Lifter Ca	mshafts										
D1ZZ-6250-B	520321	2000-6000	228	228	294	294	109	.024	.026	.502	.502
F-232/330-2S-8	521131	2600-6600	232	238	264	270	108	.020	.022	.571	.581
F-238/3200-2-8	521141	2800-6600	238	248	300	310	108	.022	.022	.554	.577
F-246/3294-2-8	521211	3200-7000	246	256	282	292	108	.026	.026	.570	.590
F-256/3634-2S1-10	521321	4000-7500	256	266	292	302	110	.026	.026	.629	.610
F-260/3694-6	521421	4200-7600	260	260	296	296	106	.026	.026	.639	.639
F-266/400-2S-8	521501	4600-8000	266	276	298	312	108	.018	.018	.692	.702
F-276/3934-8	521631	4800-8200	276	276	312	312	108	.026	.026	.681	.681
Mechanical Roller Co	amshafts										
SR-238/350-2S-12	528511	2800-6800	238	246	288	296	112	.020	.020	.606	.626
R-246/3236-2-8	528371	3200-7200	246	256	284	294	108	.024	.026	.560	.585
SR-246/362-2S-12	528521	3200-7200	246	254	296	304	112	.020	.020	.626	.647
R-252/420-2-8	528801	3600-7600	252	262	284	294	108	.020	.020	.727	.727
R-262/420-2-8	528811	4000-8000	262	272	294	304	108	.020	.020	.727	.727
R-262/4381-25-8	528411	4200-8200	262	268	294	300	108	.020	.022	.758	.758
R-272/420-2-8	528821	4400-8200	272	282	304	314	108	.020	.020	.727	.727
R-278/5002-25-12	528831	4600-8400	278	292	306	320	112	.020	.022	.865	.865
R-282/5001-25-10	528841	5000-8800	282	286	314	318	110	.020	.016	.865	.832

Ford-Mercury V-8 91-10 - 4.6-5.4 Litre SOHC 2 Valve

Hydraulic Roller Fo	llower Cams	hafts									
HR-218/500-2-16	379501	2000-5000	218	228	254	264	116	.000	.000	.500	.500
HR-228/500-2S-12	379511	2400-6200	228	234	264	270	112	.000	.000	.500	.500
HR-212/550-2S-15	379601	1600-5500	212	218	248	254	115	.000	.000	.550	.550
HR-218/550-2-16	379611	2000-5800	218	228	254	264	116	.000	.000	.550	.550
HR-228/550-2S-12	379621	2400-6200	228	234	264	270	112	.000	.000	.550	.550
HR-236/600-2S-14	379631	2800-6600	236	242	272	278	114	.000	.000	.600	.600

Ford-Mercury V-8 93-10 - 4.6-5.4 Litre DOHC 4 Valve

Hyaraulic Koller Fo	llower Camsi	narts									
HR-218/500-12	409501	2000-5800	218	218	254	254	112	.000	.000	.500	.500
HR-218/500-12	409502	2000-5800	218	218	254	254	112	.000	.000	.500	.500
HR-218/500-12	409503	2000-5800	218	218	254	254	112	.000	.000	.500	.500
HR-218/500-12	409504	2000-5800	218	218	254	254	112	.000	.000	.500	.500
HR-228/500-12	409511	2400-6200	228	228	264	264	112	.000	.000	.500	.500
HR-228/500-12	409512	2400-6200	228	228	264	264	112	.000	.000	.500	.500
HR-228/500-12	409513	2400-6200	228	228	264	264	112	.000	.000	.500	.500
HR-228/500-12	409514	2400-6200	228	228	264	264	112	.000	.000	.500	.500
HR-234/500-12	409521	2800-6600	234	234	270	270	112	.000	.000	.500	.500
HR-234/500-12	409522	2800-6600	234	234	270	270	112	.000	.000	.500	.500
HR-234/500-12	409523	2800-6600	234	234	270	270	112	.000	.000	.500	.500
HR-234/500-12	409524	2800-6600	234	234	270	270	112	.000	.000	.500	.500
HR-230/575-12	409601	2400-6200	230		266		112	.000		.575	
HR-230/575-12	409602	2400-6200	230		266		112	.000		.575	
HR-234/575-12	409611	2800-6600	234		270		112	.000		.575	
HR-234/575-12	409612	2800-6600	234		270		112	.000		.575	
HR-238/575-12	409621	3200-6800	238		274		112	.000		.575	
HR-238/575-12	409622	3200-6800	238		274		112	.000		.575	

Grind Number	Part Number	RPM Power Range	Duration Int.	@ .050" Exh.	Adverti Int.	sed Duration Exh.	Lobe Sep.	Valve La Int.	sh Exh.	Gross Va Int.	llve Lift Exh.
		Ford-Mercury	V-8 05-	10 - 4.0	6-5.4 Li	tre SOHC	3 Valve	,			
Hydraulic Roller Foll	ower Camsh										
ZHR-208/468-2S-14	399501	1800-5000	208	224	256	272	114	.000	.000	.468	.516
ZHR-216/492-2S-14	399511	2200-5400	216	236	264	284	114	.000	.000	.492	.552
ZHR-228/528-25-12 ZHR-236/552-25-12	399521 399531	2600-6200 2800-6600	228 236	244 252	276 284	292 300	112 112	.000	.000	.528 .552	.576 .600
ZIII 230/332 23 12									.000	.552	.000
lydraulic Lifter Cam		Mercury V-8 6.	3-/0 - 3 .	52-30U	-390-4	UD-4 I U-4	27-428	cu.in.			
H-248-2	343971	800-4200	192	204	248	260	114	.000	.000	.469	.501
H-260-2	343901	1200-4800	204	216	260	272	112	.000	.000	.501	.533
H-260-2	343902	1200-4800	204	216	260	272	112	.000	.000	.501	.533
266 H10	13404	1400-4800	210	210	266	266	110	.000	.000	.516	.516
266 H10 272 H10	134042 13405	1400-4800 1800-5200	210 216	210 216	266 272	266 272	110 110	.000	.000	.516 .533	.516 .533
272 H10	134052	1800-5200	216	216	272	272	110	.000	.000	.533	.533
H-272-2	343941	1800-5200	216	228	272	284	112	.000	.000	.533	.563
H-272-2	343942	1800-5200	216	228	272	284	112	.000	.000	.533	.563
C8AX-6250-C H-278-2	340301 343801	1800-5200 2000-5400	220 222	230 234	278 278	290 290	116 114	.000	.000	.498 .548	.498 .580
H-278-2	343802	2000-5400	222	234	278	290	114	.000	.000	.548	.580
H-288	344341	2200-5600	226	226	288	288	112	.000	.000	.537	.537
H-288	344342	2200-5600	226	226	288	288	112	.000	.000	.537	.537
H-296-2	344621	2800-6200	234	238	296	300	112	.000	.000	.554	.563
H-298 H-246/330-10	344561 340721	3000-6500 3400-6800	236 246	236 246	298 308	298 308	108 110	.000	.000	.572 .581	.572 .581
lydraulic Roller Can			240	240	300	300	110	.000	.000	.501	.001
HR-214/319-2S-12	349511	1400-5400	214	222	276	284	112	.000	.000	.561	.584
HR-222/320-251-12	349551	1800-5600	222	226	286	290	112	.000	.000	.563	.563
HR-226/3201-2S-12	349561	2000-5800	226	236	290	302	112	.000	.000	.563	.581
HR-234/354-2S-12 HR-242/350-2S-12	349571 349581	2400-6200 2800-6400	234 242	242 248	298 308	306 312	112 112	.000	.000	.623 .616	.651 .616
Mechanical Lifter Ca		2800-0400	242	240	300	312	112	.000	.000	.010	.010
F-238/3200-2-14	341191	2400-6000	238	248	300	310	114	.026	.026	.563	.584
C3AZ-6250-AA	340321	3000-6600	244	244	284	284	114	.018	.022	.524	.524
F-248/3334-12	340471	3400-7000	248	248	310	312	112	.026	.026	.587	.587
F-254/382-2S-10	341341	3800-7200	254	262	286	298	110	.018	.018	.672	.678
F-266/3528-8 Aechanical Roller Co	341461	4200-7600	266	266	302	302	108	.026	.026	.621	.621
SR-240/350-2S-14	348511	2800-6600	240	248	290	298	114	.020	.020	.616	.637
SR-248/362-2S-10	348521	3000-6800	248	256	285	290	110	.020	.020	.637	.658
R-252/420-2-8	348801	3400-7200	252	262	284	294	108	.020	.020	.739	.739
R-260/420-2-10	348821	3800-7600	260	270	292	302	110	.020	.020	.739	.739
R-266/420-2-10 R-276/420-2-10	348831	4200-7800	266 276	276 286	298 308	308 318	110 110	.020 .020	.020 .020	.739 .739	.739 .739
R-276/4334-2S2-10	348841 348291	4600-8200 4800-8400	276	282	316	322	110	.026	.026	.763	.727
R-282/427-251-8	348301	5000-8400	282	286	320	320	108	.028	.026	.752	.752
		Ford-Mercury	V-8 68-	97 - 37	0-429-	460 (7.5)) cu.in.				
lydraulic Lifter Cam	shafts	rora mercary		,, ,,	127	700 (7151	, cuiiii				
H-192/2667-2S-10	350501	800-4200	192	204	248	260	110	.000	.000	.456	.487
H-260-2	353901	1200-4800	204	216	260	272	112	.000	.000	.487	.518
H-260-2	353902	1200-4800	204	216	260	272	112	.000	.000	.487	.518
H-266-2 H-266-2	353931 353932	1400-5000 1400-5000	210 210	218 218	266 266	274 274	114 114	.000	.000	.487 .487	.504 .504
H-272-2	353941	1800-5400	216	228	272	284	112	.000	.000	.518	.513
H-272-2	353942	1800-5400	216	228	272	284	112	.000	.000	.518	.513
H-226/314-2-8	350541	2200-5800	226	236	286	296	108	.000	.000	.537	.556
H-288-2 H-288-2	354551	2400-6000	226 226	230 230	288 288	292 292	112 112	.000	.000	.522 .522	.530
H-288-2 H-230/318-2-14	354552 350551	2400-6000 2600-6200	226	240	288	300	114	.000	.000	.522	.530 .563
H-296-2	354561	3000-6600	236	240	296	300	110	.000	.000	.556	.563
H-296-2	354562	3000-6600	236	240	296	300	110	.000	.000	.556	.563
H-242/378-2S-12	350561	3200-6800	242	250	306	312	112	.000	.000	.646	.636
H-248/3500-8 H-252/400-25-12	350681 350571	3400-7000 3800-7200	248 252	248 256	304 322	304 326	108 112	.000	.000	.599 .684	.599 .684
II-232/400-23-12	3303/1	J0UU-12UU	۷۵۷	۷۵0	322	320	112	.000	.000	.004	.004

Section Continued CRANECAMS.COM





			Duration@	.050"	Advertised	Duration		Valve La	sh	Gross Va	lve Lift
Grind Number	Part Number	RPM Power Range	Int.	Exh.	Int.	Exh.	Lobe Sep.	Int.	Exh.	Int.	Exh.
Hydraulic Roller Can	nshafts — Re	etrofit									
HR-200/311-2S-12	359331	800-4600	200	212	262	274	112	.000	.000	.532	.568
HR-212/332-2S-14	359371	1200-5000	212	216	274	278	114	.000	.000	.568	.556
HR-216/325-2S-12	359341	1400-5400	216	224	278	286	112	.000	.000	.556	.580
HR-228/345-2S-14	359351	2200-6200	228	238	290	300	114	.000	.000	.590	.614
HR-234/340-2S-10	359381	2400-6400	234	242	300	308	110	.000	.000	.581	.581
HR-238/359-2S-12	359361	3000-6600	238	246	300	308	112	.000	.000	.614	.636
HR-246/372-2S-12	359391	3200-6800	246	250	308	312	112	.000	.000	.636	.636
HR-258/372-2S-14	359401	3600-6800	258	266	320	328	114	.000	.000	.636	.636
HR-264/400-2S-14	359411	4000-6800	264	268	334	338	114	.000	.000	.684	.684
Mechanical Lifter Ca	ımshafts										
F-238/3200-2-12	351201	3000-6600	238	248	300	310	112	.022	.022	.547	.570
F-246/3294-2-8	351211	3600-7000	246	256	282	292	108	.026	.026	.563	.583
F-246/3294-2-8	351212	3600-7000	246	256	282	292	108	.026	.026	.563	.583
F-256/3412-2-8	351341	4000-7400	256	266	292	302	108	.026	.026	.583	.603
F-256/3412-2-12	351351	4200-7600	256	266	292	302	112	.026	.026	.583	.603
F-266/3528-2-8	351511	4400-7800	266	276	302	312	108	.026	.026	.603	.624
F-272/3874-2S-8	351601	4600-8000	272	280	308	316	108	.026	.026	.662	.683
F-272/3874-2S-12	351611	4800-8200	272	280	308	316	112	.026	.026	.662	.683
F-274/3934-2S-10	351621	4600-8200	274	278	304	308	110	.012	.012	.673	.684
F-286/3765-2S-12	351631	5000-8400	286	292	322	332	112	.026	.030	.644	.653
Mechanical Roller C	amshafts										
SR-232/338-2S-12	358501	2500-6500	232	240	282	290	112	.020	.020	.578	.599
SR-248/362-2S1-12	358511	3000-6800	248	256	298	306	112	.020	.020	.619	.640
R-252/420-2-10	358801	3400-7200	252	262	284	294	110	.020	.020	.718	.718
SR-252/400-2S-10	358521	3200-7000	252	260	290	298	110	.020	.022	.684	.684
R-258/420-2S-8	358201	3600-7400	258	268	290	300	108	.020	.020	.718	.718
R-266/434-2S-12	358211	3800-7800	266	278	300	310	112	.020	.020	.742	.718
R-268/420-2-10	358821	4000-7800	268	278	300	310	110	.020	.020	.718	.718
R-272/420-251-10	358831	4200-8000	272	280	304	312	110	.020	.020	.718	.718
R-272/436-2S-14	358221	4200-8200	272	280	302	312	114	.020	.022	.746	.732
R-276/420-2-10	358841	4400-8200	276	286	308	318	110	.020	.020	.718	.718
R-276/4334-2S-12 SF01	358231	4600-8400	276	286	316	326	112	.026	.026	.741	.730
R-280/5152-2S-14 SF01	358241	5000-8800	280	296	310	336	114	.020	.030	.881	.805
R-288/5152-2S-16 SF01	358251	5400-9200	288	310	318	346	116	.020	.030	.881	.838

Honda VTEC 4 cyl. 92-00 Civic EX - SOHC 4-V 1.6 Litre D16Y8

Hydraulic Roller Foll	lower Camsh	afts									
HON-224/423-VTEC-11	252-0010	2500-8500	VTEC: 224	210	258	238	110	.008	.010	.423	.386
HON-224/423-VTEC-11	252-0010	2500-8500	PRI: 186	186	214	214	111	.008	.010	.319	.319
HON-224/423-VTEC-11	252-0010	2500-8500	SEC: 190	190	218	218	110	.008	.010	.327	.327
HON-232/443-VTEC-13	252-0012	3000-9000	VTEC: 232	218	266	246	112	.008	.010	.443	.386
HON-232/443-VTEC-13	252-0012	3000-9000	PRI: 186	186	214	214	113	.008	.010	.319	.319
HON-232/443-VTEC-13	252-0012	3000-9000	SEC: 190	190	218	218	110	.008	.010	.327	.327

Camshaft Quick Reference Guide

Grind Number	Part Number	RPM Power Range	Duration(Int.	@ .050" Exh.	Advertis Int.	sed Duration Exh.	Lobe Sep.	Valve La Int.	ısh Exh.	Gross Va Int.	lve Lift Exh.
		MG	TC-TD-TF	4 cyl. 4	1 0-54 -	1250сс					
Mechanical Lifter Ca		1000 1500	100	100	2.42	242	110	24.0	222	257	257
553-0S F-222/280-2-10	340-0002 340-0010	1000-4500 1800-5200	190 222	190 232	242 260	242 270	110 110	.018	.020 .018	.357 .420	.357 .441
MG-T-3	340-0012	2400-5800	234	234	294	294	110	.028	.030	.443	.443
		MGA-N	И <i>GB 4 с</i> у	1. 57-8	0 - 159	8-1798cc					
Mechanical Lifter Ca		1000 1500	100	245	240	262	407.5	042	21.1	276	276
88G303 F-222/280-2-10	342-0002 342-0010	1000-4500 1800-5200	199 222	215 232	248 260	263 270	107.5 110	.012 .014	.014 .016	.376 .399	.376 .419
F-232/294-8	342-0012	2400-5800	232	232	270	270	108	.016	.018	.419	.419
F-260/338-6	342-0107	4000-7500	260	260	312	312	106	.028	.030	.482	.482
Markania II itan Ca		IG Midget-Min	i-Sprite	4 cyl. 5	7-84 B	MCA 848	<u>-12758</u>	cc			
Mechanical Lifter Ca F-222/280-2-10	344-0010	1800-5200	222	232	260	270	110	.012	.014	.353	.370
F-232/294-2-10	344-0012	2200-5600	232	242	270	280	110	.012	.014	.370	.388
F-236/3526-2S-02	344-0102	4500-8000	256	266	290	300	102	.020	.020	.444	.449
Mitsu	ıbishi 4G63,	/4G63-T 4 cyl.	Eclipse -	Talon	- Gallar	it 1989-1	1999 - E	0HC 4	-V 2.0 L	itre	
Hydraulic Roller Foll			200	200	240	240	110	000	000	40.4	204
MIT-248-2SR-10 MIT-256-2SR-10	435-0010 435-0012	800-6500 1200-6800	208 216	200 208	248 256	240 248	110 110	.000	.000	.404 .424	.384 .404
MIT-264-2SR-10	435-0014	1500-7500	224	216	264	256	110	.000	.000	.443	.424
	Mitsubish	i 420A 4 cyl. E	clipse no	n-Turb	o 1995	-1999 - L	DOHC 4-	V 2.0	Litre		
Hydraulic Roller Foll											
MIT-242-8 MIT-246-10	431-0010 431-0012	800-6500 1200-6800	200 204	200 204	242 246	242 246	108 110	.000	.000	.354 .364	.354 .364
MIT-246-2SR-8	431-0012	1500-6800	204	196	246	238	108	.000	.000	.364	.344
MIT-250-8	431-0016	2000-7200	208	208	250	250	108	.000	.000	.374	.374
MIT-258-10	431-0018	2500-7500	216	216	258	258	110	.000	.000	.394	.394
Hydraulic Roller Foll		ıbishi 4G63BT	EVO 8 4	<i>cyl</i> . 20	03-200	15 - DOHC	4-V 2.0) Litre			
MIT-248-2SR-10	440-0010	800-6500	208	200	248	240	110	.000	.000	.404	.384
MIT-256-2SR-10	440-0012	1200-6800	216	208	256	248	110	.000	.000	.424	.404
MIT-264-2SR-10	440-0014	1500-7500	224	216	264	256	110	.000	.000	.443	.424
Oldsmobile \	<i> -8 67-84 - 2</i>	260-307 (5.0L))-3 <i>50 (5</i> .	7L)-40	0-403-	<u> 425-455</u>	<u>cu.in.</u> -	- 39° b	ank an	gle engi	nes
Hydraulic Lifter Cam H-192/2667-25-10	800501	800-4200	192	204	248	260	110	.000	.000	.427	.456
H-260-2	803901	1200-4800	204	216	260	272	112	.000	.000	.456	.484
H-260-2	803902	1200-4800	204	216	260	272	112	.000	.000	.456	.484
H-272-2 H-272-2	804541 804542	1600-5400 1600-5400	216 216	228 228	272 272	284 284	112 112	.000	.000	.484 .484	.512 .512
H-284-2	804551	2200-5800	222	230	284	292	110	.000	.000	.480	.496
H-284-2 H-292-2	804552 804461	2200-5800 2800-6400	222 230	230 234	284 292	292 296	110 110	.000	.000	.480 .496	.496 .504
402194	800101	2600-6000	232	232	300	300	113.5	.000	.000	.474	.474
H-234/325-2-10	800601	2800-6400	234	244	304	314	110	.000	.000	.520	.542
H-238/3347-2-10 H-244/3439-2S-10	800661	3000-6600	238	248	294	304	110	.000	.000	.536 .550	.560 .560
H-248/3500-2S-12		3200-6800	244	256	300	317	110	()()()			
Hydraulic Roller Can	800741 800681	3200-6800 3400-6800	244 248	256 256	300 304	312 312	110 112	.000 .000	.000	.560	.560
	800741 800681 nshafts — Re	3400-6800 etrofit	248	256	304	312	112	.000	.000	.560	.560
HR-214/325-2S-12 IG	800741 800681 nshafts — Re 809611	3400-6800 etrofit 1400-5600	248	256	304 276	312 284	112	.000	.000	.560	.560
HR-214/325-2S-12 IG HR-222/339-2S-12 IG HR-230/352-2S-14 IG	800741 800681 nshafts — Re 809611 809621 809631	3400-6800 etrofit 1400-5600 1800-6000 2200-6400	248 214 222 230	256 222 230 242	276 284 292	284 292 304	112 112 112 114	.000 .000 .000	.000 .000 .000	.560 .520 .542 .563	.560 .542 .563 .595
HR-214/325-2S-12 IG HR-222/339-2S-12 IG HR-230/352-2S-14 IG HR-242/372-2S-14 IG	800741 800681 nshafts — Re 809611 809621 809631 809641	3400-6800 etrofit 1400-5600 1800-6000	248 214 222	256 222 230	276 284	284 292	112 112 112	.000	.000	.560 .520 .542	.560 .542 .563
HR-214/325-2S-12 IG HR-222/339-2S-12 IG HR-230/352-2S-14 IG HR-242/372-2S-14 IG Mechanical Lifter Ca	800741 800681 nshafts — Re 809611 809621 809631 809641	3400-6800 etrofit 1400-5600 1800-6000 2200-6400 3000-6800	248 214 222 230 242	256 222 230 242 254	276 284 292 304	284 292 304 316	112 112 112 114 114	.000 .000 .000 .000	.000 .000 .000 .000	.560 .520 .542 .563 .595	.560 .542 .563 .595 .595
HR-214/325-2S-12 IG HR-222/339-2S-12 IG HR-230/352-2S-14 IG HR-242/372-2S-14 IG	800741 800681 nshafts — Re 809611 809621 809631 809641	3400-6800 etrofit 1400-5600 1800-6000 2200-6400	248 214 222 230	256 222 230 242	276 284 292	284 292 304	112 112 112 114	.000 .000 .000	.000 .000 .000	.560 .520 .542 .563	.560 .542 .563 .595
HR-214/325-2S-12 IG HR-222/339-2S-12 IG HR-230/352-2S-14 IG HR-242/372-2S-14 IG Mechanical Lifter Ca F-238/3200-2-10	800741 800681 nshafts — Re 809611 809621 809631 809641 mshafts 801181 801231	3400-6800 etrofit 1400-5600 1800-6000 2200-6400 3000-6800	248 214 222 230 242 238	256 222 230 242 254	276 284 292 304	284 292 304 316	112 112 112 114 114 110	.000 .000 .000 .000 .000	.000 .000 .000 .000 .000	.560 .520 .542 .563 .595	.560 .542 .563 .595 .595
HR-214/325-2S-12 IG HR-222/339-2S-12 IG HR-230/352-2S-14 IG HR-242/372-2S-14 IG Mechanical Lifter Ca F-238/3200-2-10 F-248/3334-2-8 Mechanical Roller Ca R-252/420-2-8	800741 800681 nshafts — Re 809611 809621 809631 809641 mshafts 801181 801231 amshafts 808801	3400-6800 etrofit 1400-5600 1800-6000 2200-6400 3000-6800 2800-6600 3600-7400	248 214 222 230 242 238 248	256 222 230 242 254 248 258	304 276 284 292 304 300 310	312 284 292 304 316 310 320	112 112 112 114 114 110 108	.000 .000 .000 .000 .000	.000 .000 .000 .000 .000 .000	.560 .520 .542 .563 .595 .512 .533	.560 .542 .563 .595 .595 .595
HR-214/325-2S-12 IG HR-222/339-2S-12 IG HR-230/352-2S-14 IG HR-242/372-2S-14 IG Mechanical Lifter Ca F-238/3200-2-10 F-248/3334-2-8 Mechanical Roller Ca	800741 800681 nshafts — Re 809611 809621 809631 809641 umshafts 801181 801231	3400-6800 etrofit 1400-5600 1800-6000 2200-6400 3000-6800 2800-6600 3600-7400	248 214 222 230 242 238 248	256 222 230 242 254 248 258	276 284 292 304 300 310	284 292 304 316 310 320	112 112 112 114 114 110 108	.000 .000 .000 .000 .000	.000 .000 .000 .000 .000	.560 .520 .542 .563 .595 .512	.560 .542 .563 .595 .595 .595



Duration@ .050" **Advertised Duration** Valve Lash **Gross Valve Lift Grind Number** Part Number **RPM Power Range** Exh. Exh. Lobe Sep. Exh. Int. Int. Int. Int. Exh. Pontiac V-8 55-81 - 265 (4.3L)-287-301 (4.9L)-316-326-347-350-370-389-400 (6.6L)-421-428-455 cu.in. Hydraulic Lifter Camshafts H-192/2667-2S-12 280511 800-4200 192 204 248 260 112 .000 .000 .400 .427 H-260-2 283901 1200-4800 204 216 272 .427 260 112 .000000 454 H-260-2 283902 1200-4800 204 216 260 272 112 .000 .000 .427 .454 9779068 968781 1600-5000 .000 .000 .408 212 225 115.5 .407 272 H10 10507 1800-5200 216 216 272 272 110 .000 .000 .454 .454 272 H10 105072 1800-5200 216 216 272 272 110 .000 .000 .454 .454 283941 1800-5400 284 480 H-272-2 216 228 272 112 .000 .000 .454 H-272-2 283942 1800-5400 216 228 272 284 112 .000 .000 .454 .480 1800-5600 274 7-268-2 283511 218 224 268 112 .000 .000 .459 .473 Z-268-2 283512 1800-5600 218 224 268 274 112 .000 .000 .459 .473 H-278-2 283801 2000-5600 222 234 278 290 114 .000 .000 .467 .494 H-278-2 283802 2000-5600 222 234 278 290 114 .000 .000 .467 494 H-288-2 283951 2400-6000 226 234 288 296 114 .000 .000 .458 .473 H-288-2 283952 288 2400-6000 234 296 114 .000 .000.458 .473 226 284 H12 10508 2800-6200 228 228 284 284 112 .000 .000 .480 .480 284 H12 105082 2800-6200 228 228 284 284 112 .000 .000 .480 .480 9794041 969681 2600-6000 230 113.5 .000 .000 .496 240 .469 280 290 7-280-2 283521 2600-6400 230 240 .000 .000 .486 494 112 Z-280-2 283522 2600-6400 230 240 280 290 112 .000 .000 .486 .494 H-234/325-10 280441 3000-6400 234 234 304 304 110 .000 .000 .488 .488 H-296-2 284281 2800-6600 234 242 296 304 112 .000 .000 .473 .488 H-244/3387-2-8 280451 3400-6800 244 254 314 324 108 .000 .000 .508 .532 3400-7000 246 254 .000 H-308-2 284571 308 316 114 .000 .495 .510 H-260/360-2S-8 280601 3800-7200 260 268 330 338 108 .000 .000 .540 .558 Hydraulic Roller Camshafts -Retrofit HR-214/325-2S-12 IG 289611 1400-5600 214 222 276 284 112 .000 .000 .488 .509 HR-222/339-2S-12 IG 289621 1800-6000 222 230 292 .000 .000 .509 284 112 .528 HR-226/345-251-12 IG 289661 2000-6200 226 234 288 296 112 .000 .000 .518 .539 HR-230/352-2S1-14 IG 289631 2200-6400 230 238 292 300 114 .000 .000 .528 .548 300 HR-238/365-251-14 IG 289651 2600-6600 238 246 308 114 .000 .000 .548 .558 3000-6800 242 252 304 314 114 .000 .000 .558 .558 HR-242/372-2-14 IG 289641 Mechanical Lifter Camshafts 541596 280901 2600-6400 236 247 268 284 113.5 .012 .018 .416 .420 F-244/3454-2S-6 280921 3000-7000 244 252 280 288 106 .026.026 .518 .536 F-248/3334-2-12 281241 3400-7000 248 258 290 300 .022 .500 .520 112 .022 F-252/3574-2\$1-6 280981 3600-7400 260 288 296 .026 .536 .554 252 106 026 F-260/3694-2S-8 281441 4000-7600 260 268 296 304 108 .026 .026 .554 .572 Mechanical Roller Camshafts SR-228/338-2S-12 IG 288541 2200-6200 228 236 278 286 112 .020 .020 .507 .525 .525 SR-236/350-2S-12 IG 288551 2600-6600 236 244 286 294 112 .020 .020 .543 SR-244/362-2S-12 IG 288521 3000-7000 244 252 294 302 112 .020 .020 .543 561 SR-252/374-2S-12 IG 3400-7200 302 306 .020 288531 252 256 112 .020 .561 .561 R-268/420-25-10 288811 4200-7800 268 276 300 308 110 .020 .020 .630 .630 Toyota 20R-22R-22RE 4 cyl. 74-89 - 2189-2666cc Mechanical Follower Camshafts T20-262-2-10 704-0010 1400-4800 224 272 110 .008 .010 .416 .430 214 262 T20-272-2-10 704-0012 1800-5200 008 224 234 110 010 430 444 272 282 T20-282-2-10 704-0014 2200-5600 234 244 282 292 110 .008 .010 .444 .458 T20-292-2-10 704-0016 2600-6000 244 254 292 302 110 .008 .010 .458 .472 T20-302-10 704-0100 3000-6400 254 254 302 302 110 .008 .010 .472 .472

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	rpm Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf	ts										
Brute low-end torque, smooth idle, daily usage, fuel economy, fuel injection compatible, 1600-2200 cruise RPM, 7.75 to 8.75 compression ratio advised.	H-192/2667-2S-10	800- 4200	750501°a	99278-12	192 204	248 260	110	(9) 21 37 (13)	.000 .000	.427 .456	
Good low-end torque, smooth idle, daily usage, fuel economy, fuel injection compatible, off road, towing, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-260-2	1200- 4800	753901*a	99278-12	204 216	260 272	112	(5) 29 45 (9)		.456 .484	
Good low and midrange torque, good idle, daily usage and off road, towing, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	H-272-2	1800- 5400	753941*a	99278-12	216 228	272 284	112	1 35 51 (3)	.000 .000	.484 .512	
Performance usage, good mid and upper RPM HP, serious off road, limited oval track, 10.25 to 11.75 compression ratio advised.	H-222/3200-2-8	2600- 6200	750591*a	99278-12	222 232	294 304	108	8 34 49 3		.512 .538	
Mechanical Lifter Camsh	afts										
Good low-end torque, good idle, daily performance usage, good low and mid-range HP, 3200-3600 cruise RPM, 9.5 to 10.75 compression ratio advised.	F-228/3334-2-12	2200- 6000	751101 ^{*a}	99260-12	228 238	264 274	112	7 41 56 2	.028 .030	.533 .555	
Good mid range torque and HP, fair idle, moderate per- formance usage, serious off-road usage, mild bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 9.5 to 11.0 compression ratio advised. Good w/plate nitrous system.	F-238/3467-2-8	2800- 6600	751121 ^{ta}	99260-12	238 248	264 274	108	16 42 57 11	.028 .030	.555 .576	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: The 1999-05 4.0 litre engines have a camshaft with a different nose configuration. Our camshafts listed above can be used in these engines if the following factory parts are used: 53020443 gear, 53020444 chain, 53020445 gear, and 83502890 bolt kit.

NOTE: To provide the most accurate valve adjustment on hydraulic

NOTE: To provide the most accurate valve adjustment on hydraulic lifter camshafts for 1964-early 1972 engines, special length pushrods can be ordered. Refer to page 305 for special

pushrod ordering instructions and page 374 for checking your hydraulic lifter preload. For late 1972-1998 engines, the rocker stands can be shimmed or longer pushrods installed to provide the proper hydraulic lifter preload. For mechanical camshafts in late 1972-05 engines, screw-in rocker arm studs and pushrod guideplates must be installed to effect valve adjustment. Special order heat treated pushrods are required for use with guideplates.

IMPORTANT: For late 1972-05 engines, if your preload is excessive, this can be remedied by using Crane's

Rocker Arm Bridge Shim Kit (99179-1). Refer to page 324 for details.

NOTE: 1974 American Motors/Jeep 232 and 258 cu.in. engines were equipped with exhaust valve rotators and 11/32" stem exhaust valves. In these instances use 3 of 99936-2 valve spring retainers and 3 of 99820-2 valve seals (on exhaust valves only) to prevent excessive valve spring shimming.

NOTE: 1987-05 American Motors/Jeep 4.0 litre engines are

NOTE: 1987-05 American Motors/Jeep 4.0 litre engines are equipped with 5/16" stem valves, requiring appropriate retainers and valve stem seals as indicated.



NE VALVE TRAIN 19. 358 See pg. 337 SPRING ETAINER VALVE ITS SPRING 96803-1: 96806-1: 96806-1:	See pg. 350 RETAINERS 2b 99948-12b 2c 99948-12b	See pg. 362 VALVE STEM SEALS 99822-12bd 99824-12cd 99824-12cd	See pg. 360 VALVE STEM LOCKS	See pg. 306 PUSHRODS	See pg. 328 TIMING CHAIN AND GEAR ASSEMBLY	See pg. 312 STEEL ROCKER ARMS	See pg. 315 —— ALUMINUM CRANE CLASSIC/ ENERGIZER	
SPRING ETAINER VALVE ITS SPRINGS 96803-1: 96806-1:	5 RETAINERS 2b 99948-12b 2c 99948-12b	VALVE STEM SEALS 99822-12 ^{b,d} 99824-12 ^{c,d}	VALVE STEM		TIMING CHAIN AND GEAR	STEEL ROCKER	— ALUMINUM CRANE CLASSIC/	ROCKERS — GOLD
96803-1: 96806-1:	2 ^b 99948-12 ^b 2 ^c 99948-12 ^b	99822-12 ^{b,d} 99824-12 ^{c,d}	STEM	PUSHRODS	AND GEAR	ROCKER	CRANE CLASSIC/	GOLD
96806-1. 96803-1. 96806-1.	2° 99948-12b	99824-12 ^{c,d}						
96806-1. 96803-1. 96806-1.	2° 99948-12b	99824-12 ^{c,d}						
96806-1								
06803-1								
		99822-12 ^{b,d}						
96806-1	2°	99824-12 ^{c,d}						
		99822-12 ^{b,d} 99824-12 ^{c,d}						
96838-1	2 ^d 99948-12 ^b	99822-12 ^{b,d}						
		99824-12 ^{c,d}						
96838-1	2 ^d 99948-12 ^b	99822-12 ^{b,d} 99824-12 ^{c,d}						
	96806-1: 96838-1:	96806-12° 96838-12 ^d 99948-12 ^b	96806-12 ^c 99824-12 ^{c,d} 96838-12 ^d 99948-12 ^b 99822-12 ^{b,d} 99824-12 ^{c,d} 96838-12 ^d 99948-12 ^b 99822-12 ^{b,d}	96806-12 ^c 99824-12 ^{c,d} 96838-12 ^d 99948-12 ^b 99822-12 ^{b,d} 99824-12 ^{c,d} 96838-12 ^d 99948-12 ^b 99822-12 ^{b,d}	96806-12 ^c 99824-12 ^{c,d} 96838-12 ^d 99948-12 ^b 99822-12 ^{b,d} 99824-12 ^{c,d} 96838-12 ^d 99948-12 ^b 99822-12 ^{b,d}	96806-12 ^c 99824-12 ^{c,d} 96838-12 ^d 99948-12 ^b 99822-12 ^{b,d} 99824-12 ^{c,d} 96838-12 ^d 99948-12 ^b 99822-12 ^{b,d}	96806-12 ^c 99824-12 ^{c,d} 96838-12 ^d 99948-12 ^b 99822-12 ^{b,d} 99824-12 ^{c,d} 96838-12 ^d 99948-12 ^b 99822-12 ^{b,d}	96806-12 ^c 99824-12 ^{cd} 96838-12 ^d 99948-12 ^b 99822-12 ^{b,d} 99824-12 ^{cd} 96838-12 ^d 99948-12 ^b 99822-12 ^{b,d}

To install these camshafts in 1995-05 4.0 litre engines, see the IMPORTANT NOTE on the opposite page.

<sup>b Except 4.0 litre engines.
c For 4.0 litre engines.
d Must machine cylinder head.</sup>

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	rpm Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
ydraulic Lifter Camshat	ts									
Brute low-end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 7.75 to 8.75 com- pression ratio advised.	H-192/2667-2S-10	800- 4200	860501*	99278-16	192 204	248 260	110	(9) 21 37 (13)	.000 .000	
Great low-end torque, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200- 2800 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-260-2	1200- 4800	863901° 863902°a	99278-16	204 216	260 272	112	(5) 29 45 (9)	.000	
Good low and mid range torque, good idle, daily usage and off road, towing, performance and fuel effi- ciency, 2600-3000 cruise RPM, 8.75 to 10.5 compres- sion ratio advised.	H-272-2	1800- 5400	863941* 863942*a	99278-16	216 228	272 284	112	1 35 51 (3)	.000 .000	
Good mid range torque and HP, good idle, daily per- formance usage, mild bracket racing, 3000-3400 cruise RPM, mild supercharged, mild nitrous, 9.5 to 10.75 compression ratio advised.	H-278-2	2200- 5800	863801° 863802°a	99278-16 99378-16*b	222 234	278 290	114	2 40 56 (2)	.000 .000	.498 .527
Good mid range to upper RPM torque and HP, good idle, moderate performance usage, bracket racing, 3200-3600 cruise RPM, 9.5 to 11.0 compression ratio advised.	H-288-2	2400- 6000	864441* 864442*ª	99278-16 99378-16*b	226 230	288 292	112	6 40 52 (2)	.000 .000	
Good mid range to upper RPM torque, rough idle, moderate performance usage, serious off road, bracket racing, 3200-3600 cruise RPM, 10.0 to 11.0 compres- sion ratio advised.	H-232/310-8	2800- 6200	860641*	99278-16 99378-16 [®]	232 232	312 312	108	14 38 50 2	.000	
Good mid to upper RPM HP, rough idle, performance usage, auto trans w/2500+ converter, 3400-3800 cruise RPM, mild nitrous, supercharged 10-14#, 10.0 to 11.5 compression ratio advised.	H-302-2	3000- 6600	864561*	99278-16 99378-16*b	232 242	302 312	112	9 43 58 4	.000 .000	.538 .563
Good upper RPM HP, rough idle, performance usage, bracket racing, 390 cu.in., auto trans w/3500+ con- verter, 3800-4200 cruise RPM, mild nitrous, 11.0 to 12.5 compression ratio advised.	H-242/3520-2-12	3400- 7000	860661°	99278-16 99378-16*b	242 252	314 324	112	14 48 63 9		.563 .589
Moderate competition only, rough idle, good upper RPM HP, bracket racing, 401+ cu.in., auto trans w/4000+ converter, good with aluminum heads, plate nitrous, 12.5 minimum compression ratio advised.	H-252/3680-2-10	4000- 7200	860681°	99278-16 99378-16*b	252 262	324 334	110	21 51 66 16	.000 .000	.589 .614

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: To provide the most accurate valve adjustment on hydraulic lifter camshafts for 1966-1973 engines, a set of positive locking nuts should be obtained for the rocker arm studs. For 1974-1991 engines, the rocker stands can be shimmed, or longer pushrods installed to provide the proper hydraulic lifter preload. Special order heat treated pushrods are required for use with guideplates.

IMPORTANT: If your hydraulic lifter preload is excessive, this can be easily remedied by using Crane's Rocker Arm Bridge Shim Kit (99179-1). Refer to page 324 for details.

NOTE: Special length pushrods can be ordered to provide proper hydraulic lifter preload. Refer to page 305 for special pushrod ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Some 1978 and 1979 engines may not be able to obtain the

correct valve spring assembled height with the components listed. Different springs and retainers may be required. Contact Crane's Performance Consultants for details.

NOTE: 1973 and 1974 American Motors/Jeep 360 and 401 cu.in. engines are equipped with exhaust valve rotators and 11/32" stem exhaust valves. In these instances, use 4 of 99936-2 valve spring retainers and 99820-8 valve seals (on the exhaust valves only) to prevent excessive valve spring shimming.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
64308-1°	99839-16 ^c	99957-16		99098-1°	95637-16 ^f	86977-1*h		36774-16 ^{h,i} 11746-16 ^{j,i}	36750-16 ^k 86757-16 ^{l,}
64308-1 ^c	99839-16°	99957-16		99098-1°	95637-16 ^f	86977-1* ^g		36774-16 ^{h,i} 11746-16 ^{j,i}	36750-16 ^t 86757-16 ^t
64308-1 ^c	99839-16 ^c	99957-16		99098-1°	95637-16 ^f	86977-1* ⁹		36774-16 ^{h,j} 11746-16 ^{j,j}	36750-16 86757-16
64308-1 ^c	99839-16 ^c	99957-16		99098-1°	95637-16 ^f	86977-1* ^g		36774-16 ^{h,i} 11746-16 ^{j,i}	36750-16 86757-16
64308-1 ^c	99839-16°	99957-16		99098-1°	95637-16 ^f	86977-1* ⁹		36774-16 ^{h,i} 11746-16 ^{j,i}	36750-16 86757-16
	99838-16 ^d	99948-16		99098-1°	95637-16 ^f	86977-1* ^g		36774-16 ^{h,i} 11746-16 ^{j,i}	36750-16 86757-16
	99838-16 ^d	99948-16	99822-16 ^d	99098-1°	95637-16 ^f	86977-1* ⁹		36774-16 ^{h,i} 11746-16 ^{j,i}	36750-16 86757-16
	99838-16 ^d	99948-16	99822-16 ^d	99098-1°	95637-16 ^f	86977-1* ^g		36774-16 ^{h,i} 11746-16 ^{j,i}	36750-16 ¹ 86757-16 ¹
	99893-16 ^d	99954-16	99822-16 ^d	99098-1°	95637-16 ^f	86977-1* ⁹		36774-16 ^{h,i} 11746-16 ^{j,i}	36750-16 86757-16

a Cam and lifter kit, includes installation lubricants and Rocker Arm Bridge Shim Kit.

b Optional Hi Intensity hydraulic lifters, see page 292 for details.

c Contains standard diameter valve springs, no machining required.

d Must machine cylinder heads.

e Machined steel, heat treated, for engines with single groove valve stems.

f Pro Series one-piece, for 1970-1991 304 thru 401 engines.

g Pro Series steel billet gears and roller chain with thrust bearing.

Crane Classic extruded, 1.6 ratio, 3/8" stud.

i Must machine 74-91 cylinder heads and install 99156-16 3/8" rocker arm studs (or 99157-16 7/16 rockers) and aftermarket pushrod guideplates. Special order heat-treated pushrods are required for use with guideplates. See page 305 for special pushrod ordering instructions.

j Energizer, 1.6 ratio, 3/8" stud.

k 1.6 ratio, 3/8" stud.

I 1.6 ratio, 7/16" stud.

					СОМ	PLETE C	AM SPE	CIFICAT	IONS	
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 293	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Gross Lift Int.
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.
lydraulic Roller Camsha			0.40.204*	04800 440	200	264	442	(2) 24		520
Brute low end torque and HP, good idle, daily usage, performance and fuel efficiency, towing, 2200-3000 cruise RPM, 8.0 to 9.5 compression ratio advised.	HR-208/3313-2S-12	1000- 5200	869501*	86532-16ª	208 216	264 272	112	(3) 31 45 (9)		.530 .530
			€							
Excellent low end torque and HP, good idle, daily usage, off road, performance and fuel efficiency, mild turbocharged, 2600-3400 cruise RPM, 8.75 to 10.5 compression ratio advised.	HR-216/325-2S-12	1600- 5600	869511*	86532-16ª	216 224	278 286	112	1 35 49 (5)		.520 .542
Good low end and mid range torque and HP, fair idle, moderate performance usage, serious off road, mild bracket racing, auto trans w/2500+ converter, 3000- 3800 cruise RPM, 9.5 to 10.75 compression ratio advised.	HR-224/339-25-12	2000- 6000	869521*	86532-16ª	224 232	286 294	112	5 39 53 (1)	.000 .000	.542 .563
Good mid range torque and HP, fair idle, moderate per- formance usage, serious off road, mild bracket racing, 390+ cu.in., auto trans w/2800+ converter, 3400-4200 cruise RPM, 10.0 to 11.5 compression ratio advised.	HR-232/352-2S-10	2600- 6600	869531"	86532-16 ^a	232 240	294 302	110	11 41 55 5		.563 .584
Good upper RPM torque and HP, rough idle, performance usage, professional off road, bracket racing, 401+ cu.in., auto trans w/3500+ converter, good with aluminum heads, 4000-4800 cruise RPM, 11.0 to 12.5 compression ratio advised.	HR-244/372-2S-12	3200- 7000	869541*	86532-16ª	244 256	306 318	112	15 49 65 11		.595 .595
Mechanical Lifter Camsh	afts									
Good mid range torque and HP, fair idle, moderate performance usage, off road, 3200-3600 cruise RPM, 10.0 to 11.5 compression ratio advised.	F-238/3200-2-12	2800- 6400	861201*	99260-16	238 248	300 310	112	12 46 61 7	.022 .022	.512 .533
Good mid range to upper RPM torque and HP, rough idle, performance usage, 3800-4200 cruise RPM, serious off road, 10.5 to 12.0 compression ratio advised.	F-248/3334-2-12	3400- 7000	861241*	99260-16	248 258	310 320	112	17 51 66 12	.022 .022	
			€							
Good upper RPM torque and HP, rough idle, performance usage, serious off road, bracket racing, 390+ cu.in., auto w/3500+ converter, good with aluminum heads, 11.0 to 12.5 compression ratio advised.	F-258/3468-8	4000- 7400	861321*	99260-16	258 258	320 320	108	26 52 62 16	.022 .022	.555 .555
Mechanical Roller Camsh	afts									
Good low end and mid range torque and HP, fair idle, moderate performance usage, serious off road, mild bracket racing, auto trans w/2500+ converter, 3200- 3600 cruise RPM, 10.0 to 11.25 compression ratio advised.	SR-236/350-25-10	2600- 6600	868511*	66550-16 ^b	236 244	286 294	110	13 43 57 7	.020 .020	.560 .579
Competition only, good mid and upper RPM torque and HP, oval track, bracket racing, auto trans w/3500+converter, professional off road, 11.5 minimum compression ratio advised.	R-258/420-25-6	3800- 7800	868821*	66550-16 ^b	258 266	290 298	106	26 52 62 24		.672 .672

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: Hydraulic roller camshafts require special length pushrods. Refer to page 305 for special pushrod ordering instructions, and page 374 for checking your lifter preload. To provide the most accurate valve adjustment on hydraulic roller lifter camshafter, screw in refer arm edge and pushrod. lifter camshafts, screw-in rocker arm studs and pushrod guideplates can be installed to effect valve adjustment.

NOTE: For mechanical or roller lifter camshafts, screw-in rocker arm studs and pushrod guideplates must be installed to effect valve adjustment. Special order heat treated pushrods are required for use with guideplates. Refer to page 305 for capital nutbed order in instruction.

special pushrod ordering instructions.

NOTE: Some 1978 and 1979 engines may not be able to obtain the correct valve spring assembled height with the components listed. Different springs and retainers may be required.

Contact Crane's Performance Consultants for details.

NOTE: 1973 and 1974 American Motors/Jeep 360 and 401 cu.in.
engines are equipped with exhaust valve rotators and 11/32" stem exhaust valves. In these instances, use 4 of **99936-2** valve spring retainers and **99820-8** valve seals (on the exhaust valves only) to prevent excessive valve spring shimming.



CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	99893-16°	99954-16	99822-16 ^c	99098-1 ^d	95622-16°	86977-1*f		36774-16 ^{g,h} 11746-16 ^{i,h}	36750-16 86757-16
	99893-16°	99954-16	99822-16°	99098-1 ^d	95622-16°	86977-1*f		36774-16 ^{g,h} 11746-16 ^{i,h}	36750-16 86757-16
	99893-16°	99954-16	99822-16	99098-1 ^d	95622-16°	86977-1*f		36774-16 ^{g,h} 11746-16 ^{i,h}	36750-16 86757-16
	99893-16°	99954-16	99822-16°	99098-1 ^d	95622-16°	86977-1* ^f		36774-16 ^{9,h} 11746-16 ^{i,h}	36750-16 86757-16
	99893-16°	99954-16	99822-16 ^c	99098-1 ^d	95622-16°	86977-1*f		36774-16 ^{g,h} 11746-16 ^{i,h}	36750-16 86757-16
	99838-16°	99948-16	99822-16'	99098-1 ^d	95641-16°	86977-1*f		36774-16 ^{g,h}	36750-16 86757-16
	99838-16°	99954-16	99822-16°	99098-1 ^d	95641-16°	86977-1° ^f		36774-16 ^{g,h}	36750-16 86757-16
	99838-16°	99954-16	99822-16 ^c	99098-1 ^d	95641-16°	86977-1*f		36774-16 ^{g,h}	36750-16 86757-16
	99838-16°	99954-16	99822-16'	99098-1 ^d	95645-16°	86977-1* ^f		36774-16 ^{g,h}	36750-16 86757-16
	99876-16°	99963-16	99822-16°	99098-1 ^d	95645-16°	86977-1*f	_	36774-16 ^{g,h}	36750-16 ³ 86757-16 ⁴

Special length pushrods are required.
Ultra Pro Series roller lifters, with -.200" height pushrod seats, special length pushrods are required.
Must machine cylinder heads.
Machined steel, heat treated for engines with single groove valve stems.
Pro Series one piece, for 1970-1995 304 thru 401 engines.
Pro Series stell billet gears and roller chain with thrust bearing.

Crane Classic extruded, 1.6 ratio, 3/8" stud.

Must machine 74-91 cylinder heads and install 99156-16 rocker arm studs and aftermarket pushrod guideplates. Special order heat-treated pushrods are required for use with guideplates. See page 305 for special pushrod ordering instructions.
 Energizer, 1.6 ratio, 3/8"stud.
 1.6 ratio, 3/8" stud.
 1.6 ratio, 7/16" stud.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Lifter Camshat	fts									
Brute low end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 7.75 to 8.75 com- pression ratio advised.	H-194/250-2S-10	800- 4200	850501°	99284-16	194 202	252 260	110	(8) 22 36 (14)	.000 .000	.400 .416
Good low end torque, smooth idle, daily usage, towing, economy, also mild turbocharged, 2200-2800 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-202/260-2S-10	1200- 4800	850521°	99284-16	202 210	260 268	110	(4) 26 40 (10)		.416 .432
Good low to mid range torque, good idle, daily usage, towing, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	H-218/280-25-12	1800- 5400	850571* 3	99284-16	218 226	276 284	112	2 36 50 (4)	.000 .000	.448 .464
Good mid range torque, fair idle, moderate perfor- mance usage, good mid-range HP, excellent for 455GS, bracket racing, 3400-3800 cruise RPM, 9.5 to 11.0 compression ratio advised.	H-226/290-25-10	2200- 5800	850631°	99284-16 99384-16*a	226 234	284 292	110	8 38 52 2	.000	.464 .480
Replacement for factory Stage 2 camshaft.	BluePrinted 1385557	2200- 5800	850421*	99284-16 99384-16*a	226 255	312 332	115	4.5 41.5 69 6	.000 .000	.453 .482
Rough idle, performance usage, good mid-range HP, 3800-4200 cruise RPM,10.5 to 12.0 compression ratio advised.	H-242/310-25-10	2800- 6600	850671* ⑤	99284-16 99384-16*a	242 250	300 308	110	16 46 60 10		.496 .512
Performance usage, good upper RPM HP for large dis- placement engines, bracket racing, auto trans w/race converter, also nitrous, 12.0 minimum compression ratio advised.	H-252/348-25-12	3600- 6800	850701°	99284-16 99384-16*a	252 260	322 330	112	19 53 37 13	.000 .000	.557 .576

Cadillac V-8 68-81

368-425-472-500 cu.in.

Hydraulic Lifter Camsha	fts								
Excellent low end torque, smooth idle, daily usage, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-202/260-2S-14	1200- 4800	1020541*	99284-16	202 210	260 268	114	(8) 30 44 (14)	.000 .447 .000 .464
Good low end torque, good idle, daily usage, towing, economy, mild marine usage, airboat, mild turbo-charged, 2400-2800 cruise RPM, 8.5 to 10.0 compression ratio advised.	H-210/270-25-12	1400- 5200	1020561*	99284-16	210 218	268 276	112	(2) 32 46 (8)	.000 .464 .000 .482
Good low and mid range torque, good idle, daily usage, performance, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	H-218/280-25-12	1800- 5600	1020571*	99284-16	218 226	276 284	112	2 36 50 (4)	.000 .482 .000 .499
Good mid range torque and HP, fair idle, moderate performance usage, bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 9.5 to 11.0 compression ratio advised.	H-226/290-25-12	2200- 5800	1020631*	99284-16 99384-16*a	226 234	284 292	112	6 40 54 0	.000 .499 .000 .516
Rough idle, performance usage, good mid and upper RPM torque and HP, bracket racing, auto trans w/3000+ converter, 10.0 to 11.5 compression ratio advised.	H-234/300-25-12	2800- 6400	1020641*	99284-16 99384-16*ª	234 242	292 300	112	10 44 58 4	.000 .516 .000 .533

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: Mechanical lifter camshafts and components are available

on special order.

NOTE: To provide the most accurate valve adjustment on hydraulic lifter camshafts, special length pushrods can be ordered. Refer to page 305 for special pushrod ordering instructions, and page 374 for checking your hydraulic lifter preload.



CRANE VALV	/E TRAIN CC	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 3
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC/ ENERGIZER	ROCKERS GOLI RACI
	99838-16	99910-16	99822-16 ^b						
	99838-16	99910-16	99822-16 ^b						
	99838-16	99910-16	99822-16 ^b						
	99838-16	99910-16	99822-16 ^b						
	99838-16	99910-16	99822-16 ^b						
	99030-10	33310-10	77022-10						
	99838-16	99910-16	99822-16 ^b						
	99838-16	99910-16	99822-16 ^b						
	99838-16	99910-16	99822-16 ^b						

99848-16	99916-16	99820-16 ^b	99097-1°	102621-16 ^d
99848-16	99916-16	99820-16 ^b	99097-1°	102621-16 ^d
99848-16	99916-16	99820-16 ^b	99097-1°	102621-16 ^d
99848-16	99916-16	99820-16 ^b	99097-1°	102621-16 ^d
99848-16	99916-16	99820-16 ^b	99097-1°	102621-16 ^d

- Optional Hi Intensity hydraulic lifters, see page 292 for details.

 Must machine cylinder heads.

 Machined steel, heat treated.

 Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Lifter Camshaf	ts									
Brute low end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 7.75 to 8.75 com- pression ratio advised.	H-192/2667-2S-12	800- 4200	200511*	99277-12	192 204	248 260	112	(11) 23 39 (15)	.000 .000	.467 .498
Good low end torque, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-260-2	1200- 4800	203901*	99277-12	204 216	260 272	112	(5) 29 45 (9)	.000	.498 .530
Good low to mid range torque, good idle, daily usage and off road, towing, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	H-272-2	1800- 5400	204541*	99277-12	216 228	272 284	112	1 35 51 (3)		.530 .560
Performance usage, good mid range to upper RPM torque and HP, oval track, radical off road, 10.5 minimum compression ratio advised.	H-234/3250-2-6	3000- 6000	200541*	99277-12	234 244	304 314	106	15 39 52 12	.000	.569 .593
Mechanical Lifter Camsh	afts									
Good mid range torque and HP, fair idle, moderate performance usage, 1/4-3/8 oval track, off road, 3400-3800 cruise RPM,10.0 to 11.5 compression ratio advised.	F-238/3200-2-8	2800- 6600	201141*	99250-12	238 248	304 314	108	16 42 57 11	.022 .022	.560 .583
Rough idle, performance usage, good mid and upper RPM HP, 3/8-1/2 oval track, bracket racing, 11.0 to 12.5 compression ratio advised.	F-248/3334-2-6	3400- 6800	201221*	99250-12	248 258	310 320	106	22 46 59 19	.022 .022	.583 .607
Performance usage, good mid and upper RPM HP, bracket racing, long unlimited oval track, 12.25 mini- mum compression ratio advised.	F-256/3634-2S-8	4200- 7200	201311*	99250-12	256 260	292 296	108	23 53 61 19		.636 .646

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: Roller camshafts and components are available on special order. See page 369 regarding outright steel billet camshafts.

NOTE: The 1963-84 Chevrolet I6 292 cu. in. engines use a different camshaft core than the 194-230-250 engines, and are not interchangeable.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC/ ENERGIZER	
	99838-12	99944-12	99820-12ª	99097-1 ^b	20621-12 ^c 20622-12 ^d				20750-12 ^e 13750-12 ^f
	99838-12	99944-12	99820-12ª	99097-1 ^b	20621-12 ^c 20622-12 ^d				20750-12 ^e 13750-12 ^f
	99838-12	99944-12	99820-12ª	99097-1 ^b	20621-12 ^c 20622-12 ^d				20750-12° 13750-12 ^f
	99838-12	99944-12	99820-12ª	99097-1 ^b	20621-12 ^c 20622-12 ^d				20750-12 ^e 13750-12 ^f
	99893-12	99953-12	99820-12ª	99097-1 ^b	20621-12 ^c 20622-12 ^d				20750-12° 13750-12 ^f
	99893-12	99953-12	99820-12ª	99097-1 ^b	20621-12 ^c 20622-12 ^d				20750-12 ^e 13750-12 ^f
	99893-12	99953-12	99820-12ª	99097-1 ^b	20621-12 ^c 20622-12 ^d				20750-12 ^e 13750-12 ^f

a Must machine cylinder head
 b Machined steel, heat treated
 c Heavy wall, heat treated, for 194-230-250 engines

d Heavy wall, heat treated, for 194-230-250 engines, for use with Crane aluminum rocker arms
 e 1.7 ratio, 3/8 stud, requires 20622-12 pushrods
 f 1.7 ratio, 7/16 stud, requires 20622-12 pushrods

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf	ts										
Brute low end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 7.75 to 8.75 compression ratio advised.	H-192/2667-2S-12	800- 4200	250511"	99286-12	192 204	248 260	112	(11) 23 39 (15)	.000 .000	.400 .427	
Low and mid-range torque and HP, great choice for cars and 4x4 trucks, highway or off road. Works really great for trailer towing.	2020	800- 4200	254112*a,b	99286-12	198 204	258 264	104	(1) 19 30 (6)	.000	.401 .427	
Mid and upper range torque and HP improver for cars, especially Camaros, S-10 pick-up's, Blazers, Jimmy's , etc., and all performance applications.	2030	1200- 4600	254122*a,b	99286-12	204 214	264 274	109	(3) 27 40 (6)		.423 .423	
Good low end torque, good idle, daily usage and off road, towing, economy, also mild turbocharged, 2200-3000 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-260-2	1200- 4800	253901* 253902*b	99286-12	204 216	260 272	112	(5) 29 45 (9)	.000	.427 .454	
Good low to mid range torque, good idle, daily usage & off road, towing, performance & fuel efficiency, increased compress. ratio & gearing advised, 2600-3200 cruise RPM, 8.75 to 10.5 compression ratio advised.	H-272-2	1800- 5400	253941*	99286-12	216 228	272 284	112	1 35 51 (3)	.000 .000	.454 .480	
Good mid to upper RPM torque and HP, fair idle, serious off road, moderate performance usage, 3000-3600 cruise RPM, 9.75 minimum compression ratio advised.	H-222/3114-25-10	2200- 6000	250321*	99286-12	222 234	278 290	110	6 36 52 2	.000 .000	.467 .494	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: These camshafts are for use in distributor equipped

engines only.

IMPORTANT: Certain 1991 and later engines may have 8mm diameter valve stems. Our 11/32″retainers and valve stem locks will not be applicable in these instances. Some engines also have a 1.600" valve spring assembly height, that will not allow the use of our recommended valve springs and retain**IMPORTANT:** Some engines may have oversize (.010") diameter lifters, check for white paint markings above lifter bores indicating their use.

NOTE: Roller camshafts and components are available on special order. Contact Crane's Performance Consultants for details.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VAL	VE TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 31.
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC/ ENERGIZER	
	99848-12°	99915-12		99097-1 ^{e,f}	25621-12 ⁹				25750-1 25759-1
	99848-12°	99915-12		99097-1 ^{e,f}	25621-12 ⁹				25750-1 25759-1
	99848-12°	99915-12		99097-1 ^{e,f}	25621-12 ⁹				25750-1 25759-1
	99848-12°	99915-12		99097-1 ^{e,f}	25621-12 ⁹				25750-1 25759-1
	99848-12° 96802-12° ^d	99915-12		99097-1 ^{e,ff} 99095-1 ^{e,f}	25621-12 ⁹				25750-1 25759-1
	99848-12° 96802-12°	99915-12		99097-1 ^{e,f} 99095-1 ^{e,f}	25621-12 ⁹				25750-1 25759-1

For 1981-89 applications.

Cam and Lifter Kit, includes installation lubricants.

Standard diameter valve springs, no machining required.

d Additional assembly height required, use 99095-1 valve stem locks.
 e For 11/32" diameter valve stems.
 f Machined steel, heat treated.

For cast iron inline-valve cylinder heads, heavy wall, heat treated, for use with pushrod guideplates. 1.5 ratio,narrow body (not self-aligning), with special $10 \text{mm} \times 1.50$ bottom $\times 3/8\% \times 24$ top rocker arm studs included.

^{1.6} ratio,narrow body (not self-aligning), with special 10mm x 1.50 bottom x 3/8"x 24 top rocker arm studs included.

		COMPLETE CAM SPECIFICATIONS									
	Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Н	ydraulic Roller Camsha	fts									
Br pe tic or ity	ute low end torque, smooth idle, low and mid-range erformance in passenger car, van and truck applica- ons. Great choice for either manual four or five speed automatic transmission. Greatly improves driveabil- ute, especially on the highway. Runs strongest from 100 RPM and up.		800- 4600	1439801*	10530-12ª	194 204	250 260	112	(10) 24 39 (15)	.000 .000	.407 .429
to	ood low end torque, smooth idle, daily usage, light wing, economy, also mild turbo-charged, 2200-3000 uise RPM, 8.0 to 9.5 compression ratio advised.	HR-204/286-25-12	1200- 5200	1439811*	10530-12ª	204 214	260 276	112	(5) 29 44 (10)	.000	.429 .430
to	ood low end torque, good idle, daily usage, off road, wing, performance and fuel economy, 2600-3400 uise RPM, 8.75 to 10.75 compression ratio advised.	HR-214/325-25-12	1600- 5600	1439721*	10530-12ª	214 222	276 284	112	(0) 34 48 (6)	.000 .000	.488 .509
pe w	ood low and mid range torque, fair idle, moderate erformance usage, mild bracket racing, auto trans /2500+ converter, 3000-3800 cruise RPM, 9.5 to 0.75 compress. ratio advised, also mild supercharged.	HR-222/339-25-12	2200- 6000	1439731*	10530-12ª	222 230	284 292	112	(4) 38 52 (2)	.000	.509 .528
at au	ood mid to upper RPM torque and HP, fair idle, moder- e performance usage, serious off road, bracket racing, to trans with 2800+ converter, 10.25 to 11.5 com- ession ratio advised, also mild supercharged.	HR-230/352-25-12	2600- 6400	1439531*	10530-12ª	230 234	292 296	112	8 42 54 0	.000 .000	.528 .539

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application. NOTE: The hydraulic roller camshafts listed above do not have a

NOTE: The hydraulic roller camshafts listed above do not have a fuel pump eccentric, therefore a mechanical fuel pump cannot be used with them (as some marine applications may require).

NOTE: 1985-91 Chevrolet 90° V-6 262 cu.in. (4.3L) engines have a different firing configuration than the 200-229 cu.in. engines, and cannot use the 200-229 camshaft. The 1987-91 262 cu.in. (4.3L) engines are equipped with hydraulic roller

camshafts that use a different configuration camshaft core than the 85-86 engines and cannot be interchanged. These 1992-2002 (4.3L) engines incorporate a balance shaft and utilize a different camshaft core that cannot be interchanged with previous models.

NOTE: Mechanical roller camshafts and components are available on special order.

NOTE: Many Chevrolet 262-400 V-8 valve train components are applicable to the 90° V-6 engines. Contact Crane's Performance Consultants for details.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM Crane Classic Energizer	
	96802-12 ^b	99915-12		99097-1 ^d	10621-12°		11801-12 ^{f,k}	11774-12 ^{g,k} 11744-12 ^{h,k}	11750-12 ^{i,k} 10751-12 ^{j,k}
	96802-12 ^b	99915-12		99097-1 ^d	10621-12°		11801-12 ^{f,k}	11774-12 ^{g,k} 11744-12 ^{h,k}	11750-12 ^{i,k} 10751-12 ^{j,k}
	99838-12°	99944-12		99097-1 ^d	10621-12°		11801-12 ^{f,k}	11774-12 ^{g,k} 11744-12 ^{h,k}	11750-12 ^{i,k} 10751-12 ^{j,k}
	99838-12°	99944-12		99097-1 ^d	10621-12°		11801-12 ^{f,k}	11774-12 ^{g,k} 11744-12 ^{h,k}	11750-12 ^{i,k} 10751-12 ^{j,k}
	99838-12°	99944-12		99097-1ª	10621-12°		11801-12 ^{f,k}	11774-12 ^{g,k} 11744-12 ^{h,k}	11750-12 ^{i,k} 10751-12 ^{j,k}

For use with standard GM alignment bars.

Standard diameter valve springs, no machining required.

Must machine cylinder heads.

Machined steel, heat treated.

Heat treated, heavy wall, for use with or without pushrod guideplate cylinder heads.

^{1.5} ratio, 3/8" stud, extra long slot (not self-aligning).

Crane Classic extruded 1.5 ratio, 3/8" stud (not self-aligning).

Energizer 1.5 ratio, 3/8" stud (not self-aligning).

^{1.5} ration, 3/8" stud (not self-aligning).

^{1.5} ratio, 3/8" stud, self-aligning, narrow body for center bolt valve covers.
Early 1992 engines are equipped with 3/8" stud self-aligning rocker arms. Late 1992 and later engines have 8mm stud self-aligning rocker arms. These engines can be converted to 3/8" studs by installing 6 of our 99148-2 rocker arm studs which have a 10mm bottom thread and a $3/8^{\prime\prime}-24$ top thread (no machining is required). Appropriate pushrod guideplates must be installed if non self-aligning type rocker arms are used. If aluminum rocker arms are desired, only the narrow body configuration will fit if standard center bolt valve covers are being used.

Chevrolet Small Block V8 Tech Tips & Notes

1957-1987 262-400 V8 (262-265-267 (4.4L)-283-302-305 (5.0L)-307-327-350 (5.7L)-400 cu.in.)

The classic Small Block Chevrolet V8 was introduced in 1955, in a 265 cu.in. version. The 1955-56 265 engines required a camshaft having a flat machined on the rear cam bearing journal to allow for oil flow to the lifter galleries and the top end. If you are using one of these blocks, a flat must be machined in center of the rear cam journal, .350" wide and .080" deep. Another option would be installing later model cam bearings in these early blocks. If your camshaft already has a flat on the rear journal, it will not cause any oiling problems if used in a later engine.

The entire family of engines, designated by Crane Cams' 11 prefix (except the Energizer line of camshafts), were equipped from the factory with flat faced lifters, either hydraulic or mechanical, throughout their production run. We offer complete lines of hydraulic, hydraulic roller, mechanical, and mechanical roller camshafts, lifters, and valve train components for these. Although we list this engine family as running through 1987, some truck applications continued through 1995. It's important to verify the engine type when dealing with these vehicles to insure the proper components are being obtained.

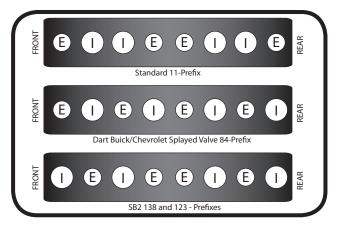
Cast hydraulic and mechanical lifter camshafts are available with standard cam bearing sizes, and also optional Chevrolet Big Block bearing sized journals (1.948" dia.), indicated by a BB suffix in the grind number. The standard firing order is 1-8-4-3-6-5-7-2, and cast standard journal camshafts can also be ordered with our SFO suffix firing order configuration of 1-8-7-3-6-5-4-2.

Crane Cams' retrofit hydraulic roller and mechanical roller camshafts are produced from steel billet material, heat treated, and finish ground in a variety of versions. Our retrofit hydraulic roller lifters do not require any block machining, and are a drop-in configuration, incorporating a vertical locking bar. For street and endurance applications, we offer camshafts equipped with a cast iron distributor drive gear and rear journal installed on the steel camshaft. These are noted by an IG suffix (Iron Gear), allowing the use of a standard type distributor gear for long term reliability.

There are many journal size options available for the roller camshafts, including: Standard (1.868"); Roller Bearing (1.875") – RB suffix; Big Block (1.948") – BB suffix; Large Roller Bearing (50mm/1.969") – LRB suffix; 55mm (2.165") –55J suffix. Other sizes are available on request. Camshafts with larger then stock journals have a step ground on the front journal, so a standard size camshaft sprocket can be used.

We offer camshafts with different lobe layouts for the various cylinder head options that can be installed on these engines. On this page are drawings illustrating the standard Small Block, Dart Buick/Chevrolet Splayed Valve (84 – prefix), and Chevrolet SB2 (138 – prefix) cylinder head valve layouts that are primarily in use today.

Standard, SFO (1-8-7-3-6-5-4-2), and SFO1 (1-8-7-2-6-5-4-3) firing orders are offered, along with other custom options



for 180 degree crankshafts and other unique situations.

Drilling and tapping the rear cam journal for the Sander accessory drive is offered (RD – suffix), as is gun drilling of the camshaft for lightness and reduced torsional deflection (DR – suffix). For certain usages, we offer special lightweight camshafts (LW – suffix) having undercut bearing journals, narrow lobes, and gun drilling where weight saving is of prime importance.

1987-1999 305 (5.0L)- 350 (5.7L) V8

This first major upgrade to the traditional Small Block V8 incorporated a hydraulic roller camshaft and lifters. These are sometimes referred to as Vortec engines when checking some reference materials. The bolt pattern on the front of the camshaft was reduced in diameter, allowing for a step on the front journal, permitting the installation of a thrust-plate to control camshaft endplay.

This engine family is referred to as Crane Cams' 10-prefix, and our early steel billet camshaft cores did not incorporate provisions for the front ignition drive that was later used on the 1992-1997 LT-1 and LT-4 engines.

We have separated these engines from the LT-1 & LT-4 versions in this catalog to properly define the emissions legalities of the camshafts, although they will now physically interchange. Since the late 90's, all of our camshafts for these powerplants have been machined for the front ignition drive and include the long cam dowel pin that's also needed. If you have an engine that does not require the long dowel pin, you can drive the pin in further to the proper length for your application.

The lifter bores on these blocks were increased in height to accommodate the hydraulic roller lifters. When using a camshaft with greater than standard lobe lift, or a small base circle cam, you must use taller-than-standard lifters to prevent them dropping out of the factory alignment bars when on the base circle. Our 10535-16 hydraulic roller lifters are intended for these purposes. Our vertical guidebar 11532-16 retrofit hydraulic roller lifters are also suitable for these applications.

We also offer mechanical roller lifter camshafts and components for these engines, in either standard or Iron Gear configurations.



1992-1996 305 (5.0L)- 350 (5.7L) LT-1 & LT-4 V8

Additional changes in 1992 resulted in the Gen II, or LT-series of engines. Reverse cooling, front mounted distributors, a different timing chain and gear set, and other improvements resulted in greater power potential and reliability. All of these were hydraulic roller camshaft and lifters equipped, incorporating the tall lifter bores. The Crane Cams 10-prefix is again used for these engines. On applications where higher than stock lift, or small base circle camshafts are used, our 10535-16 or 11532-16 hydraulic roller lifters should be used.

Mechanical roller lifter camshafts and components are offered, in standard or Iron Gear versions.

1997-2010 4.8-5.3-5.7-6.0-6.2-7.0L LS-Series V8

A clean sheet design for the Small Block, this new engine has virtually no interchangeability with the earlier engines. Crane Cams 144-prefix designates these camshafts and specific components. The camshaft has large 55mm (2.165") diameter journals, three bolts to attach the cam sprocket, and no distributor drive gear. Hydraulic roller camshafts and lifters are standard.

LS1 and LS6 engines have a camshaft position sensor split ring incorporated into the barrel of the cam, near the rear of the camshaft. LS2, LS3, LS7, and L92 engines have the camshaft position sensor incorporated into the camshaft sprocket. Our camshafts have the sensor split ring on the cam, and can be used in either version. The standard firing order is 1-8-7-2-6-5-4-3.

The LS3, LS7, and L92 engines are originally equipped with camshafts that have a single bolt to attach the cam sprocket. Our camshafts can be installed in these engines if the proper three bolt type cam sprocket is used.

Standard rocker arm ratio for these engines is 1.7:1, except the LS7, which comes equipped with 1.8:1 rockers.

Again, when using camshafts with greater than stock lobe lifts (or reduced base circle diameters), there can be a danger of the lifters dropping out of the alignment blocks. Crane Cams offers specific long travel lifters to prevent this occurrence, with our **144536-16** steel billet hydraulic roller lifters. Long travel mechanical roller lifters **144511-16** (that use the standard alignment blocks) are also available for those demanding the increased RPM capabilities of a mechanical roller camshaft (available on special order).

We're constantly adding to our product offerings for this family of engines, as its popularity continues to grow. Heavy wall pushrods, stud and shaft mounted rocker arms, valve springs, retainers, and steel billet valve locks provide performance and reliability improvements that you will find throughout this catalog.

1996-2010 SB2 V8

Designed specifically for racing applications, and never installed in any production vehicles, the SB2 engine has a unique cylinder block and cylinder heads. Although the SB2 heads have a different valve layout from other members of the Small Block family, they can also be installed on a conventional 262-400 type engine, provided many other changes are made, among these being the camshaft (use our 138-prefix camshafts for this application as noted earlier).

An SB2.2 block has staggered lifter bores, similar to the Big Block Chevys, straightening the pushrod angles for the canted valve SB2 series of cylinder heads. Our 123-prefix camshafts have been created expressly for these engines. Steel billet roller camshafts are offered with Large Roller Bearing (50mm/1.969") LRB – suffix, and 55mm (2.165") 55J –suffix options. As these are usually produced for specific racing applications, we custom grind them per order to insure the latest cam lobe design technologies are used.

Roller lifters are offered in standard .842", .875" and .904" diameter. Any of these are available with appropriate pushrod seat offsets as required by the cylinder head preparation that was performed.

Contact Crane Cams directly for the latest product information on these engines.

			СОМ	PLETE C	AM SPE	CIFICATI	ONS			
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Lifter Camshat		IMNUL	LITIISSIOTIS COUC	LII ILKS	IIIt/ LAII.	III(/ LAII.	Jeparauon	IIIt/ LXII	LAII	LAII.
Brute low end torque, great for standard 267 and 305 engines. (50 state legal in 81-87 car and 81-92 truck 267-305 applications only. C.A.R.B. E.O. D-225-19)	2010	500- 4000	114102 ^{a,b}	99277-16	184 194	244 254	104	(12) 16 21 (7)	.000 .000	.378 .401
Brute low end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 7.75 to 8.75 compression ratio advised. (50 state legal, pre-computer, C.A.R.B. E.O. D-225-18)	H-248-2	800- 4600	113971 113972 ^b	99277-16	192 204	248 260	112	(11) 23 39 (15)	.000	
Great for 305 engines in cars, light and intermediate trucks with optional gearing. Good low and mid-range torque and HP. (50 state legal in 81-87 car applications only. C.A.R.B. E.O. D-225-19)	2020	800- 4400	114112 ^{a,b}	99277-16	194 204	254 264	104	(7) 21 26 (2)	.000	
Replacement for factory 300 HP 327 cu.in. camshaft.	BluePrinted 3896929	800- 4500	968711	99277-16	195 202		112	(10.5) 25.5 37 (15)	.000	
Excellent low end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 8.0 to 95 compression ratio advised. (50 state legal, pre-computer, C.A.R.B. E.O. D-225-21)	Energizer 260 H10	1000- 4600	10003 100032°	99277-16	204 204	260 260	110	(3) 27 37 (13)	.000 .000	
Good mid-range and top-end performance in Monte Carlo SS, Camaro and Firebird with 305 HO, and 350 trucks. (50 state legal in 81-87 car and 81-92 truck 267- 305 applications only. C.A.R.B. E.O. D-225-19)	2030	1200- 4800	114122 ^{a,b}	99277-16	204 214	264 274	110	(8) 32 37 (3)	.000	.423 .446
Excellent low end torque and HP, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, marine applications: primarily used in 305 and 350 cu.in. near-stock engines for mild performance applications in heavy boats, OK for through-prop exhaust, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised. (50 state legal, pre-computer, C.A.R.B. E.O. D-225-18)	Н-260-2	1200- 5000	113901 113902 ^b	99277-16	204 216	260 272	112	(5) 29 45 (9)	.000	.427 .454
Excellent low end torque and HP, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, marine applications: primarily used in 305 and 350 cu.in. near-stock engines for mild performance applications in heavy boats, OK for through-prop exhaust, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	Z-256-2	1200- 5200	113501° 113502°b	99277-16	206 218	256 268	112	(4) 30 46 (8)	.000	.432 .459
Good low end torque, smooth idle, daily usage, fuel economy, light towing, off road, 2200-2700 cruise RPM, 8.5 to 10.0 compression ratio advised. (50 state legal, pre-computer, C.A.R.B. E.O. D-225-21).	Energizer 266 H10	1400- 5000	10004 100042°	99277-16	210 210	266 266	110	0 30 40 (10)		.440 .440
Great for 305 HO and performance 350 trucks, good mid and top end torque and HP, axle ratios of 3.73 or numeri- cally higher required, auto or 5-speed manual, must use 99470-1 Adjustable Fuel Pressure Regulator. (50 state legal in 81-87 267-400, carb equipped cars only. C.A.R.B. E.O. D-225-25)	2040	1600- 5400	114132ª,b	99277-16	210 216	270 276	114	(4) 34 47 (11)	.000 .000	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.
IMPORTANT: Adjustable Vacuum Advance Kits available. See page

333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Camshafts having standard size journals with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) are available on special order. Contact Crane's Performance Consultants for details. **NOTE:** Camshafts for modified standard blocks, or Oldsmobile/

Dart blocks, having Big Block Chevrolet size (1.948") cam bearings are available on special order. Contact Crane's Performance Consultants for details.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1*h	11800-16 ⁱ	11774-16 ⁱ 11744-16 ^k	11750-16 ¹ 10750-16 ¹ 10751-16 ¹
11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1*h	11800-16 ⁱ	11774-16 ^j 11744-16 ^k	11750-16 ¹ 10750-16 ⁿ 10751-16 ⁿ
11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1*h	11800-16 ⁱ	11774-16 ⁱ 11744-16 ^k	11750-16 ¹ 10750-16 ¹ 10751-16 ¹
11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1*h	11800-16 ⁱ	11774-16 ⁱ 11744-16 ^k	11750-16 ¹ 10750-16 ¹ 10751-16 ¹
11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1*h	11800-16 ⁱ	11774-16 ⁱ 11744-16 ^k	11750-16 ¹ 10750-16 ¹ 10751-16 ¹
11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1*h	11800-16 ⁱ	11774-16 ⁱ 11744-16 ^k	11750-16 10750-16 10751-16
11308-1 ^{4,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1*h	11800-16 ⁱ	11774-16 ^j 11744-16 ^k	11750-16 ¹ 10750-16 ¹ 10751-16 ¹
11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1*	11800-16 ⁱ	11774-16 ^j 11744-16 ^k	11750-16 ¹ 10750-16 ¹ 10751-16 ¹
11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1*h	11800-16 ⁱ	11774-16 ⁱ 11744-16 ^k	11750-16 ¹ 10750-16 ¹ 10751-16 ¹
11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ^g	11975-1*h	11800-16 ⁱ	11774-16 ^j 11744-16 ^k	11750-16 10750-16 10751-16

Section Continued



- For 81-87 applications.
 Cam and Lifter Kit, includes installation lubricants and Cam Sprocket bolt Locking Plate.
 Cam and Lifter Kit, includes assembly lubricants.
 Contains standard diameter valve springs, no machining required.
 For 1967-87 with 1.700" assembly height.
 Machined steel, heat treated.
 Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.

- h Performance steel billet gears and roller chain set.
 i 1.5 ratio, 3/8" stud, long slot, (not self-aligning).
 j Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning).
 k Energizer, 1.5 ratio, 3/8" stud (not self-aligning).
 l 1.5 ratio, 3/8" stud (not self-aligning).
 m 1.5 ratio, 3/8" stud, self-aligning), narrow body for center bolt valve covers.
 n 1.5 ratio, 3/8" stud, self-aligning narrow body for center bolt valve covers.

					COM	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf	ts										
Good low end and mid range torque and HP, good idle, daily usage, off road, towing, economy, marine applications: primarily used in 350 cui.n. mildly modified engines for mild performance applications in light boats, OK for through-prop exhaust, 2400-2800 cruise RPM, 8.5 to 10.0 compression ratio advised. (50 state legal, precomputer, C.A.R.B. E.O. D-225-18)	H-266-2	1600- 5200	113931 113932°	99277-16	210 216	266 272	114	(4) 34 47 (11)	.000 .000	.440 .454	
Good low end and mid range torque and HP, good idle, daily usage, off road, towing, economy, marine applications: primarily used in 350 cu.in. mildly modified engines for mild performance applications in light boats, OK for through-prop exhaust, 2400-2800 cruise RPM, 8.5 to 10.0 compression ratio advised.	Z-262-2	1600- 5400	113511* 113512*a	99277-16	212 218	262 268	114	(3) 35 48 (10)	.000	.446 .459	
Good low end and mid range torque, good idle, daily usage, off road, highway towing, fuel efficiency plus performance, 2600-3000 cruise RPM, 8.75 to 10.0 compression ratistate legal, pre-computer, C.A.R.B. E.O. D-225-21)	Energizer 272 H10	1600- 5400	10005 100052 ^b	99277-16	216 216	272 272	110	3 33 43 (7)	.000 .000	.454 .454	
Serious performance for 305 and 350 carb equipped cars w/aftermarket intake, performance cylinder heads and free flow exhaust, auto or manual trans or modified 305 w/5-speed, axle ratios 3.73 or numerically higher required. 11308-1 Spring and Retainer Kit required for maximum perfomance. (50 state legal in 81-87 267 thru 400 carb equipped cars only. C.A.R.B. E.O. D-225-25).	2050	1800- 5600	114142 ^{a,c}	99277-16	216 228	272 284	112	1 35 51 (3)		.454 .480	
Good low end and mid range torque and HP, good idle, daily usage and off road, towing, performance and fuel efficiency, marine applications: for 350+ cu.in. modified engines with free flowing above water exhaust systems for performance applications in light pleasure and ski boats, including jet boats, 2600-3000 cruise RPM, 8.75 to 10.75 compression ratio advised, good w/plate nitrous system. Good w/centrifugal or Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised. (50 state legal, pre-computer, C.A.R.B. E.O. D-225-18).	H-272-2	1800- 5600	113941 113942°	99277-16	216 228	272 284	112	1 35 51 (3)		.454 .480	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 Since 1975, General Motors divisions have exchanged engines 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Camshafts having standard size journals with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) are available on special order. Contact Crane's Performance Consultants for details.

NOTE: Camshafts for modified standard blocks, or Oldsmobile/Dart blocks, having Big Block Chevrolet size (1.948") cam bearings are available on special order. Contact Crane's Performance Consultants for details.

throughout different models. Be certain of exactly which engine you have before ordering.



						-			_	
CF	RANE VALV	E TRAIN CO	MPONENTS							
	See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
	LVE SPRING D RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
1	11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1* ^h	11800-16 ⁱ	11774-16 ⁱ 11744-16 ^k	11750-16 10750-16 10751-16
1	11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1° ^h	11800-16 ⁱ	11774-16 ⁱ 11744-16 ^k	11750-16 10750-16 10751-16
1	11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1*h	11800-16 ⁱ	11774-16 ^j 11744-16 ^k	11750-16 10750-16 10751-16
1	11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1°h	11800-16 ⁱ	11774-16 ⁱ 11744-16 ^k	11750-16 10750-16 10751-16
1	11308-1 ^{d,e}	99848-16 ^{d,e}	99915-16°		99097-1 ^f	11621-16 ⁹	11975-1*h	11800-16 ⁱ	11774-16 ^j 11744-16 ^k	11750-16 10750-16 10751-16

Section Continued



- Cam and Lifter Kit, includes installation lubricants and Cam Sprocket bolt Locking Plate.
- Cam and Lifter Kit, includes assembly lubricants.
- For 81-87 applications.
- **d** Contains standard diameter valve springs, no machining required.
- For 1967-87 with 1.700" assembly height.
- Machined steel, heat treated.
- **g** Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
- h Performance steel billet gears and roller chain set.
- 1.5 ratio, 3/8" stud, long slot, (not self-aligning). Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning).
- k Energizer, 1.5 ratio, 3/8" stud (not self-aligning).
- 1.5 ratio, 3/8" stud (not self-aligning).
 1.5 ratio, 3/8" stud (not self-aligning), narrow body for center bolt valve covers.
 1.5 ratio, 3/8" stud, self-aligning narrow body for center bolt valve covers.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Lifter Camshat	fts									
Good low and mid range torque, rough idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 2600-3000 cruise RPM, oval track; Street Stock, Enduro, Hobby, etc, 1/4-3/8 mile, 8.75 to 10.0 compression ratio advised.	Energizer 274 H06	1800- 5400	10017* 100172* ^b 110172* ^c	99277-16	218 218	274 274	106	7 31 39 (1)	.000 .000	.450 .450
Good idle, daily usage and off road, towing, performance and fuel efficiency, marine applications: for 350+ cu.in. modified engines with free flowing above water exhaust systems for performance applications in light pleasure and ski boats, including jet boats. 2600-3000 cruise RPM, 8.75 to 10.75 compresion ratio advised, good w/plate nitrous system. Good w/centrifugal or small Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised.	7-268-2	1800- 5800	113521° 113522°a	99277-16	218 230	268 280	112	2 36 52 (2)	.000 .000	.459 .486
Good mid range torque, good to fair idle, daily performance usage, mild bracket racing, auto trans w/stock to 2500 converter, 2700-3200 cruise RPM, 9.5 to 10.75 compression ratio advised.	Energizer 278 H10	2000- 5800	10013 100132" ^b	99277-16 99377-16 ^d	222 222	278 278	110	6 36 46 (4)	.000 .000	.467 .467
Replacement for factory 350 HP 327 cu.in. camshaft.	BluePrinted 3863151	2000- 5600	967601	99277-16 99377-16 ^d	222 222		114	1 41 49 (7)	.000	.447 .447
Performance usage, good upper RPM HP, 360+ cu.in., bracket racing; Pro ET, Super ET, etc., auto trans w/4000+ converter, 11.5 minimum compression ratio advised.	H-284	2200- 6000	114201	99277-16 99377-16 ^d	222 222	284 284	114	2 40 50 (8)	.000 .000	.450 .450

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application. IMPORTANT: Adjustable Vacuum Advance Kits available. See page

333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 Since 1975, General Motors divisions have exchanged engines 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Camshafts having standard size journals with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) are available on special order. Contact Crane's Performance Consultants for details.

NOTE: Camshafts for modified standard blocks, or Oldsmobile/Dart blocks, having Big Block Chevrolet size (1.948") cam bearings are available on special order. Contact Crane's Performance Consultants for details.

throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
11309-1 ^{9,h} 11310-1 ⁱ	96802-16 ⁱ 99846-16 ^h 99838-16 ⁱ	99915-16 ^f 99944-16	99820-16 ⁱ	99097-1 ^k	11621-16 ¹ 11630-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801C-16 ^q 10800C-16 ^r	11774-16 ^t 11744-16 ^u	11750-16 ^v 10750-16 ^w 10751-16 ^x
11308-1 ^{e,f}	99848-16 ^{e,f} 96802-16 ^j	99915-16 ^f		99097-1 ^k	11621-16 ¹ 11630-16 ^m	11975-1*n 11984-1*°	11801-16 ^s 11801C-16 ^q	11774-16 ^t 11744-16 ^u	11750-16° 10750-16
	70002-10				11050-10	11977-1*P	10800C-16 ^r	11/44-10	10751-16 ^x
11308-1 ^{e,f}	99848-16 ^{e,f}	99915-16 ^f		99097-1 ^k	11621-16 ¹	11975-1*n	11801-16	11774-16 ^t	11750-16 ^v
	96802-16 ^j				11630-16 ^m	11984-1*° 11977-1* ^p	11801C-16 ^q 10800C-16 ^r	11744-16"	10750-16 ^w 10751-16 ^x
11308-1 ^{e,f}	99848-16 ^{e,f} 96802-16 ^j	99915-16 ^f		99097-1 ^k	11621-16 ¹ 11630-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801-16 ^s 11801C-16 ^q 10800C-16 ^r	11774-16 ^t 11744-16 ^u	11750-16 ^v 10750-16 ^w 10751-16 ^x
11308-1 ^{e,f}	99848-16 ^{e,f} 96802-16 ^j	99915-16 ^f		99097-1 ^k	11621-16 ¹ 11630-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801-16° 11801C-16° 10800C-16′	11774-16 ^t 11744-16"	11750-16 ^v 10750-16 ^w 10751-16 ^x

Section Continued



- Cam and Lifter Kit, includes installation lubricants and Cam Sprocket bolt Locking Plate.
- Cam and Lifter Kit, includes assembly lubricants.
- Cam, lifter, and valve spring (99846-16) kit, includes installation lubricants.
 Optional Hi Intensity Lifters, see page 292 for details.
 Contains standard diameter valve springs, no machining required.
 For 1967-87 with 1.700" assembly height.

- Contains standard diameter valve springs and machined steel valve stem locks (99095-1), no machining required. Standard diameter XHTCS tool steel valve springs for 1.800″ assembly height.
- Must machine cylinder heads.
- Standard diameter chrome silicon valve springs for 1.750" assembly height.

- Machined steel, heat treated.
 Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
 Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
 Performance steel billet gears and roller chain set.

- Pro Series steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set with thrust bearing. 1.5 ratio, 3/8" stud, extra long slot, Nitro Carb (not self-aligning).

- 1.5 ratio, 3/8" stud self-aligning, Nitro Carb.
 1.5 ratio, 3/8" stud, extra long slot (not self-aligning).
 Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning).
- Energizer, 1.5 ratio, 3/8" stud (not self-aligning).
- 1.5 ratio, 3/8" stud (not self-aligning).
 1.5 ratio, 3/8" stud (not self-aligning), narrow body for center bolt valve covers.
- x 1.5 ratio, 3/8" stud, self-aligning narrow body for center bolt valve covers.

					COM	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf					, 2,		- cpanadon				
Good mid range to upper RPM torque and HP, good idle, daily performance usage, mild bracket racing, 3000-3400 cruise RPM, 9.5 to 10.75 compression ratio advised.	H-278-2	2200- 6200	113801* 113802*a	99277-16 99377-16 ^d	222 234	278 290	114	2 40 56 (2)	.000 .000		
Good mid range to upper RPM torque and HP, fair idle, daily performance usage, mild bracket racing, 3000-3400 cruise RPM, 9.5 to 10.75 compression ratio advised.	Z-274-2	2200- 6400	113531* 113532*a	99277-16	224 230	274 280	110	7 37 50 0	.000		
Rough idle, moderate performance usage, good mid range to upper RPM HP, 3000-3400 cruise RPM, bracket racing; Street, Heavy, etc., auto trans w/3000+ converter, oval track; Street Stock, Enduro, Hobby, etc., 1/4-3/8 mile, serious off road, 9.5 to 11.0 compress. ratio advised.	Energizer 282 H06	2400- 6200	10008° 100082° ^b 110082° ^c	99277-16 99377-16 ^d	226 226	282 282	106	12 34 44 (2)	.000 .000		
Good mid range HP, fair idle, moderate performance usage, w/plate or manifold nitrous system, mild bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 9.5 to 11.0 compression ratio advised. Good w/centrifugal or Roots supercharger, 10 lbs maximum boost w/8.0 maximum ratio advised.	H-288-2	2600- 6400	113821* 113822*a	99277-16 99377-16 ^d	226 234	288 296	114	4 42 56 (2)	.000 .000		
Performance usage, good mid range torque and HP, bracket racing; Street, Heavy, etc., auto trans w/3000+ converter, 9.5 to 11.5 compression ratio advised.	H-228/320-6	2800- 6400	110551*	99277-16 99377-16 ^d	228 228	284 284	106	12 36 44 4	.000 .000		
Good mid range to upper RPM torque and HP, fair idle, moderate performance usage, good mid range HP, 3400- 3800 cruise RPM, 9.5 to 11.0 compression ratio advised.	Energizer 284 H12	2800- 6200	10007 100072" ^b	99277-16 99377-16 ^d	228 228	284 284	112	7 41 51 (3)	.000		
Good upper RPM torque and HP, fair idle, moderate per- formance usage, 3600-4000 cruise RPM, 10.0 to 11.5 compression ratio advised. Good w/centrifugal or Roots supercharger, 12 lbs. maximum boost w/8.0 maximum compression ratio advised.	H-228/3200-14	3000- 6400	110601°	99277-16 99377-16 ^d	228 228	284 284	114	5 43 53 (5)	.000 .000		
Oval track; .390/.410 lift rule classes, 2-bbl or 4-bbl, 1/4-3/8 mile, 9.0 to 10.5 compression ratio advised.	H-228/260-25-7	2800- 6000	110251*	99277-16 99377-16 ^d	228 232	288 292	107	11 37 47 5	.000 .000		
Performance usage, good mid range torque and HP, bracket racing; Street, Heavy, etc., auto trans w/3000+ converter, oval track; Street Stock, Enduro, Hobby, etc., 1/4-3/8 mile, 10.0 to 11.5 compression ratio advised.	Saturday Night Special H-228/3200-25-6	2800- 6400	110591* 110592* ^c	99277-16 99377-16 ^d	228 234	284 290	106	12 36 47 7		.480 .494	
Performance usage, good mid and upper RPM HP, bracket racing; Street, Heavy, etc., auto trans w/3000+ converter, oval track; Street Stock, Enduro, Hobby, etc., 1/4-3/8 mile, serious off road, 10.0 to 11.5 compression ratio advised.	Energizer 286 H06	3000- 6400	10018° 100182° ^b	99277-16 99377-16 ^d	230 230	286 286	106	13 37 45 5	.000 .000		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 Since 1975, General Motors divisions have exchanged engines 350 V-8 engines) use a different configuration camshaft core throughout different models. Be certain of exactly which 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Camshafts having standard size journals with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) are available on special order. Contact Crane's Performance Consultants for details.

NOTE: Camshafts for modified standard blocks, or Oldsmobile/ Dart blocks, having Big Block Chevrolet size (1.948") cam bearings are available on special order. Contact Crane's Performance Consultants for details.

engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	M ROCKERS — C/ Gold Race
11308-1 ^{e,f}	99848-16 ^{e,f} 96802-16 ^j	99915-16 ^f		99097-1 ^m	11621-16° 11630-16 ^p	11975-1* ^q 11984-1* ^r 11977-1* ^s	11801-16 ^t 11801C-16 ^u 10800C-16 ^v	11774-16 ^w 11744-16 ^x	11750-16 ^y 10750-16 ^z 10751-16 ^{aa}
11308-1 ^{e,f}	99848-16 ^{e,f} 96802-16 ^j	99915-16 ^f		99097-1 ^m	11621-16° 11630-16 ^p	11975-1* ^q 11984-1* ^r 11977-1* ^s	11801-16 ^t 11801C-16 ^u 10800C-16 ^v	11774-16 ^w 11744-16 ^x	11750-16 ^y 10750-16 ^z 10751-16 ^{aa}
11309-1 ^{g,h} 11310-1 ⁱ	96802-16 ^j 99846-16 ^h 99838-16 ⁱ 96874-16 ^{i,k}	99915-16 ^f 99944-16 99969-16 ^l	99820-16 ⁱ	99097-1 ^m 99094-1 ⁿ	11621-16° 11630-16°	11975-1* ^q 11984-1* ^r 11977-1* ^s	11801C-16 ^u 10800C-16 ^v	11774-16 ^w 11744-16 ^x	11750-16 ^y 10750-16 ^z 10751-16 ^{aa}
11308-1 ^{e,f}	99848-16 ^{e,f} 96802-16 ^j	99915-16 ^f		99097-1 ^m	11621-16° 11630-16°	11975-1*9 11984-1* ^r 11977-1* ^s	11801-16 ^t 11801C-16" 10800C-16 ^v	11774-16 ^w 11744-16 ^x	11750-16 ^y 10750-16 ^z 10751-16 ^{aa}
11309-1 ^{9,h} 11310-1 ⁱ	96802-16 ^j 99846-16 ^h 99838-16 ⁱ 96874-16 ^{i,k}	99915-16 ^f 99944-16 99969-16 ^l	99820-16 ⁱ	99097-1 ^m 99094-1 ⁿ	11621-16° 11630-16°	11975-1* ^q 11984-1* ^r 11977-1* ^s	11801C-16 ^u 10800C-16 ^v	11774-16 ^w 11744-16 ^x	11750-16 ^y 10750-16 ^z 10751-16 ^{aa}
11309-1 ^{g,h} 11310-1 ⁱ	96802-16 ^j 99846-16 ^h 99838-16 ^j 96874-16 ^{i,k}	99915-16 ^f 99944-16 99969-16 ^l	99820-16 ⁱ	99097-1 ^m 99094-1 ⁿ	11621-16° 11630-16°	11975-1* ^q 11984-1* ^r 11977-1* ^s	11801C-16 ^u 10800C-16 ^v	11774-16 ^w 11744-16 ^x	11750-16 ^y 10750-16 ^z 10751-16 ^{aa}
11309-1 ^{9,h} 11310-1 ⁱ	96802-16 ⁱ 99846-16 ^h 99838-16 ⁱ 96874-16 ^{i,k}	99915-16 ^f 99944-16 99969-16 ^l	99820-16 ⁱ	99097-1 ^m 99094-1 ⁿ	11621-16° 11630-16°	11975-1* ^q 11984-1* ^r 11977-1* ^s	11801C-16 ^u 10800C-16 ^v	11774-16 ^w 11744-16 ^x	11750-16 ^y 10750-16 ^z 10751-16 ^{aa}
11309-1 ^{9,h} 11310-1 ⁱ	96802-16 ^j 99846-16 ^h 99838-16 ⁱ 96874-16 ^{i,k}	99915-16 ^f 99944-16 99969-16 ^l	99820-16 ⁱ	99097-1 ^m 99094-1 ⁿ	11621-16° 11630-16°	11975-1* ^q 11984-1* ^r 11977-1* ^s	11801C-16 ^u 10800C-16 ^v	11774-16 ^w 11744-16 ^x	11750-16 ^y 10750-16 ^z 10751-16 ^{aa}
11309-1 ^{9,h} 11310-1 ⁱ	96802-16 ^j 99846-16 ^h 99838-16 ⁱ 96874-16 ^{i,k}	99915-16 ^f 99944-16 99969-16 ^l	99820-16 ⁱ	99097-1" 99094-1"	11621-16° 11630-16 ^p	11975-1* ^q 11984-1* ^r 11977-1* ^s	11801C-16 ^u 10800C-16 ^v	11774-16 ^w 11744-16 ^x	11750-16 ^y 10750-16 ^z 10751-16 ^{aa}
11309-1 ^{9,h} 11310-1 ⁱ	96802-16 ^j 99846-16 ^h 99838-16 ⁱ 96874-16 ^{i,k}	99915-16 ^f 99944-16 99969-16 ⁱ	99820-16 ⁱ	99097-1" 99094-1"	11621-16° 11630-16°	11975-1* ^q 11984-1* ^r 11977-1* ^s	11801C-16 ^u 10800C-16 ^v	11774-16 ^w 11744-16 ^x	11750-16 ^y 10750-16 ^z 10751-16 ^{aa}

Section Continued



- Cam and Lifter Kit, includes installation lubricants and Cam Sprocket Bolt Locking Plate.
- Cam and Lifter Kit, includes assembly lubricants.
- c Cam, lifter, and valve spring (99846-16) kit, includes installation lubricants. Contains standard diameter valve springs, no machining required.

 Optional Hi Intensity Lifters, see page 292 for details.

 Contains standard diameter valve springs, no machining required.

 For 1967-87 with 1.700" assembly height.

- Contains standard diameter valve springs and machined steel valve stem locks (99095-1), no machining required.
- Standard diameter XHTCS tool steel valve springs for 1.800" assembly height.
- Must machine cylinder heads.
- Standard diameter chrome silicon valve springs for 1.750" assembly height. Dual valve springs for +.100" length valves.
- Requires Crane Multi Fit valve locks.
- Machined steel, heat treated.

- n Machined steel, heat treated, Multi Fit.
- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
- Performance steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set with thrust bearing.
- 1.5 ratio, 3/8" stud, extra long slot (not self-aligning).
- 1.5 ratio, 3/8" stud, extra long slot, filot seri-anglining).
 1.5 ratio, 3/8" stud, extra long slot, Nitro Carb (not self-aligning).
 1.5 ratio, 3/8" stud, self-aligning, Nitro Carb.
 Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning).
 Energizer, 1.5 ratio, 3/8" stud (not self-aligning).
 15 ratio, 3/8" stud (not self-aligning).

- 1.5 ratio, 3/8" stud (not self-aligning).

 1.5 ratio, 3/8" stud (not self-aligning), narrow body for center bolt valve covers.
- aa 1.5 ratio, 3/8" stud, self-aligning narrow body for center bolt valve covers.

						СОМ	PLETE C	AM SPE	CIFICATION	ONS		
		Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 293	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Lift Int.	
	Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
	Hydraulic Lifter Camshaf		2000	440.00*		220	200	112	2 42	200	477	
	Performance usage, good mid and upper RPM HP, fair idle, auto trans w/3000+ converter, 10.0 to 11.5 compression ratio advised.	H-230/318-12	3000- 6600	110501*	99277-16 99377-16 ^c	230 230	290 290	112	8 42 52 (2)	.000		
	Oval track; .390/.410 lift rule classes, 2-bbl or 4-bbl, 1/4-3/8 mile, 10.0 to 11.0 compression ratio advised.	H-232/260-251-6	3000- 6400	110271*	99277-16 99377-16°	232 236	292 296	106	14 38 48 8	.000		
j	Oval track; .410 lift rule classes, 2-bbl or 4-bbl, 1/4-3/8 mile, 10.0 to 11.0 compression ratio advised.	H-232/2732-6	3000- 6400	110301*	99277-16 99377-16 ^c	232 232	290 290	106	14 38 46 6	.000		
Ī	Fair idle, performance usage, good mid range HP, 3800- 4200 cruise RPM, 10.25 to 12.0 compression ratio advised.	H-296-2	3000- 6600	114561*	99277-16 99377-16 ^c	234 242	296 304	110	12 42 56 6	.000		
	Oval track; .390/.410 lift rule classes, 3/8-1/2 mile, 10.0 to 11.0 compression ratio advised.	H-236/260-251-6	3200- 6600	110291*	99277-16 99377-16°	236 242	296 302	106	16 40 51 11	.000 .000		
	Fair idle, performance usage, good mid range HP, 3800- 4200 cruise RPM, 10.25 to 12.0 compression ratio advised.	Z-286-2	3000- 6800	113541* 113542*a	99277-16 99377-16°	236 244	286 294	110	13 43 57 7	.000		
	Performance usage, good mid and upper RPM torque, bracket racing; Street, Heavy, Pro ET, Super ET, etc., auto trans w/3500+ converter, oval track; Street Stock, Enduro, Hobby, etc., 1/4-3/8 mile, 10.5 to 12.0 compres- sion ratio advised.	H-238/3347-6	3200- 6600	110651*	99277-16 99377-16 ^c	238 238	294 294	106	17 41 49 9	.000 .000		
	Rough idle, performance usage, good mid and upper RPM torque and HP, bracket racing, auto trans w/3500+ converter, 4200-4600 cruise RPM, 10.5 to 12.0 compres- sion ratio advised.	H-238/3347-252-10	3200- 6800	110521*	99277-16 99377-16 ^c	238 242	294 304	110	14 44 56 6	.000		
	Performance usage, good mid and upper RPM torque and HP, bracket racing; Street, Heavy, Pro ET, Super ET, etc., auto trans w/3500+ converter, oval track; Street Stock, Enduro, Hobby, etc., 1/4-3/8 mile, 10.5 to 12.0 compression ratio advised.	Saturday Night Special H-238/3347-25-6	3200- 6800	110691 * 110692 *b	99277-16 99377-16 ^c	238 244	294 300	106	17 41 52 12	.000 .000		
Ī	Rough idle, performance usage, w/manifold nitrous system, good mid and upper RPM HP, bracket racing, auto trans w/3500+ converter, 4200-4600 cruise RPM, 10.5 to 12.0 compression ratio advised. Good w/Roots supercharger, 15 lbs. maximum boost w/8.0 maximum compression ratio advised.	H-300-2	3200- 7000	114051*	99277-16 99377-16	238 246	300 308	112	12 46 60 6	.000 .000		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page

333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Camshafts having standard size journals with SFO firing NOTE: Camshafts having standard size journals with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) are available on special order. Contact Crane's Performance Consultants for details. .

NOTE: Camshafts for modified standard blocks, or Oldsmobile/Dart blocks, having Big Block Chevrolet size (1.948") cam bearings are available on special order. Contact Crane's Performance Consultants for details.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.

engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
11309-1 ^{4,e} 11310-1 ^f	96802-16 ⁹ 99846-16 ^e 99838-16 ^f 96874-16 ^{f,h}	99915-16 ⁱ 99944-16 99969-16 ^j	99820-16 ^f	99097-1 ^k 99094-1 ^l	11621-16 ^m 11630-16 ⁿ	11975-1*° 11984-1*¤ 11977-1*°	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16 ^u	11750-16° 10750-16° 10751-16°
11309-1 ^{d,e} 11310-1 ^f	96802-16 ⁹ 99846-16 ^e 99838-16 ^f 96874-16 ^{f,h}	99915-16 ⁱ 99944-16 99969-16 ^j	99820-16 ^f	99097-1 ^k 99094-1 ¹	11621-16 ^m 11630-16 ⁿ	11975-1*º 11984-1*º 11977-1*º	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16"	11750-16 ^v 10750-16 ^w 10751-16 ^x
11309-1 ^{d,e} 11310-1 ^f	96802-16 ⁹ 99846-16 ^e 99838-16 ^f 96874-16 ^{f,h}	99915-16 ⁱ 99944-16 99969-16 ^j	99820-16 ^f	99097-1 ^k 99094-1 ¹	11621-16 ^m 11630-16 ⁿ	11975-1*° 11984-1*¤ 11977-1*q	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16 ^u	11750-16 ^v 10750-16 ^w 10751-16 ^x
11310-1 ^f	99838-16 ^f 96874-16 ^{f,h}	99944-16 99969-16 ^j	99820-16 ^f	99097-1 ^k 99094-1 ^l	11621-16 ^m 11630-16 ⁿ	11975-1*° 11984-1*¤ 11977-1*q	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16 ^u	11750-16° 10750-16° 10751-16°
11309-1 ^{d,e} 11310-1 ^f	96802-16 ⁹ 99846-16 ^e 99838-16 ^f 96874-16 ^{f,h}	99915-16 ⁱ 99944-16 99969-16 ^j	99820-16 ^f	99097-1 ^k 99094-1 ¹	11621-16 ^m 11630-16 ⁿ	11975-1°° 11984-1°° 11977-1°°	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16 ^u	11750-16° 10750-16° 10751-16°
11310-1 ^f	99838-16 ^f 96874-16 ^{f,h}	99944-16 99969-16 ^j	99820-16 ^f	99097-1 ^k 99094-1 ¹	11621-16 ^m 11630-16 ⁿ	11975-1*º 11984-1*º 11977-1*º	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16"	11750-16° 10750-16° 10751-16°
11310-1 ^f	99838-16 ^f 96874-16 ^{f,h}	99944-16 99969-16 ^j	99820-16 ^f	99097-1 ^k 99094-1 ¹	11621-16 ^m 11630-16 ⁿ	11975-1*º 11984-1*¤ 11977-1*¤	11801C-16 [°] 10800C-16 [°]	11774-16 ^t 11744-16"	11750-16 ^v 10750-16 ^w 10751-16 ^x
11309-1 ^{d,e} 11310-1 ^f	96802-16 ⁹ 99846-16 ^e 99838-16 ^f 96874-16 ^{f,h}	99915-16 ⁱ 99944-16 99969-16 ^j	99820-16 ^f	99097-1 ^k 99094-1 ^l	11621-16 ^m 11630-16 ⁿ	11975-1*° 11984-1*° 11977-1*9	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16 ^u	11750-16° 10750-16° 10751-16°
11309-1 ^{d,e} 11310-1 ^f	96802-16 ⁹ 99846-16 ^e 99838-16 ^f 96874-16 ^{f,h}	99915-16 ⁱ 99944-16 99969-16 ^j	99820-16 ^f	99097-1 ^k 99094-1 ¹	11621-16 ^m 11630-16 ⁿ	11975-1*° 11984-1*° 11977-1*°	11801C-16 [°] 10800C-16 [°]	11774-16 ^t 11744-16 ^u	11750-16 ^v 10750-16 ^w 10751-16 ^x
11310-1 ^f	99838-16 ^f 96874-16 ^{f,h}	99944-16 99969-16 ^j	99820-16 ^f	99097-1 ^k 99094-1 ¹	11621-16 ^m 11630-16 ⁿ	11975-1*° 11984-1*¤ 11977-1*q	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16 ^u	11750-16° 10750-16° 10751-16°

Section Continued



- Cam and Lifter Kit, includes installation lubricants and Cam Sprocket Bolt Locking Plate.
 Cam, lifter, and valve spring (99846-16) kit, includes installation lubricants. Contains standard diameter valve springs, no machining required.
 Optional Hi Intensity Lifters, see page 292 for details.
- Contains standard diameter valve springs and machined steel valve stem locks (99095-1), no machining required.
- Standard diameter XHTCS tool steel valve springs for 1.800" assembly height.
- Must machine cylinder heads.
- Standard diameter chrome silicon valve springs for 1.750" assembly height.
- Dual valve springs for +.100" length valves.
- For standard diameter valve springs, no machining required.
- Requires Crane Multi Fit valve locks.
- Machined steel, heat treated.

- Machined steel, heat treated, Multi Fit.
- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
 Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
 Performance steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set.

- 1.5 ratio, 3/8" stud, extra long slot, Nitro Carb (not self-aligning).
- 1.5 ratio, 3/8" stud, self-aligning, Nitro Carb. Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning).
- Energizer, 1.5 ratio, 3/8" stud (not self-aligning).
- 1.5 ratio, 3/8" stud (not self-aligning).
- 1.5 ratio, 3/8" stud (not self-aligning), narrow body for center bolt valve covers.
- 1.5 ratio, 3/8" stud, self-aligning narrow body for center bolt valve covers.

					COM	PLETE C	AM SPE	CIFICA	TIONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Clo @ .050" Cam Lift Int/Exh	e Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Lifter Camshaf	ts									
Performance usage, good mid to upper RPM torque, bracket racing; Heavy, Pro ET, Super ET, etc., auto trans w/3500+ converter, oval track; Street Stock, Enduro, Hobby, etc., 3/8-1/2 mile, 10.5 to 12.0 compression ratio advised.	H-244/3439-6	3200- 6800	110711"	99277-16 99377-16 ^c	244 244	300 300	106	20 44 52 12		.516 .516
Performance usage, good upper RPM torque and HP, bracket racing; Heavy, Pro ET, Super ET, etc., auto trans w/3500+ converter, 10.5 to 12.0 compression ratio advised.	Saturday Night Special H-244/3439-2S-6	3400- 7000	110741° 110742°a	99277-16 99377-16	244 252	300 308	106	20 44 56 16		.516 .525
Performance usage, good upper RPM torque and HP, bracket racing; Heavy, Pro ET, Super ET, etc., auto trans w/3500+ converter, oval track; Street Stock, Enduro, Hobby, etc., 3/8-1/2 mile, 10.5 to 12.0 compression ratio advised.	Energizer 302 H06	3400- 7000	10011° 100112° ^b 110112° ^a	99277-16 99377-16 ^c	246 246	302 302	106	21 45 53 13	.000 .000	
Rough idle, performance usage, good w/manifold nitrous system, good upper RPM HP, bracket racing, auto trans w/3500+ converter, 11.25 to 13.0 compression ratio advised. Good w/Roots supercharger, 18 lbs. maximum boost w/8.0 maximum compression ratio advised.	H-308-2	3400- 7200	114571*	99277-16 99377-16 ^c	246 254	308 316	112	16 50 64 10	.000	.495 .510
Competition only, good upper RPM HP, 360+ cu.in., bracket racing w/light car; Pro ET, Super ET, etc., auto trans w/4000+ converter, 12.0 minimum compression ratio advised.	H-252/3500-12	3600- 7200	110541*	99277-16 99377-16	252 252	308 308	112	19 53 63 9	.000 .000	
Competition only, NHRA Stock Eliminator 255 HP 350 cu.in.	654-655-08 T2 0A	4200- 7200	110311*	99277-16 99377-16	252 272	286 306	108	18 54 64 28	.000 .000	.390 .410
Competition only, good upper RPM HP, 360+ cu.in., bracket racing; Pro ET, Super ET, etc., auto trans w/4000+ converter, 11.5 minimum compression ratio advised.	H-256/3500-8	3800- 7200	114581*	99277-16 99377-16°	256 256	312 312	108	25 51 61 15		.525 .525

order. Contact Crane's Performance Consultants for details.

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Camshafts for modified standard blocks, or Oldsmobile/
Dart blocks, having Big Block Chevrolet size (1.948") cam bearings are available on special order. Consultants for details.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUI Crane Classi Energizer	
11310-1 ^d	99838-16 ^d 96874-16 ^g	99944-16 99969-16 ⁱ	99820-16 ⁴	99097-1 ^k 99094-1 ^l	11621-16™ 11630-16⊓	11975-1°° 11984-1°° 11977-1°°	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16 ^u	11750-16 ^v 10750-16 ^w 10751-16 ^x
11309-1 ^{e,f} 11310-1 ^d	96802-16 ^h 99846-16 ^f 99838-16 ^d 96874-16 ^g	99915-16 ^j 99944-16 99969-16 ⁱ	99820-16 ^d	99097-1 ^k 99094-1 ¹	11621-16 ^m 11630-16 ⁿ	11975-1°° 11984-1°° 11977-1°°	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16 ^u	11750-16 ^v 10750-16 ^w 10751-16 ^x
11309-1 ^{e,f} 11310-1 ^d	96802-16 ^h 99846-16 ^f 99838-16 ^d 96874-16 ^g	99915-16 ^j 99944-16 99969-16 ⁱ	99820-16 ^d	99097-1 ^k 99094-1 ¹	11621-16 ^m 11630-16 ⁿ	11975-1*º 11984-1*º 11977-1*٩	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16 ^u	11750-16° 10750-16° 10751-16°
11310-1 ^d	99838-16 ^d 96874-16 ^g	99944-16 99969-16 ⁱ	99820-16 ^d	99097-1 ^k 99094-1 ¹	11621-16 ^m 11630-16 ⁿ	11975-1*° 11984-1* ^p 11977-1* ^q	11801C-16 ⁷ 10800C-16 ⁵	11774-16 ^t 11744-16"	11750-16 ^v 10750-16 ^w 10751-16 ^x
11310-1 ^d	99838-16 ^d 96874-16 ^g	99944-16 99969-16 ⁱ	99820-16 ^d	99097-1 ^k 99094-1 ^l	11621-16 ^m 11630-16 ⁿ	11975-1*° 11984-1* ^p 11977-1* ^q	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16 ^u	11750-16° 10750-16° 10751-16°
11309-1 ^{e,f}	99846-16 ^f	99915-16 ^j		99097-1 ^k	11630-16 ⁿ	11975-1*° 11984-1* ^p 11977-1* ^q	11801C-16 ^r 10800C-16 ^s		
11310-1 ^d	99838-16 ^d 96874-16 ^g	99944-16 99969-16 ⁱ	99820-16 ^d	99097-1 ^k 99094-1 ^l	11621-16 ^m 11630-16 ⁿ	11975-1°° 11984-1°° 11977-1°°	11801C-16 ^r 10800C-16 ^s	11774-16 ^t 11744-16 ^u	11750-16 ^v 10750-16 ^w 10751-16 ^x

- a Cam, lifter, and valve spring (99846-16) kit, includes installation lubricants. Contains standard diameter valve spring, no machining required.

 Cam and Lifter Kit, includes assembly lubricants.

 Optional Hi Intensity Lifters, see page 292 for details.

- Must machine cylinder heads.
- Contains standard diameter valve springs and machined steel valve stem locks (99095-1), no machining required.
- Standard diameter XHTCS tool steel valve springs for 1.800" assembly height.
- Dual valve springs for +.100" length valves.
- Standard diameter chrome silicon valve springs for 1.750" assembly height.
- Requires Crane Multi Fit valve locks.
- For standard diameter valve springs, no machining required.
- Machined steel, heat treated.

- Machined steel, heat treated, Multi Fit.
- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
 Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
 Performance steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set.

- 1.5 ratio, 3/8" stud, extra long slot, Nitro Carb (not self-aligning).
- 1.5 ratio, 3/8" stud, self-aligning, Nitro Carb. Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning).
- Energizer, 1.5 ratio, 3/8" stud (not self-aligning).
- 1.5 ratio, 3/8" stud (not self-aligning).
- 1.5 ratio, 3/8" stud (not self-aligning), narrow body for center bolt valve covers.
- 1.5 ratio, 3/8" stud, self-aligning narrow body for center bolt valve covers.

					СОМ	PLETE C	AM SPE	CIFICATIO	ONS		
Andinator	Camshaft Series/		Camshaft PART NUMBER/	See pg. 294	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
Hydraulic Roller Camshar Brute low end torque and HP, smooth idle, daily usage,	HR-260-2-12 IG	1000-	119811*a	11532-16 ^b	204	260	112	(5) 29	.000	420	
towing, economy, also mild turbocharged, 2200–3000 cruise RPM, 8.0 to 9.5 compression ratio advised.	IIN-200-2-12 Id	5200	\$	11332-10	214	270	112	44 (10)	.000		
Excellent low end and mid range torque and HP, good idle, daily usage, off road, performance and fuel efficiency, 2400-3200 cruise RPM, 8.75 to 10.5 compression ratio advised. Good w/small centrifugal or Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised, .900" base circle for long stroke clearance.	HR-210/325-2S-12.90 IG	1400- 5600	119561*a	11532-16 ^b	210 218	272 280	112	(2) 32 46 (8)	.000 .000		
Excellent low end and mid range torque and HP, good idle, daily usage, off road, performance and fuel efficiency, 2600-3400 cruise RPM, good w/small plate nitrous system, 8.75 to 10.5 compression ratio advised. Good w/centrifugal or small Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised.	HR-276-2S-12 IG	1600- 5800	119821*a	11532-16 ^b	214 222	276 284	112	0 34 48 (6)	.000 .000	.488 .509	
Excellent low end and mid range torque and HP, good idle, daily usage, off road, performance and fuel efficiency, 2600-3400 cruise RPM, good w/small plate nitrous system, 8.75 to 10.5 compression ratio advised. Good w/centrifugal or small Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised, .900" base circle for long stroke clearance.	HR-216/339-2S-12.90 IG	1600- 5800	119671*a	11532-16 ^b	216 224	284 292	112	1 35 49 (5)	.000 .000		
Good mid range torgue and HP, fair idle, moderate per- formance usage, mild bracket racing, auto trans w/2500+ converter, good w/plate or manifold nitrous system, 3000-3800 cruise RPM, 9.5 to 10.75 compression ratio advised. Good w/centrifugal or Roots supercharger, 10 lbs. max. boost w/8.0 max. compression ratio advised.	HR-284-2S-12 IG	2000- 6200	119831*a	11532-16 ^b	222 230	284 292	112	4 38 52 (2)	.000 .000		
Good mid range torque and HP, fair idle, moderate per- formance usage, mild bracket racing, auto trans w/2500+ converter, good w/plate or manifold nitrous system, 3000-3800 cruise RPM, 9.5 to 10.75 compression ratio advised. Good w/centifugal or Roots supercharger, 10 lbs. maximum boost w/8.0 maximum compression ratio advised, 900" base circle for long stroke clearance.	HR-222/345-25-12.90 IG	2000- 6200	119701*a	11532-16 ^b	222 230	288 296	112	4 38 52 (2)	.000		
Good mid range torque and HP, fair idle, moderate per- formance usage, serious off road, mild bracket racing w/ heavy car, auto trans w/2500+ converter, 3000-3800 cruise RPM, 9.5 to 10.75 compression ratio advised.	HR-230/352-251-8 IG	2400- 6400	119571*a	11532-16 ^b	230 238	292 300	108	12 38 52 6	.000 .000		
Good mid range torque and HP, fair idle, performance usage, 3600-4400 cruise RPM, good with manifold nitrous system, 10.0 to 11.5 compression ratio advised. Good w/Roots supercharger, 15 lbs. maximum boost w/8.0 maximum compression ratio advised, .900" base circle for long stroke dearance.	HR-230/359-25-12.90 IG	2600- 6600	119661*a	11532-16 ^b	230 238	292 300	112	8 42 56 2	.000 .000		
Good mid range torque and HP, fair idle, performance usage, mild bracket racing, auto trans w/3000+ converter, 3800-4600 cruise RPM, good with manifold nitrous system, 10.0 to 11.5 compression ratio advised. Good w/Roots supercharger, 15 lbs. maximum boost, w/8.0 maximum compression ratio advised.	HR-296-25-12 IG	2800- 6800	119841*a	11532-16 ^b	234 242	296 304	112	10 44 58 4	.000 .000		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous power, torque and RPM potential. Due to their RPM capability, and to insure that correct components are used, the appropriate CamPonent Kit is recommended. Each Crane CamPonent Kit contains the valve train components needed for maximum performance.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: When using 55-56, 265 cu.in. blocks, late model cam bearings must be installed.

NOTE: Camshafts having standard size journals with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) are available on special order. Contact Crane's Performance Consultants for details. NOTE: Camshafts for modified standard blocks, or Oldsmobile/Dart blocks, having Big Block Chevrolet size (1.948") cam bearings are available on special order. Contact Crane's Performance Consultants for details.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM Crane Classic Energizer	
11307-1 ^{c,d}	99838-16 ^d 96802-16 ^e 144846-16 ^x	99944-16 99915-16 ⁹	99820-16 ^d	99097-1 ⁱ	11628-16 ^k 95621-16 ^l	11975-1* ^m 11984-1* ⁿ 11977-1*°	11801-16 ^p 11801C-16 ^q 10800C-16 ^r	11774-16 ^s 11744-16 ^t	11750-16" 10750-16" 10751-16"
11307-1 ^{c,d}	99838-16 ^d 96802-16 ^e 144846-16 ^x	99944-16 99915-16 ⁹	99820-16 ^d	99097-1 ⁱ	11628-16 ^k 95621-16 ^l	11975-1* ^m 11984-1* ⁿ 11977-1*°	11801-16 ^p 11801C-16 ^q 10800C-16 ^r	11774-16 ^s 11744-16 ^t	11750-16 ^u 10750-16 ^v 10751-16 ^w
11307-1 ^{cd}	99838-16 ^d 96802-16 ^e 144846-16 ^x	99944-16 99915-16 ⁹	99820-16 ^d	99097-1 ⁱ	11628-16 ^k 95621-16 ^l	11975-1* ^m 11984-1* ⁿ 11977-1*°	11801-16 ^p 11801C-16 ^q 10800C-16 ^r	11774-16 ^s 11744-16 ^t	11750-16" 10750-16" 10751-16"
11307-1 ^{c,d}	99838-16 ^d 96802-16 ^e 144846-16 ^x	99944-16 99915-16 ⁹	99820-16 ^d	99097-1 [†]	11628-16 ^k 95621-16 ^l	11975-1* ^m 11984-1* ⁿ 11977-1*°	11801-16 ^p 11801C-16 ^q 10800C-16 ^r	11774-16 ⁵ 11744-16 ^t	11750-16 ^u 10750-16 ^v 10751-16 ^w
11307-1 ^{c,d}	99838-16 ^d 96877-16 ^{d,f} 144846-16 ^x	99944-16 99969-16 ^h	99820-16 ^d	99097-1 ⁱ 99088-1 ^j	11628-16 ^k 95621-16 ^l	11975-1* ^m 11984-1* ⁿ 11977-1*°	11801-16 ^p 11801C-16 ^q	11774-16 ^s 11744-16 ^t	11750-16 ⁴ 10750-16 ⁷ 10751-16 ⁸
11307-1 ^{c,d}	99838-16 ^d 96877-16 ^{d,f} 144846-16 ^x	99944-16 99969-16 ^h	99820-16 ^d	99097-1 ⁱ 99088-1 ^j	11628-16 ^k 95621-16 ^l	11975-1* ^m 11984-1* ⁿ 11977-1*°	11801-16 ^p 11801C-16 ^q	11774-16 ^s 11744-16 ^t	11750-16 ^u 10750-16 ^v 10751-16 ^w
11307-1 ^{c,d}	99838-16 ^d 96877-16 ^{d,f} 144846-16 ^x	99944-16 99969-16 ^h	99820-16 ^d	99097-1 ⁱ 99088-1 ^j	11628-16 ^k 95621-16 ^l	11975-1* ^m 11984-1* ⁿ 11977-1*°	11801-16 ^p 11801C-16 ^q	11774-16 ^s 11744-16 ^t	11750-16" 10750-16" 10751-16"
11307-1 ^{cd}	99838-16 ^d 96877-16 ^{d,f} 144846-16 ^x	99944-16 99969-16 ^h	99820-16 ^d	99097-1 ⁱ 99088-1 ^j	11628-16 ^k 95621-16 ^l	11975-1* ^m 11984-1* ⁿ 11977-1*°	11801-16 ^p 11801C-16 ^q	11774-16 ^s 11744-16 ^t	11750-16" 10750-16" 10751-16"
11307-1 ^{c,d}	99838-16 ^d 96877-16 ^{d,f} 144846-16 ^x	99944-16 99969-16 ^h	99820-16 ^d	99097-1 ⁱ 99088-1 ^j	11628-16 ^k 95621-16 ^l	11975-1* ^m 11984-1* ⁿ 11977-1*°	11801-16 ^p 11801C-16 ^q	11774-16 ^s 11744-16 ^t	11750-16" 10750-16" 10751-16"

Section Continued



- Requires cam button spacer, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod **11985-1** is highly recommended to prevent fuel pump lobe wear. vertical locking bar hydraulic roller lifters, no machining required.

 CamPonent Kit contents:
 Hydraulic Roller Lifters, set of 16 (11532-16)
 Pushrods, Special Length, set of 16 (11628-16)
 Valve Springs, set of 16 (99838-16)
 Valve Spring Retainers, set of 16 (99944-16)
 Machined Steel Valve Stem Locks, set of 32 (99097-1)
 Valve Stem Seals, set of 16 (99820-16)
 Fuel Pump Pushrod (11985-1)
 Cam Sprocket Bolt Locking Plate Kit (99168-1)
 Needle Bearing Cam Button Spacer (99164-1)
 Must machine cylinder heads.
 Standard diameter chrome silicon valve springs for 1.750" assembly height.
 For +.100" long valves.
 For standard diameter valve springs.

- Requires Crane Multi Fit valve locks.
- Machined steel, heat treated. Machined steel, heat treated, Multi Fit.
- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.

 Pro Series one-piece, for use with or without pushrod guideplate cylinder heads.

 Performance steel billet gears and roller chain set.

- Performance steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set with thrust bearing.
 1.5 ratio, 3/8" stud, extra long slot (not self-aligning).
 1.5 ratio, 3/8" stud, extra long slot, Nitro Carb (not self-aligning).
 1.5 ratio, 3/8" stud, extra long slot, Nitro Carb (not self-aligning).
 1.5 ratio, 3/8" stud, extra long slot, Nitro Carb (not self-aligning).
 1.5 ratio, 3/8" stud (not self-aligning).
 1.5 ratio, 3/8" stud (not self-aligning).
 1.5 ratio, 3/8" stud (not self-aligning), narrow body for center bolt valve covers.
 1.5 ratio, 3/8" stud, self-aligning narrow body for center bolt valve covers.
 Standard diameter PAC Enhanced valve springs for 1.750" assembly height.

					СОМ	PLETE C	AM SPE	CIFICATION	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Roller Camshat	fts — Retrofit										
Good mid range torque and HP, fair idle, performance usage, mild bracket racing, auto trans w/3000+ converter, 3800-4600 cruise RPM, good with manifold nitrous system, 10.0 to 11.5 compression ratio advised. Good w/Roots supercharger, 15 lbs. maximum boost, w/8.0 maximum compression ratio advised, .900" base circle for long stroke clearance.	HR-234/365-2S-12.90 IG	2800- 6800	119691*a	11532-16 ^b	234 242	296 304	112	10 44 58 4	.000 .000		
Good mid to upper RPM torque and HP, fair idle, performance usage, mild bracket racing, auto trans w/3000+converter, 3800-4600 cruise RPM, good with manifold nitrous system, 10.5 to 112.0 compression ratio advised. Good w/Roots supercharger, 18 lbs. maximum boost, w/8.0 maximum compression ratio advised, .900" base circle for long stroke clearance.	HR-238/372-252-10.90 IG	3000- 6800	119581°a	11532-16 ^b	238 242	300 304	110	14 44 56 6	.000		
Good upper RPM torque and HP, rough idle, performance usage, bracket racing, auto trans w/3500+ converter, 4200-5000 cruise RPM, 10.5 to 12.0 compression ratio advised, 370+ cu.in. Also mild supercharged and/or nitrous, .860" base circle for long stroke clearance.	HR-306-25-10.86 IG	3200- 7000	119651*a	11532-16 ^b	240 248	306 314	110	15 45 59 9	.000 .000		
Rough idle, performance usage, good w/large nitrous system, good upper RPM torque and HP, 370+ cu.in., bracket racing, auto trans w/3500+ converter, 4200-5000 cruise RPM, 10.5 to 12.0 compression ratio advised, .860" base circle for long stroke clearance. Good w/ Roots supercharger, 18 lbs. maximum boost w/8.0 maximum compression ratio advised.	HR-240/372-251-14.86 IG	3400- 7200	119681*a	11532-16 ^b	240 248	306 314	114	11 49 63 5	.000		
Rough idle, performance usage, good w/large nitrous system, good upper RPM torque and HP, 370+ cu.in., bracket racing, auto trans w/3500+ converter, 10.5 to 12.5 compression ratio advised, .900" base circle for long stroke dearance. Good w/ Roots supercharger, 20 lbs. max. boost w/8.0 max. compression ratio advised.	HR-242/372-25-12.90 IG	3600- 7200	119591*a	11532-16 ^b	242 250	304 312	112	14 48 62 8	.000 .000		
Rough idle, performance usage, good w/large nitrous system, good upper RPM torque and HP, 380+ cu.in., bracket racing, auto trans w/4000+ converter, 11.0 to 12.5 compression ratio advised. Good w/ Roots supercharger, 22 lbs. maximum boost w/8.0 maximum compression ratio advised.	HR-246/372-25-14 IG	3800- 7200	119601*a	11532-16 ^b	246 254	308 316	114	14 52 66 8	.000 .000		
Competition only, good upper RPM torque and HP, 370+cu.in., bracket racing, auto trans w/4000+converter, 11.5 to 13.0 compression ratio advised, .860" base circle for long stroke clearance.	HR-250/372-25-10.86 IG	4000- 7200	119611° ^a	11532-16 ^b	250 258	316 324	110	20 50 64 14	.000		
Competition only, good upper RPM torque and HP, 370+cu.in., bracket racing, auto trans w/race converter, 12.0 minimum compression ratio advised.	HR-252/400-25-8 IG	4200- 7200	119711 ^{*a}	11532-16 ^b	252 256	322 326	108	22.5 49.5 60.5 15.5	.000		
Competition only, good upper RPM HP, 380+ cu.in., bracket racing, auto trans w/race converter, good w/large nitrous system, 12.5 minimum compression ratio advised.	HR-258/372-25-12.86 IG	4400- 7200	119721*a	11532-16 ^b	258 266	320 328	112	22 56 70 16	.000 .000	.558 .558	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous power, torque and RPM potential. Due to their RPM capability, and to insure that correct components are used, the appropriate CamPonent Kit is recommended. Each Crane CamPonent Kit contains the valve train components needed for maximum performance.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: When using 55-56, 265 cu.in. blocks, late model cam bearings must be installed.

NOTE: Camshafts having standard size journals with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) are available on special order. Contact Crane's Performance Consultants for details. NOTE: Camshafts for modified standard blocks, or Oldsmobile/Dart blocks, having Big Block Chevrolet size (1.948") cam bearings are available on special order. Contact Crane's Performance Consultants for details.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



	CRANE VALV	E TRAIN CO	MPONENTS							
_	See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
	VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	11307-1 ^{cd}	99838-16 ^d 96877-16 ^{d,e} 144846-16 ^u	99944-16 99969-16 ^f	99820-16 ^d	99097-1 ⁹ 99088-1 ^h	11628-16 ⁱ 95621-16 ^j	11975-1* ^k 11984-1* ^l 11977-1* ^m	11801-16 ⁿ 11801C-16°	11774-16 ^p 11744-16 ^q	11750-16° 10750-16° 10751-16°
	11307-1 ^{c,d}	99838-16 ^d 96877-16 ^{d,e} 144846-16 ^u	99944-16 99969-16 ^f	99820-16 ^d	99097-1 ⁹ 99088-1 ^h	11628-16 ⁱ 95621-16 ^j	11975-1* ^k 11984-1* ^l 11977-1* ^m	11801-16 ⁿ 11801C-16°	11774-16 ^p 11744-16 ^q	11750-16 ^v 10750-16 ^s 10751-16 ^t
	11307-1 ^{c,d}	99838-16 ^d 96877-16 ^{d,e} 144846-16 ^u	99944-16 99969-16 ^f	99820-16 ^d	99097-1 ⁹ 99088-1 ^h	11628-16 ⁱ 95621-16 ^j	11975-1* ^k 11984-1* ^l 11977-1* ^m	11801-16 ⁿ 11801C-16°	11774-16 ^p 11744-16 ^q	11750-16° 10750-16° 10751-16°
	11307-1 ^{c,d}	99838-16 ^d 96877-16 ^{d,e} 144846-16 ^u	99944-16 99969-16 ^f	99820-16 ^d	99097-1 ⁹ 99088-1 ^h	11628-16 ⁱ 95621-16 ^j	11975-1* ^k 11984-1* ⁱ 11977-1* ^m	11801-16 ⁿ 11801C-16°	11774-16 ^p 11744-16 ^q	11750-16 ^v 10750-16 ^s 10751-16 ^t
	11307-1 ^{c,d}	99838-16 ^d 96877-16 ^{d,e} 144846-16 ^u	99944-16 99969-16 ^f	99820-16 ^d	99097-1 ⁹ 99088-1 ^h	11628-16 ⁱ 95621-16 ^j	11975-1° ^k 11984-1° ^l 11977-1° ^m		11774-16 ^p 11744-16 ^q	11750-16° 10750-16° 10751-16°
	11307-1 ^{c,d}	99838-16 ^d 96877-16 ^{d,e} 144846-16 ^u	99944-16 99969-16 ^f	99820-16 ^d	99097-1 ⁹ 99088-1 ^h	11628-16 ⁱ 95621-16 ^j	11975-1* ^k 11984-1* ⁱ 11977-1* ^m		11774-16 ^p 11744-16 ^q	11750-16 ^s 10750-16 ^s 10751-16 ^t
	11307-1 ^{c,d}	99838-16 ^d 96877-16 ^{d,e} 144846-16 ^u	99944-16 99969-16 ^f	99820-16 ^d	99097-1 ⁹ 99088-1 ^h	11628-16 ⁱ 95621-16 ^j	11975-1* ^k 11984-1* ^l 11977-1* ^m		11774-16 ^p 11744-16 ^q	11750-16 ^v 10750-16 ^s 10751-16 ^t
	11307-1 ^{c,d}	99838-16 ^d 96877-16 ^{d,e} 144846-16 ^u	99944-16 99969-16 ^f	99820-16 ^d	99097-1 ⁹ 99088-1 ^h	11628-16 ⁱ 95621-16 ^j	11975-1* ^k 11984-1* ^l 11977-1* ^m		11774-16 ^p 11744-16 ^q	11750-16° 10750-16° 10751-16°
	11307-1 ^{c,d}	99838-16 ^d 96877-16 ^{d,e} 144846-16 ^u	99944-16 99969-16 ^f	99820-16 ^d	99097-1 ⁹ 99088-1 ^h	11628-16 ⁱ 95621-16 ^j	11975-1*k 11984-1* ¹ 11977-1* ^m		11774-16 ^p 11744-16 ^q	11750-16 ^v 10750-16 ^s 10751-16 ^t

- Requires cam button spacer, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod **11985-1** is highly recommended to prevent fuel pump lobe wear.
- Vertical locking bar hydraulic roller lifters, no machining required.

Vertical locking bar hydraulic roller lifters, no machining CamPonent Kit contents:
Hydraulic Roller Lifters, set of 16 (11532-16)
Pushrods, Special Length, set of 16 (11628-16)
Valve Springs, set of 16 (99838-16)
Valve Spring Retainers, set of 16 (99944-16)
Machined Steel Valve Stem Locks, set of 32 (99097-1)
Valve Stem Seals, set of 16 (99820-16)
Fuel Pump Pushrod (11985-1)
Cam Sprocket Bolt Locking Plate Kit (99168-1)
Needle Rearing Cam Button Spacer (99164-1)

Needle Bearing Cam Button Spacer (99164-1)

Must machine cylinder heads.

- For +.100" long valves. Requires Crane Multi Fit valve locks.

- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads. Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads. Pro Series one-piece, for use with or without pushrod guideplate cylinder heads. Performance steel billet gears and roller chain set. Pro Series steel billet gears and roller chain set. Pro Series steel billet gears and roller chain set with thrust bearing. 1.5 ratio, 3/8" stud, extra long slot (not self-aligning). 1.5 ratio, 3/8" stud, extra long slot, Nitro Carb (not self-aligning). Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning). Energizer, 1.5 ratio, 3/8" stud (not self-aligning). 1.5 ratio, 3/8" stud (not self-aligning), narrow body for center bolt valve covers. 1.5 ratio, 3/8" stud, self-aligning ing narrow body for center bolt valve covers. Standard diameter PAC Enhanced valve springs for 1.750" assembly height.

- Standard diameter PAC Enhanced valve springs for 1.750" assembly height.

					COM	PLETE C	AM SPE	CIFIC	ATIC	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration	Degrees Lobe Separation	Open/C @ .05 Cam L Int/Ex	0" ift	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Mechanical Lifter Camsh		NANGL	LITISSIONS COde	LIITENS	IIIL/ LAII.	III(/LXII.	эерагация	IIIt/L/	AII	LAII.	LXII.
Replacement for factory 340 HP 327 cu.in. Duntov cam- shaft.	BluePrinted 3736097	2000- 5600	110901	99250-16	227 230	260 268	110.5	3.5 43 46	4.5	.012 .018	
Excellent low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 2600-3000 cruise RPM, limited oval track, 8.75 to 10.0 compression ratio advised.	F-228/3067-2-6	2400- 6000	110911*	99250-16	228 238	290 300	106	12 49	36 9	.022 .022	
Good low end and mid range torque and HP, good idle, daily performance usage, auto trans w/stock to 2500 converter, 2600-3000 cruise RPM, 9.25 to 10.75 compres- sion ratio advised.	F-228/3067-2-10	2600- 6200	110931*	99250-16	228 238	290 300	110		39 4	.022 .022	
Good mid range to upper RPM torque and HP, fair idle, moderate performance usage, 3400-3800 cruise RPM, 9.5 to 11.0 compression ratio advised. Good w/centrifu- gal or Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised.	F-238/3200-14	3000- 6600	110941*	99250-16	238 238	278 278	114		18 0	.022 .022	
Good low end and mid range torque and HP, fair idle, moderate performance usage, bracket racing, good w/plate or manifold nitrous system, 3400-3800 cruise RPM, 10.0 to 11.5 compression ratio advised. Good w/centrifugal or Roots supercharger, 10 lbs. maximum boost w/8.5 maximum compression ratio advised.	F-278-2	3000- 6800	113841*	99250-16	238 248	278 288	114		18 5	.022 .022	
Replacement for factory 330 HP 350 cu.in. camshaft.	BluePrinted 3972182	2800- 6600	110951	99250-16	242 254		116	11 ±	51 5	.020 .025	
Good mid range torque, performance usage, bracket rac- ing; Heavy, Pro ET, Super ET, etc., auto trans w/3000+ converter, oval track; Late Model, Sportsman, I.M.C.A., etc., 1/4-3/8 mile, 10.5 to 12.0 compression ratio advised.	Saturday Night Special F-244/3454-2S-6	3200- 6800	110921* 110922*a	99250-16	244 252	280 288	106	19 4 55	15 17	.026 .026	
Good mid range torque and HP, rough idle, moderate performance usage, 3600-4000 cruise RPM, good with plate or small manifold nitrous system, 10.5 to 12.0 compression ratio advised. Also good for mild supercharged.	F-280-2	3200- 7000	114681*	99250-16	244 252	280 288	112	14 62	50 10	.026 .026	
Performance usage, bracket racing; Heavy, Pro ET, Super ET, etc., auto trans w/3000+ converter, oval track; Late Model, Sportsman, I.M.C.A., etc., 1/4-3/8 mile, 11.0 to 12.5 compression ratio advised.	F-248/3334-6	3400- 7000	110961*	99250-16	248 248	288 288	106		16 14	.022 .022	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Self-aligning rocker arms cannot be used with mechanical lifter camshafts. NOTE: When using 55-56, 265 cu.in. blocks, late model cam bear-

NOTE: When using 55-56, 265 cu.in. blocks, late model cam bear ings must be installed.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Camshafts having standard size journals with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) are available on special order. Contact Crane's Performance Consultants for details.

NOTE: Camshafts for modified standard blocks, or Oldsmobile/ Dart blocks, having Big Block Chevrolet size (1.948") cam bearings are available on special order. Contact Crane's Performance Consultants for details.

NOTE: Camshafts specifically engineered for engines that have .875" or .904" diameter lifters are available on special order. Contact Crane's Performance Consultants for details. Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUI Crane Classi Energizer	
11308-1 ^{b,c}	99848-16 ^{b,c}	99915-16 ^h		99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16™	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801-16 ^q	11774-165	11750-16 ^t
11309-1 ^{d,e}	99846-16° 96877-16 ^f	99915-16 ^h 99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801-16 ^q	11774-16°	11750-16 ^t
11309-1 ^{4,e}	99846-16° 96877-16 ^f	99915-16 ^h 99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801-16 ^q	11774-16 ^s	11750-16 ^t
	96877-16 ^f	99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801-16 ^q	11774-16 ^s	11750-16 ^t
	96877-16 ^f	99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801-16 ^q	11774-16°	11750-16 ^t
	96877-16 ^f	99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801-16 ^q	11774-16°	11750-16 ^t
11309-1 ^{d,e}	99846-16° 96877-16 ^f	99915-16 ^h 99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801-16 ^q 11801C-16 ^r	11774-16 ^s	11750-16 ⁴
	96877-16 ^f	99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1 ^{*n} 11984-1 ^{*o} 11977-1 ^{*p}	11801-16 ^q 11801C-16 ^r	11774-16 ^s	11750-16 ⁶
11309-1 ^{4,e}	99846-16° 96877-16 ^f	99915-16 ^h 99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801-16 ^q 11801C-16 ^r	11774-16 ^s	11750-16 ^t 10750-16 ^t



- Cam, lifter and valve spring (99846-16) kit, includes installation lubricants. Contains standard diameter valve springs, no machining required.
- Contains standard diameter valve springs, no machining required.
- For 1967-87 with 1.700" assembly height.
- Contains standard diameter valve springs and machined steel valve stem locks (99095-1), no machining required.
- Standard diameter XHTCS tool steel valve springs for 1.800" assembly height.
- Must machine cylinder heads.
- Standard diameter chrome silicon valve springs for 1.750" assembly height.
- For standard diameter valve springs, no machining required.
- Machined steel, heat treated.
- Machined steel, heat treated, +.050" assembly height.

- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
- Pro Series one-piece.
- n Performance steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set with thrust bearing.
- 1.5 ratio, 3/8" stud, extra long slot (not self-aligning).
- 1.5 ratio, 3/8" stud, extra long slot, Nitro Carb (not self-aligning).
- Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning).
- t 1.5 ratio, 3/8" stud (not self-aligning). Valve Train Stabilizer available, see page 363.
 u 1.5 ratio, 3/8" stud (not self-aligning), narrow body for center bolt valve covers.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Mechanical Lifter Camsh		NAINGL	LITISSIOTS COde	LII ILKS	IIII/LXII.	IIIt/LXII.	Separation	IIII/LXII	LXII.	LXII.
Good mid range torque and HP, rough idle, moderate performance usage, good w/manifold nitrous system, bracket racing, auto trans w/3000+ converter, 3800-4200 cruise RPM, 11.0 to 12.5 compression ratio advised. Good w/Roots supercharger, 15 lbs. maximum boost w/8.0 maximum compression ratio advised.	F-288-2	3400- 7200	113861*	99250-16	248 258	288 298	114	15 53 68 10	.022 .022	
Performance usage, good mid and upper RPM torque and HP, bracket racing; Pro, Pro ET, Super ET, etc., auto trans w/race converter, oval track; Late Model, Sportsman, I.M.C.A., etc., 3/8-1/2 mile, 11.0 to 12.5 compression ratio advised.	285-295-06	3600- 7000	12003*	99250-16	250 260	285 295	106	21 49 58 22	.026 .028	.533 .555
Performance usage, good mid range torque and HP, bracket racing; Pro, Pro ET, Super ET, etc., auto trans w/race converter, oval track; Late Model, Sportsman, I.M.C.A., etc., 3/8-1/2 mile, 11.5 to 12.5 compression ratio advised.	Saturday Night Special F-252/3574-25-6	3800- 7200	110981* 110982*a	99250-16	252 260	288 296	106	22 50 58 22	.026 .026	.536 .554
Good mid range HP, rough idle, performance usage, 4000-4400 cruise RPM, good w/manifold nitrous system, 11.5 to 12.5 compression ratio advised. Good w/ Roots supercharger, 18 lbs. maximum boost w/8.0 maximum compression ratio advised.	F-290-2	3800- 7600	114691*	99250-16	252 260	290 298	112	17 55 65 15	.026 .026	.536 .554
Replacement for factory 290 HP 302 cu.in. Z-28 cam- shaft.	BluePrinted 3849346	4000- 7000	967251	99250-16	254 254		114	15 59 63 11	.030 .030	
Competition only, serious flat lifter restricted oval track; Late Model, Sportsman, etc., 3/8-1/2 mile, intended for 1.8 intake and 1.7 exhaust ratio rocker arms, 11.5 to 12.5 compression ratio advised.	F-256/340-25-8	4000- 7800	110971*	99250-16	256 260	288 292	108	26 50 64 16	.018 .020	.612 .578
Performance usage, good mid range torque and HP, bracket racing; Pro, Pro ET, Super ET, etc., auto trans w/race converter, oval track; Late Model, Sportsman, I.M.C.A., etc., 3/8-1/2 mile, 11.5 to 12.5 compression ratio advised.	Saturday Night Special F-256/3634-25-5	4000- 7600	111411* 111412*a	99250-16	256 264	292 300	105	25 51 59 25	.026 .026	
Replacement for factory Off Road Special camshaft.	BluePrinted 3927140	4200- 7200	968821	99250-16	257 269		112	20.5 56.5 70.5 18.5	.024 .026	
Performance usage, good mid and upper RPM HP, bracket racing; Pro, Super Pro, Hot Rod, Super ET, etc., auto trans w/race converter, oval track; Late Model, Sportsman, I.M.C.A., etc., 3/8-1/2 mile, 11.5 minimum compression ratio advised.	F-260/3694-2S-6	4400- 7600	111431*	99250-16	260 268	296 304	106	26 54 62 26	.026 .026	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Self-aligning rocker arms cannot be used with mechanical lifter camshafts.

NOTE: When using 55-56, 265 cu.in. blocks, late model cam bearings must be installed.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Camshafts specifically engineered for engines that have than the 57-87 engines and cannot be interchanged.

NOTE: Camshafts having standard size journals with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) are available on special order. Contact Crane's Performance Consultants for details.

NOTE: Camshafts for modified standard blocks, or Oldsmobile/ Dart blocks, having Big Block Chevrolet size (1.948") cam bearings are available on special order. Contact Crane's Performance Consultants for details.

.875" or .904" diameter lifters are available on special order. Contact Crane's Performance Consultants for details.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



					_			_	
CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM Crane Classio Energizer	
	96877-16 ^f	99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16¹ 95636-16™	11975-1*" 11984-1*° 11977-1*P	11801-16 ^q 11801C-16 ^r	11774-16	11750-16 ^t 10750-16 ^u
11309-1 ^{b,c}	99846-16 ^c 96802-16 ^g 96877-16 ^f	99915-16 ^h 99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16™	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801C-16 ^r	11774-16°	11750-16 ^t 10750-16 ^u
11309-1 ^{b,c}	99846-16 ^c 96802-16 ^g 96877-16 ^f	99915-16 ^h 99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1*** 11984-1** 11977-1**	11801C-16 ^r	11774-16	11750-16 ^t 10750-16 ^u
11309-1 ^{b,c}	99846-16 ^c 96802-16 ^g 96877-16 ^f	99915-16 ^h 99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801C-16 ^r	11774-16°	11750-16 ^t 10750-16 ^u
11308-1 ^{d,e}	99848-16 ^{d,e} 96802-16 ^g	99915-16 ^h 99943-16		99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801-16 ^q 11801C-16 ^r	11774-16 ^s	11750-16 ^t 10750-16 ^u
	96877-16 ^f	99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1* ⁿ 11984-1*° 11977-1* ^p	11801C-16 ^r	11774-16°	11750-16 ^t 10750-16 ^u
11309-1 ^{b,c}	99846-16 ^c 96802-16 ^g 96877-16 ^f	99915-16 ^h 99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801C-16 ^r	11774-16	11750-16 ^t 10750-16 ^u
11309-1 ^{b,c}	99846-16 ^c 96802-16 ^g 96877-16 ^f	99915-16 ^h 99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1" ⁿ 11984-1" ^o 11977-1" ^p	11801C-16 ^r	11774-16 ^s	11750-16 ^t 10750-16 ^u
11309-1 ^{b,c}	99846-16 ^c 96802-16 ^g 96877-16 ^f	99915-16 ^h 99943-16	99820-16 ^f	99097-1 ⁱ 99095-1 ^j	11621-16 ^k 11630-16 ^l 95636-16 ^m	11975-1* ⁿ 11984-1* ^o 11977-1* ^p	11801C-16 ^r	11774-16°	11750-16 ^t 10750-16 ^u



- Cam, lifter and valve spring (99846-16) kit, includes installation lubricants. Contains standard diameter valve springs, no machining required.
- Contains standard diameter valve springs and machined steel valve stem locks (99095-1), no machining required.
- Standard diameter XHTCS tool steel valve springs for 1.800" assembly height.
- Contains standard diameter valve springs, no machining required.
- For 1967-87 with 1.700" assembly height.
- Must machine cylinder heads.
- Standard diameter chrome silicon valve springs for 1.750" assembly height.
- For standard diameter valve springs, no machining required.
- Machined steel, heat treated.
- Machined steel, heat treated, +.050" assembly height.

- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
- Pro Series one-piece.
- Performance steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set.
 - Pro Series steel billet gears and roller chain set with thrust bearing.
 - 1.5 ratio, 3/8" stud, extra long slot (not self-aligning).
- 1.5 ratio, 3/8" stud, extra long slot, Nitro Carb (not self-aligning).
- Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning).
- t 1.5 ratio, 3/8" stud (not self-aligning). Valve Train Stabilizer available, see page 363.
 u 1.5 ratio, 3/8" stud (not self-aligning), narrow body for center bolt valve covers.

					СОМ	PLETE C	AM SPE	CIFIC	CATI	ONS		
Application	Camshaft Series/ Grind Number	rpm Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	0pen/ @ .0 Cam Int/	50" Lift	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Mechanical Lifter Camsh	afts											
Performance usage, good mid and upper RPM HP, bracket racing; Pro, Super Pro, Hot Rod, Super ET, etc., auto trans w/race converter, oval track; Late Model, Sportsman, I.M.C.A., etc., 3/8-1/2 mile, serious off road, 11.5 minimum compression ratio advised.	Saturday Night Special F-260/370-2-6	4400- 7600	111451° 111452°a	99250-16	260 270	295 305	106		52 25	.026 .028		
Competition only, serious flat lifter restricted oval track; Late Model, Sportsman, etc., 3/8-5/8 mile, intended for 1.8 intake and 1.5 ratio exhaust rocker arms, 12.0 mini- mum compression ratio advised.	F-262/340-2S-7	4400- 7800	110991*	99250-16	262 268	294 304	107	28 64	54 24	.020 .026	.612 .572	
Good upper RPM torque and HP, rough idle, moderate performance usage, good upper RPM HP, 4400-4800 cruise RPM, good w/large manifold nitrous system, 11.5 to 12.5 compression ratio advised. Good w/Roots supercharger, 20 lbs. maximum boost w/8.0 maximum compression ratio advised.	F-300-2	4600- 8200	114701*	99250-16	264 272	300 308	112		61 21	.026 .026	.563 .581	
	Saturday Night Special F-268/3814-25-6	4600- 8000	111501* 111502*a,b	99250-16	268 276	304 312	106		57 29	.026 .026		
Competition only, good upper RPM torque and HP, 360+ cu.in., bracket racing; Quick ET, etc., auto trans w/race converter, 12.5 minimum compression ratio advised.	F-310	4800- 8200	114711°	99250-16	272 272	310 310	108		61 25	.026 .026		
Competition only, good upper RPM HP, 370+ cu.in., bracket racing; Quick ET, etc., auto trans w/race converter, 12.5 minimum compression ratio advised.	F-276/3934-2S-6	4800- 8400	111001°	99250-16	276 284	312 320	106		62 34		.590 .608	
Radical Competition only, good high RPM HP, 380+ cu. in., flat lifter restricted classes, stick or auto trans. w/race converter, 12.5 minimum compression ratio advised.	F-320	5000- 8600	114721*	99250-16	280 280	320 320	108	35 71	65 29	.026 .026		
Radical Competition only, good high RPM HP, 388+ cu. in., flat lifter restricted classes, stick or auto trans. w/race converter, 12.5 minimum compression ratio advised.	F-280/3994-2S-8	5000- 8800	111751*	99250-16	280 288	316 324	108		65 33	.026 .026	.599 .617	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Self-aligning rocker arms cannot be used with mechanical lifter camshafts.

NOTE: When using 55-56, 265 cu.in. blocks, late model cam bearings must be installed.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Camshafts specifically engineered for engines that have than the 57-87 engines and cannot be interchanged.

NOTE: Camshafts having standard size journals with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) are available on special order. Contact Crane's Performance Consultants for details.

NOTE: Camshafts for modified standard blocks, or Oldsmobile/ Dart blocks, having Big Block Chevrolet size (1.948") cam bearings are available on special order. Contact Crane's Performance Consultants for details.

.875" or .904" diameter lifters are available on special order. Contact Crane's Performance Consultants for details.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



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CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM Crane Classic Energizer	
11309-1 ^{cd}	99846-16 ^d 96877-16 ^b	99915-16° 99943-16	99820-16 ^b	99097-1 ^f 99095-1 ^g	11621-16 ^h 11630-16 ⁱ 95636-16 ^j	11975-1* ^k 11984-1* ⁱ 11977-1* ^m	11801C-16 ⁿ	11774-16°	11750-16 ^p 10750-16 ^q
	96877-16 ^b	99943-16	99820-16 ^b	99097-1 ^f 99095-1 ^g	11621-16 ^h 11630-16 ⁱ 95636-16 ^j	11975-1* ^k 11984-1* ^l 11977-1* ^m	11801C-16 ⁿ	11774-16°	11750-16° 10750-16°
	96877-16 ^b	99943-16	99820-16 ^b	99097-1 ^f 99095-1 ^g	11621-16 ^h 11630-16 ⁱ 95636-16 ^j	11975-1* ^k 11984-1* ^l 11977-1* ^m		11774-16°	11750-16 ^p 10750-16 ^q
	96877-16 ^b	99943-16	99820-16 ^b	99097-1 ^f 99095-1 ^g	11621-16 ^h 11630-16 ⁱ 95636-16 ^j	11975-1* ^k 11984-1" ^l 11977-1* ^m		11774-16°	11750-16 ^p 10750-16 ^q
	96877-16 ^b	99943-16	99820-16 ^b	99097-1 ^f 99095-1 ^g	11621-16 ^h 11630-16 ⁱ 95636-16 ^j	11975-1* ^k 11984-1* ^l 11977-1* ^m		11774-16°	11750-16 ^p 10750-16 ^q
	96877-16 ^b	99943-16	99820-16 ^b	99097-1 ^f 99095-1 ^g	11621-16 ^h 11630-16 ⁱ 95636-16 ^j	11975-1* ^k 11984-1* ^l 11977-1* ^m		11774-16°	11750-16 ^p 10750-16 ^q
	96877-16 ^b	99943-16	99820-16 ^b	99097-1 ^f 99095-1 ^g	11621-16 ^h 11630-16 ⁱ 95636-16 ^j	11975-1*k 11984-1* ^l 11977-1* ^m		11774-16°	11750-16 ^p 10750-16 ^q
	96877-16 ^b	99943-16	99820-16 ^b	99097-1 ^f 99095-1 ^g	11621-16 ^h 11630-16 ⁱ 95636-16 ^j	11975-1*k 11984-1* ^l 11977-1* ^m		11774-16°	11750-16 ^p 10750-16 ^q

- Cam, lifter and valve spring (99846-16) kit, includes installation lubricants. Contains standard diameter valve springs, no machining required.
- Must machine cylinder heads.
- c Contains standard diameter valve springs and machined steel valve stem locks (99095-1), no machining required.
- Standard diameter XHTCS tool steel valve springs for 1.800" assembly height.
- For standard diameter valve springs, no machining required.
- Machined steel, heat treated.
- Machined steel, heat treated, +.050" assembly height.
- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads. Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
- Pro Series one-piece.

- Performance steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set with thrust bearing.
- **n** 1.5 ratio, 3/8" stud, extra long slot, Nitro Carb (not self-aligning). • Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning).
- 1.5 ratio, 3/8" stud (not self-aligning). Valve Train Stabilizer available, see page 363.
- **q** 1.5 ratio, 3/8" stud (not self-aligning), narrow body for center bolt valve covers.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 296	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Gross Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
Mechanical Roller Camsh											
Excellent low end and mid range torque and HP, good idle, daily performance usage, mild bracket racing, auto trans w/2500+ converter, 3000-3400 cruise RPM, 9.5 to 11.0 compression ratio advised.	SR-228/338-2S-12 IG	2200- 6200	118541*a	11515-16° 11519-16 ^d 11570-16°	228 236	278 280	112	7 41 55 1	.020 .020		
Good low end & mid range torque & HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/3000+ converter, 3400-3800 cruise RPM, good w/ plate or manifol nitrous system, 10.5 to 11.5 compression ratio advised, .900" base circle for long stroke clearance. Good w/centrifugal or small Roots supercharger, 10 lbs. max. boost w/8.5 max. compression ratio advised.	SR-232/350-25-12.90 IG	2400- 6600	118571*a	11515-16° 11519-16 ^d 11570-16°	232 240	286 294	112	9 43 57 3	.020 .020	.525 .543	
Good low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/3000+ converter, 3400-3800 cruise RPM, good w/plate or manifold nitrous system, 10.5 to 11.5 compression ratio advised. Good w/centrifugal or small Roots supercharger, 10 lbs. maximum boost w/8.5 maximum compression ratio advised.	SR-236/350-2S-12 IG	2400- 6600	118551*a	11515-16° 11519-16 ^d 11570-16°	236 244	286 294	112	11 45 59 5		.525 .543	
Good mid range torque and HP, fair idle, bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.5 to 12.0 compression ratio advised, 990" base circle for long stroke dearance in 388+ cu.in.	SR-240/362-2S-10.90 IG	3000- 7000	118581*a	11515-16° 11519-16 ^d 11570-16°	240 248	294 302	110	15 45 59 9	.020 .020		
Good mid to upper RPM torque and HP, fair idle, performance usage, good w/manifold nitrous system, bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.5 to 12.0 compress. ratio advised, 900" base circle for long stroke clearance. Good w/Roots supercharger, 14 lbs. max. boost w/8.0 max. compress. ratio advised.	SR-240/362-25-12.90 IG	3400- 7200	118611*a	11515-16 ^c 11519-16 ^d 11570-16 ^e	240 248	294 302	112	13 47 61 7	.020 .020		
Good mid range torque and HP, performance usage, bracket racing, Heavy, Pro, etc., auto trans w/race con- verter, serious off road, oval track, good mid-range torque and HP, 2-bbl or 4-bbl, 1/4-3/8 mile, 11.0 to 12.5 compression ratio advised.	TR-242/3867-2S-6	3600- 7200	118131° ^b	11515-16 ^c 11519-16 ^d 11570-16 ^e	242 250	282 290	106	17 45 53 17	.022 .022		
Good mid to upper RPM torque and HP, fair idle, performance usage, bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.5 to 12.0 compression ratio advised.	SR-244/362-2S-12 IG	3400- 7200	118521*a	11515-16° 11519-16 ^d 11570-16°	244 252	294 302	112	15 49 63 9	.020 .020		
Good mid to upper RPM torque and HP, fair idle, performance usage, good w/manifold nitrous system, bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.5 to 12.0 compression ratio advised. Good w/Roots supercharger, 14 lbs. maximum boost w/8.0 maximum compression ratio advised.	SR-244/362-2S-14 IG	3600- 7400	118531 ^{sa}	11515-16 ^c 11519-16 ^d 11570-16 ^e	244 252	294 302	114	13 51 63 7	.020 .020	.543 .561	
Good mid to upper RPM torque and HP, fair idle, performance usage, serious off road, bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.75 to 12.5 compression ratio advised.	SR-248/400-2S-8 IG	3600- 7400	118631*a	11515-16° 11519-16 ^d 11570-16°	248 252	286 290	108	21 47 59 13	.020 .022		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Self-aligning rocker arms cannot be used with mechanical lifter roller camshafts.

NOTE: When using 55-56, 265 cu.in. blocks, late model cam bearings must be installed.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Many options are available for these camshafts, and any of our custom ground camshafts. An iron distributor drive gear and rear journal can be specified. Drilling and tapping for Sander rear drive is available. SFO firring order (1-8-7-3-6-5-4-2, or 4/7 swap) and SFO1 (1-8-7-2-6-5-4-3), or 4/7 3/2 swap, are offered. Optional journal sizes are Roller Bearing (1.875"), Big Block (1.949"), Large Roller Bearing/50mm (1.969"), and 55mm (2.165") Gun drilling (where applicable) is available. Lightweight undercut journal, narrow lobe cores are offered. Lobe layouts for Buick Race/Dart, Splayed Valve, and SB2 cylinder heads are available.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CDANEN	LIVE TO A INLEA	MOONENES							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 31
VALVE SPRING AND RETAINER KITS	i	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC ENERGIZER	A ROCKERS -
	99893-16 ^f 96870-16 ^{f,g}	99953-16 99943-16 ⁹	99820-16 ^f	99097-1 ^k	11630-16 ^m 95636-16 ⁿ	11975-1*° 11984-1*° 11977-1*°		11774-16 ^r	11750-16 10750-16
	99893-16 ^f 96870-16 ^{f,g}	99953-16 99943-16 ⁹	99820-16 ^f	99097-1 ^k	11630-16 ^m 95636-16 ⁿ	11975-1°° 11984-1°° 11977-1°°		11774-16 ^r	11750-10 10750-10
	99893-16 ^f 96870-16 ^{f,g}	99953-16 99943-16 ⁹	99820-16 ^f	99097-1 ^k	11630-16 ^m 95636-16 ⁿ	11975-1°° 11984-1°° 11977-1°°		11774-16'	11750-16 10750-16
	99893-16 ^f 96870-16 ^{f,g}	99953-16 99943-16 ⁹	99820-16 ^f	99097-1 ^k	11630-16 ^m 95636-16 ⁿ	11975-1*° 11984-1*° 11977-1*°		11774-16 ^r	11750-10 10750-10
	99893-16 ^f 96870-16 ^{f,g}	99953-16 99943-16 ⁹	99820-16 ^f	99097-1 ^k	11630-16 ^m 95636-16 ⁿ	11975-1 [°] ° 11984-1 [°] ° 11977-1 [°] °		11774-16 ^r	11750-10 10750-10
	99885-16 ^f 96883-16 ^{f,g}	99956-16 99675-16 ⁱ 99970-16 ^j	99820-16 ^f	99097-1 ^k 99087-1 ^l	11630-16 ^m 95636-16 ⁿ	11975-1°° 11984-1°° 11977-1°°		11774-16′	11750-1 10750-1
	99893-16 ^f 96870-16 ^{f,g}	99953-16 99943-16 ⁹	99820-16 ^f	99097-1 ^k	11630-16 ^m 95636-16 ⁿ	11975-1°° 11984-1°° 11977-1°°		11774-16 ^r	11750-1 10750-1
	99893-16 ^f 96870-16 ^{f,g}	99953-16 99943-16 ⁹	99820-16 ^f	99097-1 ^k	11630-16 ^m 95636-16 ⁿ	11975-1°° 11984-1°° 11977-1°°		11774-16'	11750-1 10750-1
	99893-16 ^f 96870-16 ^{f,g}	99953-16 99943-16 ⁹	99820-16 ^f	99097-1 ^k	11630-16 ^m 95636-16 ⁿ	11975-1*° 11984-1*° 11977-1*°		11774-16 ^r	11750-1 10750-1



- a Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear.
 b Requires cam button spacer and a 11990-1 (.489"1.D.) or 11989-1 (.500"1.D. Accel) aluminum-
- bronze distributor drive gear. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear.
- Horizontal locking bar roller lifters.
- Vertical locking bar roller lifters. Ultra Pro Series vertical locking bar roller lifters.
- Must machine cylinder heads.
- For cylinder heads with +.100"long valves, use **99943-16** retainers.
 For cylinder heads with +.100"long valves, use **99970-16** retainers and **99087-1** valve stem locks.
- Titanium, must use 99097-1 valve stem locks, included with the retainers.
- Requires Crane Multi Fit valve locks.

- Machined steel, heat treated. Machined steel, heat treated, Multi Fit.
- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads. Pro Series one-piece, for use with or without pushrod guideplate cylinder heads.
- Performance steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set with thrust bearing. Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning). Valve Train Stabilizer available, see page 363. 1.5 ratio, 3/8" stud (not self-aligning). Valve Train Stabilizer available, see page 363.
- 1.5 ratio, 3/8" stud (not self-aligning), narrow body for center bolt valve covers.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Mechanical Roller Camsh	afts										
Performance usage, bracket racing, good mid-range torque and HP, Heavy, Pro, etc., auto trans w/race converter, oval track, 1/4-3/8 mile, 11.0 to 12.5 compression ratio advised.	R-248/420-252-6	3800- 7400	118741° ^a	11519-16 ^d 11570-16 ^e	248 256	280 288	106	21 47 57 19	.020 .020		
Good upper RPM torque and HP, rough idle, performance usage, bracket racing, auto trans w/3500+ converter, 4200-4600 cruise RPM, 11.0 minimum compression ratio advised, 388+ cu.in., supercharged and/or nitrous.	SR-250/374-2S-10.90 IG	3800- 7400	118591*b	11515-16 ⁹ 11519-16 ^d 11570-16 ^e	250 258	300 308	110	20 50 64 14	.020 .020		
Good upper RPM torque and HP, rough idle, performance usage, good w/manifold nitrous system, 388+ cu.in., Pro Street, bracket racing, auto trans w/3500+ converter, 4200-4600 cruise RPM, 11.0 minimum compression ratio advised, 900" base circle for long stroke clearance. Good w/Roots supercharger, 18 lbs. maximum boost w/8.0 maximum compression ratio advised.	SR-250/374-2S-12,90 IG	3800- 7400	118691 ^{*b}	11519-16 ^d 11570-16 ^e	250 258	300 308	112	18 52 66 12	.020 .020		
Performance usage, bracket racing, good mid range torque & HP, Heavy, Pro, etc., auto trans w/race converter, oval track, good mid range torque and HP, 1/4-3/8 mile, serious off-road, 11.0 to 12.5 compression ratio advised.	R-252/420-2S-6 R-252/420-2S-6 SF0	4000- 7600	118751°a 118761°a,c	11519-16 ^d 11570-16 ^e	252 260	284 292	106	23 49 59 21	.020 .020		
Performance usage, w/manifold nitrous system, good mid and upper RPM torque and HP, bracket racing, auto trans w/3500+ converter, 11.0 to 12.5 compression ratio advised. Good w/Roots supercharger, 18 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-252/420-25-10	4000- 7600	118911°a	11519-16 ^d 11570-16 ^e	252 260	284 292	110	20 52 64 16	.020 .020		
Rough idle, performance usage, good w/manifold nitrous system, good upper RPM torque and HP, 388+cu.in., Pro Street, bracket racing, auto trans w/3500-converter, 4200-4600 cruise RPM, 11.0 minimum compression ratio advised. Good w/Roots supercharger, 18 lbs. max. boost w/8.0 max. compression ratio advised.	SR-252/374-2S-12 IG	3800- 7400	118711 [®]	11515-16 ^g 11519-16 ^d 11570-16 ^e	252 260	302 310	112	19 53 67 13	.020 .020		
Competition only, oval track, 1/4 - 3/8 mile, flat top pistons w/7600 RPM rev limit, 12.5 minimum compression ratio advised. Lift with 1.75:1 ratio rocker arms.	R-256/4301-25-6	4000- 7800	118971*a	11519-16 ^d 11570-16 ^e	256 262	284 290	106	25 51 60 22	.020 .022		
Competition only, oval track, special for 360 Sprint Car, tapped for Sander rear drive, for roller bearing journals (1.875"), 12.5 minimum compression ratio advised. Lift with 1.75:1 ratio rocker arms.	R-256/4301-25-6 RB RD	4000- 7800	118811" ^a	11519-16 ^d 11570-16 ^e	256 262	284 290	106	25 51 60 22	.020 .022		
Performance usage, bracket racing, good mid range torque & HP, Pro, Super Pro, etc., auto trans w/race converter, oval track, good mid range torque & HP, 1/4-3/8 mile, serious off road, 11.5 to 12.5 compress. ratio advised.	R-256/420-251-6	4000- 7800	118821*a	11519-16 ^d 11570-16 ^e	256 264	288 296	106	25 51 61 23	.020 .020		
Competition only, oval track, Sprint Car, tapped for Sander rear drive, for large roller bearing journals (1.9685"/50mm), 12.5 minimum compression ratio advised. Lift with 1.65:1 ratio rocker arms.	R-258/452-254-8 LRB RD SFO	7800 7800	118951*a	11519-16 ^d 11570-16 ^e	258 260	287 289	108	26 52 63 17	.020 .022		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Self-aligning rocker arms cannot be used with mechanical lifter roller camshafts.

NOTE: When using 55-56, 265 cu.in. blocks, late model cam bearings must be installed.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Many options are available for these camshafts, and any of our custom ground camshafts. An iron distributor drive gear and rear journal can be specified. Drilling and tapping for Sander rear drive is available. SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) and SFO1 (1-8-7-2-6-5-4-3), or 4/7 3/2 swap, are offered. Optional journal sizes are Roller Bearing (1.875"), Big Block (1.949"), Large Roller Bearing/50mm (1.969"), and 55mm (2.165") Gun drilling (where applicable) is available. Lightweight undercut journal, narrow lobe cores are offered. Lobe layouts for Buick Race/Dart, Splayed Valve, and SB2 cylinder heads are available.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



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CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUI Crane Classi Energizer	
	96886-16 ^{g,h} 96885-16 ^{g,h}	99970-16 ^k 99659-16 ^w 99675-16 ^j	99820-16 ⁹	99097-1 ^m 99087-1 ⁿ	11630-16° 95636-16 ^p	11975-1* ^q 11984-1* ^r 11977-1* ^s			11750-16 ^u 11771-16 ^v
	99893-16 ⁹ 96870-16 ^{9,i}	99953-16 99943-16 ¹	99820-16 ⁹	99097-1 ^m	11630-16° 95636-16°	11975-1* ^q 11984-1* ^r 11977-1* ^s		11774-16 ^t	11750-16 ^u 11771-16 ^v
	99893-16 ^g 96870-16 ^{g,i}	99953-16 99943-16 ¹	99820-16 ⁹	99097-1™	11630-16° 95636-16°	11975-1* ^q 11984-1* ^r 11977-1* ^s		11774-16 ^t	11750-16 ^u 11771-16 ^v
	96886-16 ^{9,h} 96885-16 ^{9,h}	99970-16 ^k 99659-16 ^w 99675-16 ^j	99820-16 ⁹	99097-1 ^m 99087-1 ⁿ	11630-16° 95636-16°	11975-1* ^q 11984-1* ^r 11977-1* ^s			11750-16 ^u
	96886-16 ^{g,h} 96885-16 ^{g,h}	99970-16 ^k 99659-16 ^w 99675-16 ^j	99820-16 ⁹	99097-1 ^m 99087-1 ⁿ	11630-16° 95636-16 ^p	11975-1*9 11984-1*7 11977-1*5			11750-16 ⁴ 11771-16 ⁴
	99893-16 ⁹ 96870-16 ^{9,i}	99953-16 99943-16 ¹	99820-16 ⁹	99097-1 ^m	11630-16° 95636-16°	11975-1*9 11984-1*r 11977-1*s		11774-16 ^t	11750-16 ⁴ 11771-16 ⁴
	96886-16 ^{g,h} 96885-16 ^{g,h}	99970-16 ^k 99659-16 ^w 99675-16 ^j	99820-16 ⁹	99097-1 ^m 99087-1 ⁿ	11630-16° 95636-16°	11984-1* ^r 11977-1* ^s			11750-16 ^u 11771-16 ^v
	96886-16 ^{g,h} 96885-16 ^{g,h}	99970-16 ^k 99659-16 ^w 99675-16 ^j	99820-16 ⁹	99097-1 ^m 99087-1 ⁿ	11630-16° 95636-16°	11984-1* ^r 11977-1* ^s			11750-16 ^u 11771-16 ^v
	96886-16 ^{9,h} 96885-16 ^{9,h}	99970-16 ^k 99659-16 ^w 99675-16 ^j	99820-16 ⁹	99097-1 ^m 99087-1 ⁿ	11630-16° 95636-16°	11984-1° ^r 11977-1° ^s			11750-16 ⁴ 11771-16 ⁴
	96886-16 ^{g,h} 96885-16 ^{g,h}	99970-16 ^k 99659-16 ^w 99675-16 ^j	99820-16 ⁹	99097-1 ^m 99087-1 ⁿ	11630-16° 95636-16 ^p	11984-1* ^r 11977-1* ^s			11750-16 ^u 11771-16 ^v



- Requires cam button spacer and a 11990-1 (.489" I.D.) or 11989-1 (.500" I.D. Accel) aluminum-
- Requires cam button spacer and a 11990-1 (.489"I.D.) or 11989-1 (.500"I.D. Accel) aluminumbronze distributor drive gear. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear. Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear. Camshaft has SFO firing order, with 4/7 swap. Vertical locking bar roller lifters. Ultra Pro Series vertical locking bar roller lifters. Horizontal locking bar roller lifters. Must machine cylinder heads. For cylinder heads with +.100" long valves, use 99970-16 retainers and 99087-1 valve stem locks. For cylinder heads with +.100" long valves, use 99943-16 retainers. Titanium, must use 99097-1 valve stem locks, included with the retainers. Requires Crane Multi Fit valve locks.

- For cylinder heads with +.100'' long valves.

- For cylinder heads with +.100" long valves.
 Machined steel, heat treated.
 Machined steel, heat treated, Multi Fit.
 Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
 Pro Series one-piece, for use with or without pushrod guideplate cylinder heads.
 Performance steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set with thrust bearing.
 Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning). Valve Train Stabilizer available, see page 363.
 1.5 ratio, 3/8" stud (not self-aligning), Valve Train Stabilizer available, see page 363.
 Titanium: for 96886-16 valve springs.

- Titanium, for **96886-16** valve springs.

					СОМ	PLETE C	AM SPE	CIFICAT	ONS		
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 296	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
Mechanical Roller Camsh		4000	440444*>	44.840.444	240	200	400	27 52	222		
Rough idle, performance usage, good upper RPM HP, 388+ cu.in., Pro Street, bracket racing, auto trans w/3500+ converter, 4600-5000 cruise RPM, 12.0 minimum compression ratio advised.	SR-260/400-2S-8 IG	4000- 7600	118661*a	11519-16 ^d 11570-16 ^e	260 264	298 302	108	27 53 65 19	.020 .022	.600 .600	
Performance usage, bracket racing, good mid to upper	R-260/420-252-6	4200-	118831*b	11519-16 ^d	260	292	106	27 53	.020	.630	
RPM torque and HP, Pro, Super Pro, etc., auto trans w/ race converter, oval track, good mid to upper RPM torque and HP, 2-bbl or 4-bbl, 1/4-3/8 mile, 11.5 minimum compression ratio advised.	N-200/420-232-0	8000	3	11570-16°	264	296	100	61 23		.630	
Competition only, oval track, special for 360 Sprint Car,	294-304-08RRD.95	4200-	19145*b	11548-16 ⁹	260	294	108	23 57	.012		
.950" base circle diameter, tapped for Sander rear drive, 12.5 minimum compression ratio advised.		8200	€}	11570-16°	266	304		62 24	.020	.630	
Performance usage, bracket racing, good mid to upper	R-260/4467-2S-6.96	4200-	118411*b	11519-16 ^d	260	290	106	26 54	.012		
RPM torque and HP, Pro, Super Pro, etc., auto trans w/race converter, oval track, 1/4-3/8 mile, .960" base circle diameter, 11.5 minimum compression ratio advised.	R-260/4467-2S-6.96 SF0	8000	118431*b,c	11570-16°	268	306		62 26	.022	.625	
Performance usage, bracket racing, good mid to upper RPM torque and HP, Pro, Super Pro, etc., auto trans w/ race ocnverter, oval track, good mid to upper RPM torque and HP, 1/4-3/8 mile, 12.5 minimum compression ratio advised.	R-260/420-2-6 R-260/420-2-6 SFO	4200- 8000	118841*b 118931*b,c	11519-16 ^d 11570-16 ^e	260 270	292 302	106	27 53 64 26	.020 .020	.630 .630	
Competition only, oval track, Sprint Car, Modified, Super Modified, 3/8-1/2 mile dirt or asphalt, 355-406 cu.in., .950" base circle diameter, tapped for Sander rear drive, 12.0 minimum compression ratio advised.	294-306-06 RRD.95	4200- 8000	19137*b	11519-16 ^d 11570-16 ^e	260 270	294 306	106	26 54 63 27	.012 .030	.670 .615	
Competition only, oval track, good mid range torque and HP, 2-bbl or 4-bbl, 1/4-3/8 mile, 9.0 compression restrict-	295-299-06R.98	4200-	19128*b	11519-16 ^d	262	295	106	27 55		.650	
ed classes.		7800	\$	11570-16°	266	299		61 25	.012	.650	
Competition only, oval track, for 410 Sprint Car and W00, .950" base circle diameter, tapped for Sander rear drive,	383-431-08R.95 LWD RB RD	4400-	19146*b	11570-16°	264 268	294 298	108	26 58 64 24	.020		
lightweight gun drilled core, for roller bearing (1.875") journals. Lift w/1.8:1 rocker arms.		8400	3		200	290		64 24	.022	.//0	
Competition only, bracket racing, good mid to upper RPM	R-264/420-251-6	4200-	118861*b	11519-16 ^d	264	296	106	29 55	.020	.630	
HP, Super Pro, etc., auto trans w/race converter, oval track, 3/8-1/2 mile, 12.5 minimum compression ratio advised.		8000	\$	11570-16°	272	304		65 27	.020	.630	
Competition only, w/large manifold nitrous system, good mid to upper RPM torque and HP, bracket racing, auto	R-264/420-251-10	4200-	118921*b	11519-16 ^d	264	296	110	26 58	.020	.630	
trans w/race converter, 12.5 minimum compression ratio advised. Good w/Roots supercharger, 20 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-264/420-251-10 SFO	8200	118941*b,c	11570-16°	272	304		70 22	.020	.630	

RPM range shown is for average usage. These cam profiles

will RPM higher, depending upon application.

IMPORTANT: Self-aligning rocker arms cannot be used with mechanical lifter roller camshafts.

NOTE: When using 55-56, 265 cu.in. blocks, late model cam bearings must be installed.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Many options are available for these camshafts, and any of our custom ground camshafts. An iron distributor drive gear and rear journal can be specified. Drilling and tapping for Sander rear drive is available. SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) and SF01 (1-8-7-2-6-5-4-3), or 4/7 3/2 swap, are offered. Optional journal sizes are Roller Bearing (1.875"), Big Block (1.949"), Large Roller Bearing/50mm (1.969"), and 55mm (2.165") Gun drilling (where applicable) is available. Lightweight undercut journal, narrow lobe cores are offered. Lobe layouts for Buick Race/Dart, Splayed Valve, and SB2 cylinder heads are available.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN CRANE CLASSIC ENERGIZER	A ROCKERS — C/ GOLD RACE
	99893-16 ^f 96870-16 ^{f,g}	99953-16 99943-16 ⁹	99820-16°	99097-11	11630-16 ⁿ 95636-16°	11984-1* ^r 11977-1* ^q		11774-16 ^r	11750-16 ⁶ 11771-16 ⁶
	96886-16 ^{f,i} 96885-16 ^{f,i}	99970-16 ^k 99659-16 ^u 99675-16 ^j	99820-16°	99097-1 ¹ 99087-1 ^m	11630-16° 95636-16°	11984-1* ^r 11977-1* ^q			11750-16 ⁶ 11771-16 ⁶
	96886-16 ^{f,i} 96885-16 ^{f,i}	99970-16 ^k 99659-16 ^u 99675-16 ^j	99820-16°	99097-1 ¹ 99087-1 ^m	11630-16° 95636-16°	11984-1* ^r 11977-1* ^q			11750-16 ³
	96886-16 ^{f,i} 96885-16 ^{f,i}	99970-16 ^k 99659-16 ^u 99675-16 ^j	99820-16°	99097-1 ¹ 99087-1 ^m	11630-16 ⁿ 95636-16°	11984-1* ^r 11977-1* ^q			11750-16 11771-16
	96886-16 ^{f,i} 96885-16 ^{f,i}	99970-16 ^k 99659-16 ^u 99675-16 ^j	99820-16°	99097-1 ¹ 99087-1 ^m	11630-16° 95636-16°	11984-1* ^r 11977-1* ^q			11750-16 11771-16
	96886-16 ^{f,i} 96885-16 ^{f,i}	99970-16 ^k 99659-16 ^u 99675-16 ^j	99820-16°	99097-1 ¹ 99087-1 ^m	11630-16° 95636-16°	11984-1* ^r 11977-1* ^q			11750-16 11771-16
	96886-16 ^{¢i} 96885-16 ^{¢i}	99970-16 ^k 99659-16 ^u 99675-16 ^j	99820-16°	99097-1 ¹ 99087-1 ^m	11630-16 ⁿ 95636-16°	11984-1* ^r 11977-1* ^q			11750-16 11771-16
	96886-16 ^{f,i} 96885-16 ^{f,i}	99970-16 ^k 99659-16 ^u 99675-16 ^j	99820-16°	99097-1 ¹ 99087-1 ^m	11630-16° 95636-16°	11984-1° ^r 11977-1° ^q			11750-16 11771-16
	96886-16 ^{f,i} 96885-16 ^{f,i}	99970-16 ^k 99659-16 ^u 99675-16 ^j	99820-16°	99097-1 ¹ 99087-1 ^m	11630-16 ⁿ 95636-16°	11984-1* ^r 11977-1* ^q			11750-16 11771-16
	96886-16 ^{f,i} 96885-16 ^{f,i}	99970-16 ^k 99659-16 ^u 99675-16 ^j	99820-16°	99097-1¹ 99087-1™	11630-16° 95636-16°	11984-1* ^r 11977-1* ^q			11750-16 11771-16



- Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear. Requires cam button spacer and a 11990-1 (.489"I.D.) or 11989-1 (.500"I.D. Accel) aluminum-bronze distributor drive gear. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear.
- Camshaft has SFO firing order, with 4/7 swap.
- Vertical locking bar roller lifters.
- Ultra Pro Series vertical locking bar roller lifters.
- Must machine cylinder heads.
- For cylinder heads with +.100" long valves, use 99943-16 retainers.
- For cylinder heads with +.100" long valves.
- For cylinder heads with +.100" long valves, use 99970-16 retainers and 99087-1 valve stem locks.
- Titanium, must use 99097-1 valve stem locks, included with the retainers.

- Requires Crane Multi Fit valve locks.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads. Pro Series one piece, for use with or without pushrod guideplate cylinder heads. Pro Series steel billet gears and roller chain set.

- Pro Series steel billet gears and roller chain set. With thrust bearing. Crane Classic extruded, 1.5 ratio, 3/8" stud (not self-aligning). Valve Train Stabilizer available, see page 363. 1.5 ratio, 7/16" stud (not self-aligning), Valve Train Stabilizer available, see page 363. 1.5 ratio, 7/16" stud (not self-aligning), Wide Body. Valve Train Stabilizer available, see page 363.

- Titanium, for 96886-16 valve springs.

					COM	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Mechanical RollerCamsh	afts						•			
Competition only, oval track, Sprint Car, Modified, Super Modified, 1/2-5/8 mile dirt or asphalt, 355-406 cu.in., .950″ base circle diameter, tapped for Sander rear drive, 12.5 minimum compression ratio advised.	298-311-06RRD.95	4400- 8000	19139°a	11570-16°	264 273	298 311	106	27 57 64.5 28.5	.012 .030	
Competition only, oval track, for 410 Sprint Car and W00, tapped for Sander rear drive, for roller bearing (1.875") journals. Lift w/1.7:1 rocker arms.	R-264/4381-2S-8 RB RD	4400- 8000	118771*a	11570-16°	264 268	296 300	108	26 58 66 22	.020 .022	
Competition only, oval track, for 410 Sprint Car and W00, tapped for Sander rear drive, lightweight gun drilled core, for 55mm journals. Lift w/1.7:1 rocker arms.	R-264/4381-25-8 LWD RD 55J	4400- 8000	118781°a	11570-16 ^c	264 268	296 300	108	26 58 66 22	.020 .022	.745 .745
Competition only, bracket racing, good upper RPM HP, Super Pro, etc., auto trans w/race converter, oval track, 2-bbl or 4-bbl, 3/8-1/2 mile, 12.5 minimum compression ratio advised.	R-268/420-251-7	4600- 8200	118871°a	11519-16 ^d 11570-16 ^c	268 272	300 304	107	30 58 66 26		.630 .630
Competition only, bracket racing, good mid to upper RPM torque and HP, Super Pro, Super Gas, etc., auto trans w/race converter, .960" base circle diameter, 12.5 mini- mum compression ratio advised.	R-268/4467-2S-6.96 R-268/4467-2S-6.96 SFO	4400- 8200	118421*a 118441*a,b	11519-16 ^d 11570-16 ^c	268 276	298 314	106	31 57 67 29	.012 .022	.670 .625
Competition only, bracket racing, good mid to upper RPM torque and HP, Super Pro, Super Gas, etc., auto trans w/race converter, 12.5 minimum compression ratio advised. Lift with 1.65:1 rocker arms.	R-268/452-2S-7	4400- 8200	118791*a	11570-16°	268 272	297 301	107	31 57 67 25	.020 .022	.746 .746
Competition only, bracket racing, good mid to upper RPM torque and HP, Super Pro, Super Gas, etc., auto trans w/race converter, 12.5 minimum compression ratio advised.	R-270/420-258-6	4400- 8200	118881*a	11570-16 ^c	270 276	302 308	106	32 58 67 29	.020 .020	.630 .630
Competition only, good w/large manifold nitrous system, good upper RPM torque and HP, bracket racing, auto trans w/race converter, 12.5 minimum compression ratio advised. Good w/large Roots supercharger, 24 lbs. maxi- mum boost w/8.0 maximum compression ratio advised.	R-272/4334-252-10 R-272/4334-252-10 SFO	4400- 8200	118321 ^{*a} 118331 ^{*a,b}	11570-16°	272 282	312 322	110	29 63 74 28	.026 .026	
Competition only, drag racing, Super Stock, 350 cu.in., auto transmission w/race converter, lift with 1.8 intake, 1.6 exhaust rockers.	R-272/428-2S-6 SFO	4600- 8200	118291*a,b	11570-16°	272 280	302 310	106	34 58 69 31	.020 .014	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Self-aligning rocker arms cannot be used with

mechanical lifter roller camshafts.

NOTE: When using 55-56, 265 cu.in. blocks, late model cam bearings must be installed.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for détails.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Many options are available for these camshafts, and any of our custom ground camshafts. An iron distributor drive gear and rear journal can be specified. Drilling and tapping for Sander rear drive is available. SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) and SFO1 (1-8-7-2-6-5-4-3), or 4/7 3/2 swap, are offered. Optional journal sizes are Roller Bearing (1.875"), Big Block (1.949"), Large Roller Bearing/50mm (1.969"), and 55mm (2.165") Gun drilling (where applicable) is available. Lightweight undercut journal, narrow lobe cores are offered. Lobe layouts for Buick Race/Dart, Splayed Valve, and SB2 cylinder heads are available.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM Crane Classic Energizer	
	96886-16 ^{e,g} 96885-16 ^{e,g}	99970-16 ⁱ 99659-16 ^r 99675-16 ^h	99820-16°	99097-1 ^j 99087-1 ^k	11630-16 ¹ 95636-16 ^m	11984-1* ⁿ 11977-1*°			11750-16 ^p 11771-16 ^q
	96886-16 ^{e,g} 96885-16 ^{e,g}	99970-16 ⁱ 99659-16 ^r 99675-16 ^h	99820-16°	99097-1 ^j 99087-1 ^k	11630-16 ¹ 95636-16 ^m	11984-1* ⁿ 11977-1*°			11750-16 ^p 11771-16 ^q
	96886-16 ^{e,g} 96885-16 ^{e,g}	99970-16 ⁱ 99659-16 ^r 99675-16 ^h	99820-16°	99097-1 ^j 99087-1 ^k	11630-16 ¹ 95636-16 ^m	11984-1* ⁿ 11977-1*°			11750-16 ^p 11771-16 ^q
	96886-16 ^{e,g} 96885-16 ^{e,g}	99970-16 ⁱ 99659-16 ^r 99675-16 ^h	99820-16°	99097-1 ^j 99087-1 ^k	11630-16¹ 95636-16™	11984-1* ⁿ 11977-1*°			11750-16 ^p 11771-16 ^q
	96886-16 ^{e,g} 96885-16 ^{e,g}	99970-16 ⁱ 99659-16 ^r 99675-16 ^h	99820-16°	99097-1 ^j 99087-1 ^k	11630-16 ¹ 95636-16 ^m	11984-1* ⁿ 11977-1*°			11750-16 ^p 11771-16 ^q
	96886-16 ^{e,g} 96885-16 ^{e,g}	99970-16 ⁱ 99659-16 ^r 99675-16 ^h	99820-16°	99097-1 ^j 99087-1 ^k	11630-16 ¹ 95636-16 ^m	11984-1* ⁿ 11977-1*°			11750-16 ^p 11771-16 ^q
	96886-16 ^{e,g} 96885-16 ^{e,g}	99970-16 ⁱ 99659-16 ^r 99675-16 ^h	99820-16°	99097-1 ^j 99087-1 ^k	11630-16 ¹ 95636-16 ^m	11984-1* ⁿ 11977-1*°			11750-16 ^p 11771-16 ^q
	99880-16 ^{e,f}	99675-16 ^h	99820-16°	99097-1 ^j	11630-16 ¹ 95636-16 ^m	11984-1* ⁿ 11977-1*°			11750-16 ^p 11771-16 ^q
	99880-16 ^{e,f}	99675-16 ^h	99820-16°	99097-1 ^j	11630-16 ¹ 95636-16 ^m	11984-1* ⁿ 11977-1* ^o			11750-16 ^p 11771-16 ^q



- Requires cam button spacer and a 11990-1 (.489" l.D.) or 11989-1 (.500" l.D. Accel) aluminumbronze distributor drive gear. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear.

 Camshaft has SFO firing order, with 4/7 swap.

 Ultra Pro Series vertical locking bar roller lifters.

- Vertical locking bar roller lifters. Must machine cylinder heads.
- For cylinder heads with +.100" long valves.
- For cylinder heads with +.100" long valves, use 99970-16 retainers and 99087-1 valve stem locks.
- Titanium, must use **99097-1** valve stem locks, included with the retainers.
- Requires Crane Multi Fit valve locks.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.

- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.

- Pro Series one piece, for use with or without pushrod guideplate cylinder heads.
 Pro Series steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set with thrust bearing.
 1.5 ratio, 3/8" stud (not self-aligning). Valve Train Stabilizer available, see page 363.
 1.5 ratio, 7/16" stud (not self-aligning), Wide Body. Valve Train Stabilizer available, see page 363.
 Titanium, for 96886-16 valve springs.

						СОМ	PLETE C	AM SPE	CIFICATION	ONS		
	Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
	Mechanical Roller Camsh	afts										
•	Competition only, good upper RPM torque and HP, bracket racing, 360+ cu.in., .900" base circle diameter, auto trans w/race converter, 12.5 minimum compression ratio advised.		4600- 8200	118801*a	11570-16°	274 282	305 313	106	35 59 71 31	.020 .022	.681 .681	
	Competition only, bracket racing, good upper RPM HP, Super Pro, Super Gas, etc., auto transmission w/race converter, 12.5 minimum compression ratio advised.	R-276/420-251-6	4600- 8400	118891*a	11570-16°	276 284	308 316	106	35 61 71 33		.630 .630	
	Competition only, high RPM maximum performance applications, Super Stock/Competition Eliminator, 292-340 cu.in., etc., stick or auto transmission w/race converter, for 55mm journals, 14.0 minimum compression ratio advised. Lift w/1.8:1 intake rocker arms.	R-276/5152-2S-14 SFO 55J	6000- 9800	118991*a,b	11570-16° 11574-16ª	276 292	306 326	114	29 67 83 29	.020 .026	.927 .720	
	Competition only, drag racing, Super Stock, 350 cu.in., auto transmission w/race converter, lift with 1.65:1 rocker arms.	R-278/452-252-6 SFO	4800- 8400	118961*a,b	11570-16° 11574-16 ^d	278 284	307 313	106	37 61 72 32	.020 .022		
	Competition only, bracket racing, good upper RPM HP, Super Quick, Super Comp, etc., auto transmission w/race converter, 12.5 minimum compression ratio advised.	R-280/420-25-8	5000- 8600	118901°a	11570-16°	280 284	312 316	108	36 64 74 30	.020 .020	.630 .630	
	Competition only, good upper RPM HP, Super Stock, Super Quick, stick or auto transmission w/race converter, 12.5 minimum compression ratio advised.	R-280/450-25-8	5000- 8600	118361*a	11570-16 ^c 11574-16 ^d	280 284	320 324	108	35 65 73 31		.675 .641	
	Competition only, 370+ cu.in., Super Quick, etc., stick or auto transmission w/race converter, good w/large multistage nitrous system, 13.0 minimum compression ratio advised. Good w/large Roots supercharger, 30 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-282/4765-252-10	5000- 8600	118381°a	11570-16° 11574-16 ^d	282 290	316 324	110	36 66 80 30	.035 .030		
	Competition only, high RPM maximum performance applications, Competition Eliminator, 292-340 cu.in., etc., Super Quick w/400+ cu.in., stick or auto transmission w/race converter, 14.0 minimum compression ratio advised. Lift w/1.65 rocker arms.	R-282/4765-252-12 R-282/4765-252-12 SFO	6000- 9400	118451*a 118461*a,b	11570-16° 11574-16 ^d	282 290	316 324	112	34 68 82 28	.035 .030		
	Competition only, high RPM Competition Eliminator, stick or auto transmission w/race converter, 14.0 minimum compression ratio advised. Lift w/1.65 rocker arms.	R-282/5002-25-13 SFO	6000- 9600	118491*a,b	11570-16° 11574-16 ^d	282 290	312 330	113	33 69 83 27	.020 .030	.825 .776	
	Competition only, high RPM maximum performance applications, good w/large multi-stage nitrous system, 388+ cu.in., Super Quick, etc., stick or auto transmission w/race converter, 14.0 minimum compression ratio advised. Good w/large Roots supercharger, 388+ cu.in., 35 lbs. maximum boost with 7.5 maximum compression ratio advised. Lift w/1.65 rocker arms.	R-286/4765-253-12 R-286/4765-253-12 SF0	6000- 9800	118471*a 118481*a,b	11570-16 ^c 11574-16 ^d	286 294	320 328	112	36 70 84 30	.035 .030		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application. IMPORTANT: Self-aligning rocker arms cannot be used with

mechanical lifter roller camshafts.

NOTE: When using 55-56, 265 cu.in. blocks, late model cam bearings must be installed.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for détails.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

NOTE: Many options are available for these camshafts, and any of our custom ground camshafts. An iron distributor drive gear and rear journal can be specified. Drilling and tapping for Sander rear drive is available. SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap) and SFO1 (1-8-7-2-6-5-4-3), or 4/7 3/2 swap, are offered. Optional journal sizes are Roller Bearing (1.875"), Big Block (1.949"), Large Roller Bearing/50mm (1.969"), and 55mm (2.165") Gun drilling (where applicable) is available. Lightweight undercut journal, narrow lobe cores are offered. Lobe layouts for Buick Race/Dart, Splayed Valve, and SB2 cylinder heads are available.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRAN	IE VALVE	TRAIN CO	MPONENTS						
See pg.	. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 3
VALVE S And Ret Kit	TAINER	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM ROCKERS Crane Classic/ Gold Energizer race
		99880-16 ^{e,f}	99675-16 ^h	99820-16°	99097-1 ^j 99087-1 ^k	11630-16 ¹ 95636-16 ^m	11984-1* ⁿ 11977-1*°		11771-1
		99885-16 ^{e,f} 96883-16 ^{e,g}	99956-16 99675-16 ^h 99970-16 ⁱ	99820-16°	99097-1 ^j 99087-1 ^k	11630-16 ¹ 95636-16 ^m	11984-1* ⁿ 11977-1*°		11750-1 11771-1
		99885-16 ^{e,f} 96883-16 ^{e,g}	99956-16 99675-16 ^h 99970-16 ⁱ	99820-16°	99097-1 ^j 99087-1 ^k	95636-16 ^m	11984-1* ⁿ 11977-1*°		11771-1
		99885-16 ^{e,f} 96883-16 ^{e,g}	99956-16 99675-16 ^h 99970-16 ⁱ	99820-16°	99097-1 ^j 99087-1 ^k	11630-16¹ 95636-16™	11984-1* ⁿ 11977-1*°		11771-1
		99885-16 ^{e,f} 96883-16 ^{e,g}	99956-16 99675-16 ^h 99970-16 ⁱ	99820-16°	99097-1 ^j 99087-1 ^k	11630-16 ¹ 95636-16™	11984-1* ⁿ 11977-1* ^o		11750-1 11771-1
		99880-16 ^{e,f}	99675-16 ^h	99820-16°	99097-1 ^j	11630-16 ¹ 95636-16™	11984-1* ⁿ 11977-1*°		11771-1
		99880-16 ^{e,f}	99675-16 ^h	99820-16°	99097-1 ^j	95636-16 ^m	11984-1* ⁿ 11977-1*°		11771-1
		99880-16 ^{e,f}	99675-16 ^h	99820-16°	99097-1 ^j	95636-16 ^m	11984-1* ⁿ 11977-1*°		11771-1
		99880-16 ^{e,f}	99675-16 ^h	99820-16°	99097-1 ^j	95636-16 ^m	11984-1* ⁿ 11977-1*°		11771-1
		99880-16 ^{e,f}	99675-16 ^h	99820-16°	99097-1 ^j	95636-16 ^m	11984-1* ⁿ 11977-1*°		11771-1

- Requires cam button spacer and a 11990-1 (.489" I.D.) or 11989-1 (.500" I.D. Accel) aluminumbronze distributor drive gear. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear.

 Camshaft has SFO firing order, with 4/7 swap.

 Ultra Pro Series vertical locking bar roller lifters.

 Ultra Pro Series vertical locking bar roller lifters for .904" diameter lifter bores.

 Must machine cylinder heads.

 For editor back with . 100" long pages.

- For cylinder heads with +.100" long valves.
- For cylinder heads with +.100" long valves, use **99970-16** retainers and **99087-1** valve stem locks.
- Titanium, must use **99097-1** valve stem locks, included with the retainers.
- Requires Crane Multi Fit valve locks.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.

- Heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
- Pro Series one-piece, for use with or without pushrod guideplate cylinder heads.
- Pro Series steel billet gears and roller chain set.
- 0
- Pro Series steel billet gears and roller chain set with thrust bearing.

 1.5 ratio, 7/16" stud (not self-aligning), Wide Body.Valve Train Stabilizer available, see page 363.

 1.5 ratio, 3/8" stud (not self-aligning). Valve Train Stabilizer available, see page 363.

					COM	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Camsha	fts									
For low-end and mid-range performance in 87-92 cars and light trucks. Fine w/auto or manual and stock rear gears, great for 305 requiring extra low-end torque to cruise below 1800 RPM, ideal for TBI engines w/auto trans and stock converter. (50 state legal for listed applications, C.A.R.B. E.O. D-225-22).	2010	500- 4200	104201	10530-16ª	184 194	246 256	106	(14) 18 23 9	.000 .000	
Designed for TPI 305 engines in 87-89 Camaros and Firebirds w/auto trans. Good all-around performance. The use of Adjustable Fuel Pressure Regulator (99470-1) is recommended for maximum performance. (50 state legal for listed applications, C.A.R.B. E.O. D-225-22).	2011	500- 4400	104204	10530-16ª	184 204	246 266	108	(11) 15 35 (11)		.384 .429
For mid and top end torque and HP. Mainly for 87-92 305 cars w/TBI and manual 4 or 5-speed. (50 state legal for listed applications, C.A.R.B. E.O. D-225-22).	2020	800- 4600	104211	10530-16ª	194 204	256 266	111	(14) 28 33 (9)		.407 .429
Builds mid and upper RPM performance in 87 TPI engines with 5-speed transmission and all rear gear ratios. Also fits 88-89 305 engines w/5-speed and 2.73 or 3.27 rear gears for mid-range performance. Adjustable Fuel Pressure Regulator (99470-1) recommended for maximum performance. (50 state legal for listed applications, C.A.R.B. E.O. D-225-22).	2030	1200- 5200	104221	10530-16ª	204 214	260 270	116	(14) 38 43 9		.429 .452
For mid & upper RPM performance in 88-89 305 engines w/5-speed and 3.45 or numerically higher rear gear ratios. Adjustable Fuel Pressure Regulator (99470-1) is recommended for maximum performance. (50 state legal for listed applications, C.A.R.B. E.O. D-225-22).	2031	1400- 5400	104225	10530-16ª	208 214	264 270	112	(3) 31 44 (10)	.000 .000	
For 87-89 Corvettes, Camaros and Firebirds factory equipped w/350 TPI engines. Adjustable Fuel Pressure Regulator (99470-1) is recommended for maximum performance. (50 state legal for listed applications, C.A.R.B. E.O. D-225-22).	2032	1800- 5800	104224	10530-16ª	214 220	270 276	112	0 34 47 (7)		.452 .465

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous

IMPORTANT NOTE: Crane Hydraulic Roller Cams ofter tremendous power, torque and RPM potential. Due to their RPM capability and increased valve travel, it is HIGHLY RECOMMENDED that the appropriate Crane valve train components be installed for maximum performance and reliability.

NOTE: The camshafts listed above incorporate the front ignition

NOTE: The camshafts listed above incorporate the front ignition drive pilot hole for late model applications. A long cam dowel pin is installed, which can be driven in further when required for short dowel pin application engines.

NOTE: Mechanical roller tappet camshafts and components are available on special order. Contact Crane's Perfromance Consultants for details.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

Since 1975, General Motors divisions have exchanged engines

ince 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



					_			-	
CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
11308-1 ^b	99848-16 ^b 144846-16 ^r	99915-16		99097-1 ^d	10621-16° 95624-16 ^f	10975-1* ⁹	11801-16 ^{h,i} 11806-16 ^{j,i} 10800C-16 ^k	11774-16 ^{l,i} 11744-16 ^{m,i}	11750-16 ^{n,i} 10750-16 ^{o,i} 10751-16 ^p 10758-16 ^q
11308-1 ^b	99848-16 ^b 144846-16 ^r	99915-16		99097-1 ^d	10621-16° 95624-16 ^f	10975-1 ^{*g}	11801-16 ^{h,i} 11806-16 ^{j,i} 10800C-16 ^k	11774-16 ^{l,i} 11744-16 ^{m,i}	11750-16 ^{n,i} 10750-16 ^{o,i} 10751-16 ^p 10758-16 ^q
11308-1 ^b	99848-16 ^b 144846-16 ^r	99915-16		99097-1 ^d	10621-16° 95624-16 ^f	10975-1* ^g	11801-16 ^{h,i} 11806-16 ^{j,i} 10800C-16 ^k	11774-16 ^{l,i} 11744-16 ^{m,i}	11750-16 ^{n,i} 10750-16 ^{o,i} 10751-16 ^p 10758-16 ^q
	96802-16 ^c 144846-16 ^r	99915-16		99097-1 ⁴	10621-16° 95624-16 ^f	10975-1* ^g	11801-16 ^{h,i} 11806-16 ^{j,i} 10800C-16 ^k	11774-16 ^{l,i} 11744-16 ^{m,i}	11750-16 ^{n,i} 10750-16 ^{o,i} 10751-16 ^p 10758-16 ^q
	96802-16 ^c 144846-16 ^r	99915-16		99097-1 ^d	10621-16° 95624-16 ^f	10975-1 ^{*g}	11801-16 ^{h,i} 11806-16 ^{j,i} 10800C-16 ^k	11774-16 ^{I,i} 11744-16 ^{m,i}	11750-16 ^{n,i} 10750-16 ^{o,i} 10751-16 ^p 10758-16 ^q
	96802-16 ^c 144846-16 ^c	99915-16		99097-1 ^d	10621-16° 95624-16 ^f	10975-1 ^{*g}	11801-16 ^{h,i} 11806-16 ^{j,i} 10800C-16 ^k	11774-16 ^{l,i} 11744-16 ^{m,i}	11750-16 ^{n,i} 10750-16 ^{o,i} 10751-16 ^p 10758-16 ^q

- For use with standard GM alignment bars.
- Contains standard diameter valve springs, no machining required. Standard diameter valve springs, for 1.750" assembly height.
- Machined steel, heat treated.
- Heavy wall, heat treated, for use with either pushrod guideplate or non-guideplate cylinder heads. Pro Series, one-piece
- Performance steel billet gears and roller chain set, for 1987-91 applications.
- 1.5 ratio, extra long slot (not self-aligning).

 In order to use these rocker arms on engines originally equipped with self-aligning rockers, hard-ened pushrod guideplates must be installed, and valve cover clearance checked.
- 1.5 ratio, roller tip, extra long slot (not self-aligning).
- 1.5 ratio, self-aligning, Nitro Carb.
- Crane Classic extruded, 1.5 ratio (not self-aligning). Factory cast valve covers may require internal Clearancing.

 Energizer, 1.5 ratio (not self-aligning). Will not have sufficient clearance in factory cast valve covers.

 1.5 ratio (not self-aligning). Factory cast valve covers may require internal clearancing.

 1.5 ratio (not self-aligning), narrow body for center bolt valve covers.

- 1.5 ratio, self-aligning narrow body for center bolt valve covers.

 1.6 ratio, self-aligning narrow body for center bolt valve covers.
- Standard diameter PAC Enhanced valve springs for 1.750" assembly height.

						СОМ	PLETE C	AM SPE	CIFICATION	ONS		
		Camshaft Series/	RPM POWER		See pg. 294	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Lift Int.	
	Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
	Hydraulic Roller Camshat Brute low end torque and HP, smooth idle, daily usage,		1000	400044*3	40F20 46h	204	260	112	(5) 20	200	420	
	light towing, economy, also mild turbocharged, 2200- 3000 cruise RPM, marine applications: primarily used in 350 cu.in. near-stock engines for mild performance applications in heavy boats, 8.0 to 9.5 compression ratio advised.	HR-260-2-12 IG	1000- 5200	109811*a	10535-16 ⁶ 10535-16 ⁶	204 214	260 270	112	(5) 29 44 (10)	.000		
	Brute low end torque and HP, smooth idle, daily usage, light towing, economy, also mild turbocharged, primarily used in 383+ cu.in. engines, 2200-3000 cruise RPM, marine applications: use for mild performance applications in heavy boats, 8.0 to 9.5 compression ratio advised, .900" base circle for long stroke clearance.	HR-206/319-2S-12.90 IG	1000- 5200	109851*a	10535-16°	206 214	268 276	112	(4) 30 44 (10)	.000 .000		
AETC	Excellent low end and mid range torque and HP, good idle, daily usage, off road, performance and fuel efficiency, 2600-3400 cruise RPM, marine applications: primarily used in 350 cu.in. mildly modified engines with high flow exhaust systems, for performance applications in light boats, 8.75 to 10.75 compression ratio advised. Good w/small supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised.	HR-276-2S-12 IG	1600- 5800	109821*a	10530-16 ⁶ 10535-16 ⁶	214 222	276 284	112	0 34 48 (6)	.000		
	Excellent low end and mid range torque and HP, good idle, daily usage, off road, performance and fuel efficiency, primarily used in 383+ c.i.n. engnes, 2600-3400 cruise RPM, marine applications: for mildly modified engines with high flow exhaust systems, for performance applications in light boats, 8.75 to 10.75 compression ratio advised. Good w/small supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised, .900" base circle for long stroke clearance.	HR-216/339-25-12.90 IG	1600- 5800	109671*a	10535-16°	216 224	284 292	112	1 35 49 (5)	.000		
	Excellent mid range torque and HP, good idle, moderate performance usage, crate motor upgrade, mild bracket racing, auto trans w/2000+ converter, marine applications: for 350 cu.in. modified engines with free-flowing above water exhaust systems for performance applications in light pleasure and ski boats, including jet boats, 2800-3600 cruise RPM, 9.0 to 11.0 compression ratio advised. Good w/supercharger, 10 lbs. maximum boost w/8.0 maximum compression ratio advised.	HR-218/332-253-12 IG	1800- 6000	109861°a	10535-16 ^c	218 226	280 288	112	2 36 50 (4)	.000 .000		
	Good mid range torque and HP, fair idle, moderate performance usage, crate motor upgrade, mild bracket racing, auto trans w/2500+ converter, marine applications: for 350+ cu.in. modified engines with free-flowing above water exhaust systems for performance applications in light pleasure and ski boats, including jet boats, 3000-3800 cruise RPM, 9.5 to 11.0 compression ratio advised. Good w/supercharger, 10 lbs. maximum boost w/8.0 maximum compression ratio advised.	HR-284-25-12 IG	2000- 6200	109831*a	10535-16°	222 230	284 292	112	4 38 52 (2)	.000		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application. IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous

power, torque and RPM potential. Due to their RPM capability and increased valve travel, it is HIGHLY RECOMMENDED

ity and increased valve travel, it is HIGHLY RECOMMENDED that the appropriate Crane valve train components be installed for maximum performance and reliability.

NOTE: The camshafts listed above incorporate the front ignition drive pilot hole for late model applications. A long cam dowel pin is installed, which can be driven in further when required for short dowel pin application engines.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

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throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	N ROCKERS — C/ GOLD RACE
11309-1 ^{d,f} 11310-1 ^{e,f}	99846-16 ⁹ 99838-16 ^e 96802-16 ^h 144846-16 ^{aa}	99915-16 ⁱ 99944-16	99820-16°	99051-1 ¹ 99097-1™	10621-16° 95624-16°	10975-1 ^{*q}	11801-16' 10800C-16'	11774-16 ^{t,z} 11744-16 ^{u,z}	11750-16 ^{v,z} 10750-16 ^{w,z} 10751-16 ^x 10758-16 ^y
11309-1 ^{4,f} 11310-1 ^{e,f}	99846-16 ⁹ 99838-16 ^e 96802-16 ^h 144846-16 ^{aa}	99915-16 ^j 99944-16	99820-16°	99051-1 ¹ 99097-1 ^m	10621-16° 95624-16°	10975-1 ^{*q}	11801-16 ^r 10800C-16 ^s	11774-16 ^{t,z} 11744-16 ^{u,z}	11750-16 ^{v,z} 10750-16 ^{w,z} 10751-16 ^x 10758-16 ^y
11309-1 ^{d,f} 11310-1 ^{e,f}	99846-16 ⁹ 99838-16 ⁶ 96802-16 ^h 144846-16 ²³	99915-16 ⁱ 99944-16	99820-16°	99051-1 ¹ 99097-1 ^m	10621-16° 95624-16°	10975-1° ^q	11801-16 [,] 10800C-16 [,]	11774-16 ^{t,z} 11744-16 ^{u,z}	11750-16 ^{v,z} 10750-16 ^{w,z} 10751-16 ^x 10758-16 ^y
11309-1 ^{d,f} 11310-1 ^{e,f}	99846-16 ⁹ 99838-16 ^e 96877-16 ^{e,i} 144846-16 ^{aa}	99915-16 ⁱ 99944-16 99969-16 ^k	99820-16°	99051-1 ¹ 99097-1 ^m 99094-1 ⁿ	95624-16 ^p	10975-1 ^{*q}	11801-16' 10800C-16 ⁵	11774-16 ^{t,z} 11744-16 ^{u,z}	11750-16 ^{v,z} 10750-16 ^{w,z} 10751-16 ^x 10758-16 ^y
11309-1 ^{d,f} 11310-1 ^{e,f}	99846-16 ⁹ 99838-16 ^e 96877-16 ^{e,i} 144846-16 ^{aa}	99915-16 ^j 99944-16 99969-16 ^k	99820-16°	99051-1 ¹ 99097-1 ^m 99094-1 ⁿ	10621-16° 95624-16°	10975-1° ^q	11801-16 ⁷ 10800C-16 ⁵	11774-16 ^{t,z} 11744-16 ^{u,z}	11750-16 ^{v,z} 10750-16 ^{w,z} 10751-16 ^x 10758-16 ^y
11309-1 ^{d,f} 11310-1 ^{e,f}	99846-16 ⁹ 99838-16 ^e 96877-16 ^{e,i} 144846-16 ^{aa}	99915-16 ^j 99944-16 99969-16 ^k	99820-16°	99051-1 ¹ 99097-1 ^m 99094-1 ⁿ	10621-16° 95624-16°	10975-1° ^q	11801-16' 10800C-16'	11774-16 ^{t,z} 11744-16 ^{u,z}	11750-16 ^{v,z} 10750-16 ^{w,z} 10751-16 ^x 10758-16 ^y



- Camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required.
- For use with standard GM alignment bars.
- For use with standard GM alignment bars. Required for use with camshafts having greater than stock lobe lift or reduced base circle diameters
- Contains standard diameter valve springs (99846-16), and machined steel valve stem locks (99095-1), no machining required.
- Must machine cylinder heads.
- Valve guide machining may be required to insure sufficient valve guide-to-retainer clearance at full valve lift due to limited travel with stock components.
- Standard diameter XHTCS tool steel valve springs, no machining required.
- Standard diameter chrome silicon valve springs for 1.750" assembly height.
- For +.100" length valves.
- For standard diameter valve springs.
- Requires Crane Multi Fit valve locks.
- Machined steel, heat treated, .050" additional assembly height for 99846-16 and 96802-16 valve springs. May interfere with self-aligning rocker arms.

- m Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Heavy wall, heat treated, for use with either pushrod guideplate or non-guideplate cylinder heads.
- Pro Series one-piece, for use with either pushrod guideplate or non-guideplate cylinder heads.
- Performance steel billet gears and roller chain set (for 1987-91 applications).
- 1.5 ratio, extra long slot (not self-aligning).
- 1.5 ratio, extra long slot, Nitro Carb (not self-aligning).
- Crane Classic extruded, 1.5 ratio (not self-aligning). Factory cast valve covers may require internal
- Energizer, 1.5 ratio (not self-aligning), will not have sufficient clearance in factory cast valve covers.
- 1.5 ratio (not self-aligning). Factory cast valve covers may require internal clearancing.
- 1.5 ratio, (not self-aligning), narrow body for center bolt valve covers.
- 1.5 ratio, self-aligning narrow body for center bolt valve covers.
- 1.6 ratio, self-aligning narrow body for center bolt valve covers.
- In order to use these rocker arms on engines originally equipped with self-aligning rockers, hardened pushrod guideplates and heat-treated pushrods must be installed, and valve cover clearance checked.
- **aa** Standard diameter PAC Enhanced valve springs for 1.750" assembly height.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Camsha	fts									
Good mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, primarily used in 383 + cu.in. engines, auto trans w/2500 + converter, marine applications: for modified engines with free-flowing above water exhaust systems for performance applications in light pleasure and ski boats, including jet boats, 3000-3800 cruise RPM, 9.5 to 11.0 compression ratio advised. Good w/supercharger, 14 lbs. maximum boost w/8.0 maximum compression ratio advised, 1.040" base circle for long stroke clearance.	HR-224/345-25-14.04 IG	2200- 6400	109871**	10535-16 ^b	224 232	286 294	114	3 41 55 (3)	.000 .000	
Good mid range torque and HP, fair idle, performance usage, 3600-4400 cruise RPM, good with manifold nitrous system, 10.0 to 11.5 compression ratio advised. Good w/Roots supercharger, 15 lbs. maximum boost w/8.0 maximum compression ratio advised, .900" base circle for long stroke clearance.	HR-230/359-2S-12.90 IG	2600- 6600	109661*a	10535-16 ^b	230 238	292 300	112	8 42 56 2	.000 .000	
Good mid range torque and HP, fair idle, performance usage, mild bracket racing, auto trans w/3000+ converter, 3800-4600 cruise RPM, good w/manifold nitrous system, 10.0 to 11.5 compression ratio advised. Good w/Roots supercharger, 15 lbs. maximum boost, w/8.0 maximum compression ratio advised.	HR-296-25-12 IG	2800- 6800	109841*a	10535-16 ^b	234 242	296 304	112	10 44 58 4	.000 .000	.539 .558
Good mid range torque and HP, fair idle, performance usage, mild bracket racing, auto trans w/3000+ converter, 3800-4600 cruise RPM, good w/manifold nitrous system, 10.0 to 11.5 compression ratio advised. Good w/Roots supercharger, 15 lbs. maximum boost, w/8.0 maximum compression ratio advised, .900" base circle for long stroke clearance.	HR-234/365-25-12.90 IG	2800- 6800	109691*a	10535-16 ^b	234 242	296 304	112	10 44 58 4	.000	
Rough idle, performance usage, good upper RPM torque and HP, bracket racing, auto trans w/3500+ converter, 4200-5000 cruise RPM, 10.5 to 12.0 compression ratio advised, 370+ cu.in. supercharged and/or nitrous, 1.040" base circle for long stroke clearance.	HR-302-25-10.04 IG	3200- 7200	109651" ^a	10535-16 ^b	240 244	302 306	110	15 45 57 7	.000 .000	

RPM range shown is for average usage. These cam profiles

will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous power, torque and RPM potential. Due to their RPM capability and increased valve travel, it is HIGHLY RECOMMENDED

that the appropriate Crane valve train components be installed for maximum performance and reliability.

NOTE: The camshafts listed above incorporate the front ignition drive pilot hole for late model applications. A long cam dowel pin is installed, which can be driven in further when

required for short dowel pin application engines.

NOTE: 1988-99 (hevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

Since 1975, General Motors divisions have exchanged engines

throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
11309-1 ^{4,6} 11310-1 ^{4,6}	99846-16 ^f 99838-16 ^d 96877-16 ^{d,h} 144846-16 ^y	99915-16 ^h 99944-16 99969-16 ⁱ	99820-16 ^d	99051-1 ⁱ 99097-1 ^k 99094-1 ⁱ	95624-16 ⁿ	10975-1°°	11801-16 ^p 10800C-16 ^q	11774-16 ^{5,x} 11744-16 ^{5,x}	11750-16 ^{t.x} 10750-16 ^{u.x} 10751-16 ^v 10758-16 ^w
11309-1 ^{ce} 11310-1 ^{d,e}	99846-16 ^f 99838-16 ^d 96877-16 ^{d,h} 144846-16 ^y	99915-16 ^h 99944-16 99969-16 ⁱ	99820-16 ^d	99051-1 ⁱ 99097-1 ^k 99094-1 ⁱ	95626-16 ⁿ	10975-1*°	11801-16 ^p 10800C-16 ^q	11774-16 ^{r,x} 11744-16 ^{s,x}	11750-16 ^{t,x} 10750-16 ^{u,x} 10751-16 ^v 10758-16 ^w
11309-1 ^{ce} 11310-1 ^{de}	99846-16 ^f 99838-16 ^d 96877-16 ^{d,h} 144846-16 ^y	99915-16 ^h 99944-16 99969-16 ⁱ	99820-16 ^d	99051-1 ^j 99097-1 ^k 99094-1 ^l	10621-16 ^m 95624-16 ⁿ	10975-1*°	11801-16 ^p 10800C-16 ^q	11774-16 ^{r,x} 11744-16 ^{s,x}	11750-16 ^{t,x} 10750-16 ^{u,x} 10751-16 ^v 10758-16 ^w
11309-1 ^{ce} 11310-1 ^{de}	99846-16 ^f 99838-16 ^d 96877-16 ^{d,h} 144846-16 ^y	99915-16 ^h 99944-16 99969-16 ⁱ	99820-16 ^d	99051-1 ^j 99097-1 ^k 99094-1 ^l	95626-16 ⁿ	10975-1°°	11801-16 ^p 10800C-16 ^q	11774-16 ^{r,x} 11744-16 ^{s,x}	11750-16 ^{t,x} 10750-16 ^{u,x} 10751-16 ^v 10758-16 ^w
11309-1 ^{ce} 11310-1 ^{de}	99846-16 ^f 99838-16 ^d 96877-16 ^{d,h} 144846-16 ^y	99915-16 ^h 99944-16 99969-16 ⁱ	99820-16 ^d	99051-1 ^j 99097-1 ^k 99094-1 ^l	95625-16 ⁿ	10975-1*°	11801-16 ^p 10800C-16 ^q	11774-16 ^{r,x} 11744-16 ^{s,x}	11750-16 ^{t,x} 10750-16 ^{u,x} 10751-16 ^v 10758-16 ^w

- Camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required.
- For use with standard GM alignment bars. Required for use with camshafts having greater than stock lobe lift or reduced base circle diameters
- c Contains standard diameter valve springs (99846-16), and machined steel valve stem locks (99095-1), no machining required.
- Must machine cylinder heads.
- Valve guide machining may be required to insure sufficient valve guide-to-retainer clearance at full valve lift due to limited travel with stock components.
- Standard diameter XHTCS tool steel valve springs, no machining required.
- For +.100" length valves.
- For standard diameter valve springs.
- Requires Crane Multi Fit valve locks.
- Machined steel, heat treated, .050" additional assembly height for **99846-16** and **96802-16** valve springs. May interfere with self-aligning rocker arms.
- Machined steel, heat treated.

- Machined steel, heat treated, Multi Fit.
- Heavy wall, heat treated, for use with either pushrod guideplate or non-guideplate cylinder heads.
- Pro Series one-piece, for use with either pushrod guideplate or non-guideplate cylinder heads.
 - Performance steel billet gears and roller chain set (for 1987-91 applications).
- 1.5 ratio, extra long slot (not self-aligning).
- 1.5 ratio, extra long slot, Nitro Carb (not self-aligning).
- Crane Classic extruded, 1.5 ratio (not self-aligning). Factory cast valve covers may require internal-
- Energizer, 1.5 ratio (not self-aligning), will not have sufficient clearance in factory cast valve covers.
- 1.5 ratio (not self-aligning). Factory cast valve covers may require internal clearancing.
- 1.5 ratio, (not self-aligning), narrow body for center bolt valve covers.
- 1.5 ratio, self-aligning narrow body for center bolt valve covers.
- 1.6 ratio, self-aligning narrow body for center bolt valve covers.
 In order to use these rocker arms on engines originally equipped with self-aligning rockers, hardened pushrod guideplates and heat-treated pushrods must be installed, and valve cover clearance checked.
- y Standard diameter PAC Enhanced valve springs for 1.750" assembly height.

					СОМ	PLETE C	AM SPE	CIFIC	ATIO	NS		
	Camshaft Series/	RPM	Camshaft	See pg. 296	Degrees Duration	Advertised Degrees	Degrees	0pen/C @ .05	0"	Lash Hot	Gross Lift	
Application	Grind Number	POWER Range	PART NUMBER/ Emissions Code	LIFTERS	@ .050" Int/Exh.	Duration Int/Exh.	Lobe Separation	Cam L Int/E		Int. Exh.	Int. Exh.	
Mechanical Roller Camsh	afts											
Excellent low end and mid range torque and HP, good idle, daily performance usage, mild bracket racing, auto trans w/2500+ converter, 3000-3400 cruise RPM, 9.5 to 11.0 compression ratio advised.	SR-228/338-25-12 IG	2200- 6200	108541*a	11570-16 ^b	228 236	278 280	112	7 55		.020 .020		
Good low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, 383+cu.in., auto trans w/3000+ converter, 3400-3800 cruise RPM, good with plate or manifold nitrous system, 10.5 to 11.5 compression ratio advised, .900" base circle for long stroke clearance. Good with centrifugal or small Roots supercharger, 10 lbs. maximum boost w/8.5 maximum compression ratio advised.	SR-232/350-25-12.90 IG	2400- 6600	108571*a	11570-16 ^b	232 240	286 294	112	9 57			.525 .543	
Good low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/3000+ converter, 3400-3800 cruise RPM, good with plate or manifold nitrous system, 10: to 11.5 compression ratio advised. Good with centrifugal or small Roots supercharger, 10 lbs. maximum boost w/8.5 maximum compression ratio advised.	SR-236/350-2S-12 IG	2400- 6600	108551*a	11570-16 ^b	236 244	286 294	112	11 59			.525 .543	
Good mid range torque and HP, fair idle, performance usage, w/manifold nitrous system, bracket racing, 383+cu.in., auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.5 to 12.0 compression ratio advised, .900" base circle for long stroke clearance. Good w/Roots supercharger, 14 pounds maximum boost w/8.0 maximum compression ratio advised.	SR-240/362-25-12.90 IG	3400- 7200	108611*a	11570-16 ^b	240 248	294 302	112	13 <i>6</i> 1			.543 .561	
Good mid to upper RPM torque and HP, fair idle, performance usage, w/manifold notrous system, bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.5 to 12.0 compression ratio advised. Good w/Roots supercharger, 14 pounds maximum boost w/8.0 maximum compression ratio advised.	SR-244/362-25-12 IG	3400- 7200	108521*a	11570-16 ^b	244 252	294 302	112	15 63		.020 .020	.543 .561	

Chevrolet V-8 92-96

305 (5.0L)-350 (5.7L) cu.in. LT1

Hydraulic Roller Camsha	fts									
Good low end torque, for 94-96 aluminum head equipped LT1 Camaros, Firebirds and Corvettes. Works in stock and mild modified engines. Boosts mid and top end without low end loss. Use 10758-16 1.6 ratio rocker arms for more power. Not for use w/stock springs. For mass air F.I. only.	2033	1500- 5700	104227*a	10530-16° 10535-16 ^d	210 224	272 286	112	(2) 32 49 (6)	.000 .479 .000 .518	
For 94-95 highly modified, aluminum head LT1 Camaros, Firebirds and Corvettes. High flow heads, headers and exhaust required. Manual transmission recommended. Top end power with some low end loss. Use 10758-16 1.6 ratio rocker arms for more power. Not for use w/stock springs. For mass air F.I. only. (50 state legal for listed applications CARR FOR D-275-55)	2050	2400- 6400	104241ª	10535-16 ^d	218 218	280 280	116	(2) 40 50 (12)	.000 .498 .000 .498	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous

power, torque and RPM potential. Due to their RPM capability and increased valve travel, it is HIGHLY RECOMMENDED thy and increased valve travel, it is HIGHLY RECOMMENDED that the appropriate Crane valve train components be installed for maximum performance and reliability.

NOTE: The camshafts listed above incorporate the front ignition drive pilot hole for late model applications. A long cam dowel pin is installed, which can be driven in further when required for short dowel pin application engines.

NOTE: 1988-99 Chevrolet 305 and 350 V-8 engines (and some 1987 350 V-8 engines) use a different configuration camshaft core than the 57-87 engines and cannot be interchanged.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



	Custom G	rind Cams	Also Availab	le – Call 86	6-388-5120	or go to cro	anecams.com	i tor order	ing intorm	ation
	CRANE VALV	E TRAIN CO	MPONENTS							
	See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
	VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	N ROCKERS — C/ GOLD RACE
		99893-16 ^f	99951-16	99820-16°	99097-1 ^h	11621-16 ⁱ 95638-16 ^j	10975-1* ^k		11774-16 ^{m,n}	11750-16 ⁿ 10750-16 ⁿ
		99893-16 ^f	99951-16	99820-16°	99097-1 ^h	95638-16 ^j	10975-1* ^k		11774-16 ^{m,n}	11750-16 ⁿ
		99893-16 ^f	99951-16	99820-16°	99097-1 ^h	11621-16 ⁱ 95638-16 ^j	10975-1* ^k		11774-16 ^{m,n}	11750-16 ⁿ
		99893-16 ^f	99951-16	99820-16°	99097-1 ^h	95638-16 ^j	10975-1* ^k		11774-16 ^{m,n}	11750-16" 10750-16"
		99893-16 ^f	99951-16	99820-16°	99097-1 ^h	11621-16 ⁱ 95638-16 ^j	10975-1* ^k		11774-16 ^{m,n}	11750-16 ^r
	11308-1 ^e	99893-16° 96802-16 ⁹	99951-16° 99915-16 ⁹		99097-1 ^h	10621-16 ⁱ 95624-16 ^j		10800C-16 ¹		10751-16 10758-16
_	11308-1°	99893-16° 96802-16 ⁹	99951-16° 99915-16°		99097-1 ^h	10621-16 ⁱ 95624-16 ^j		10800C-16 ¹		10751-16 10758-16

a Camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor gear 1 1.5 ratio, extra long slot, Nitro Carb (not self-aligning). not required.

Ultra Pro Series vertical locking bar roller lifters.

- For use with standard GM alignment bars.
- Optional Crane long travel hydraulic roller lifters, for use with standard GM alignment bars. Required for use with high lift and small base circle camshafts.
- For LT1 aluminum cylinder heads.
- Must machine cylinder heads.
- For LT1 iron cylinder heads.
- Machined steel, heat treated.
- Heavy wall, heat treated, for use with either pushrod guideplate or non-guideplate cylinder heads. Pro Series one-piece, for use with either pushrod guideplate or non-guideplate cylinder heads.
- Performance steel billet gears and roller chain set (for 1987-91 applications).

- m Crane Classic extruded, 1.5 ratio (not self-aligning). Factory cast valve covers may require internal
- **n** In order to use these rocker arms on engines originally equipped with self-aligning rockers, hardened pushrod guideplates and heat-treated pushrods must be installed, and valve cover clearance
- 1.5 ratio (not self-aligning). Factory cast valve covers may require internal clearancing.
- 1.5 ratio (not self-aligning), narrow body for center bolt valve covers.
- 1.5 ratio, self-aligning narrow body for center bolt valve covers.
- 1.6 ratio, self-aligning narrow body for center bolt valve covers. Valve springs and retainers must be changed to allow for increased valve travel.

					COMPLETE CAM SI			CIFICATI			
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Roller Camsha	fts										
Great daily driver or truck towing, for stock 4.8L thru 5.7L, smooth idle, great fuel economy, good torque and HP increase, computer upgrades not required, can use stock valve springs, good w/1.8:1 rocker arms.	HR-206/294-2S-14.55	1400- 5500	1449511*	144530-16ª 144536-16 ⁶ 144532-16 ⁶	214	270 278	114	(6) 32 46 (12)	.000 .000		
Good daily driver, for stock or slightly modified 4.8L thru 6.0L, light choppy idle, good fuel economy, overall torque and HP increase, computer upgrades not required, good w/1.8:1 rocker arms.	HR-210/3241-25-14 4A	1800- 6000	1449041*	144530-16ª 144536-16 ⁶ 144532-16 ⁶	218	272 280	114	(5) 35 47 (9)	.000		
Great daily driver, for stock 4.8L thru 6.0L, slight idle note, great fuel economy, overall torque and HP increase, computer upgrades not required, good w/1.8:1 rocker arms.	HR-210/3241-2S-16 2A	1600- 6000	1449051*	144530-16ª 144536-16 ⁶ 144532-16 ⁶	218	272 280	116	(9) 39 47 (9)	.000 .000	.551 .551	
Good daily driver, for stock or slightly modified 4.8L thru 6.0L, light choppy idle, good fuel economy, 10.5+ compression ratio advised, computer upgrades required, good w/1.8:1 rocker arms.	HR-216/3241-15	2200- 6300	1449061*	144530-16 ^a 144536-16 ^b 144532-16 ^c	216	278 278	115	(2) 38 48 (12)	.000	.551 .551	
Good daily driver, for stock or modified 4.8L thru 6.0L, light choppy idle, good fuel economy, 10.5+ compres- sion ratio advised, good with supercharger or nitrous, computer upgrades required.	HR-216/344-2S1-16 3A	1900- 6000	1449071*	144530-16ª 144536-16 ⁶ 144532-16 ⁶	222	277 283	116	(5) 41 50 (8)	.000 .000		
Good daily driver, for stock or modified 4.8L thru 6.0L, light choppy idle, good fuel economy, good with supercharger or nitrous, computer upgrades required, good w/1.8:1 ratio rocker arms.	HR-216/3241-2S-15	2000- 6500	1449561*	144530-16 ^a 144536-16 ^b 144532-16 ^c	224	278 286	115	(2) 38 52 (8)	.000		
Good daily driver, for stock or modified 5.7L thru 6.0L, light choppy idle, good fuel economy, 10.5+ compres- sion ratio advised, computer upgrades required.	HR-216/344-2S-14	2200- 6500	1449081°	144530-16ª 144536-16 ^b 144532-16°	224	277 285	114	(1) 37 51 (7)	.000 .000		
Daily driver, for modified 5.7L thru 6.0L, light choppy idle, fair fuel economy, headers and aft cat exhaust advised, 10.5+ compression ratio advised, auto trans w/2400-2800 stall converter, computer upgrades required, good w/1.8:1 ratio rocker arms.	HR-220/3241-251-14	2400- 6500	1449011°	144530-16ª 144536-16º 144532-16º	224	282 286	114	1 39 51 (7)	.000 .000		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous power, torque and RPM potential. Due

tremendous power, torque and RYM potential. Due to their RPM capability and increased valve travel, it is HIGHLY RECOMMENDED that the appropriate Crane valve train components be installed for maximum performance and reliability.

NOTE: 1997-up Chevrolet 5.7L LS1/LS6, 1988-99 305 and 350 V-8

ITE: 1997-up Chevrolet 5.7L LS1/LS6, 1988-99 305 and 350 V-8 (and some 1987 350 V-8) engines, and the 1957-87 262-400 V-8 engines, each use different configuration camshaft cores, and cannot be interchanged.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.

Crane Cams offers many different cam lobe profiles for the GM "LS1/ LS2/LS6 Engine Family". These hydraulic roller cams are designed for applications ranging from mild street performance upgrades, serious torque and HP increases for trucks, to all-out competition profiles for LS1 powered race cars.

Crane's LS engine family's grinds are designed to take optimum advantage of the LS1/LS2/LS6's lighter valve train and

greated reduced component inertia. This low inertia allows extraordinarily quick valve acceleration rates. This actually increases the "area beneath the lift curve" in each profile. Simply put, they begin moving the valve off its seat at a much quicker rate, to initiate earlier flow. The profiles retains and lengthens this rate of acceleration during the valve-opening cycle and as it approaches maximum valve lift. They function like a much "bigger" cam (greater duration) yet they increase low-end and mid-range torque in the most often used rpm range. Peak horsepower and torque output are enhanced throughout the entire rpm range. The valve lift tables were also designed to minimize horsepower-robbing



CDANEVAL	VE TRAIN CO	MDONENTS					
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	— ALUMINUM ROCKERS — GOLD RACE
144317-1 ^d 144316-1 ^e	99831-16 ^f 144838-16 ^g 144847-16 ^h	99637-16 ⁱ 99657-16 ⁱ 144944-16 ^k 144661-16 ^l	99818-16 ^m	99108-1 ⁿ 99107-1°	144621-16 ^p 144622-16 ^q 95627-16 ^r	144984-1* ⁵ 144985-1* ^t 144986-1* ^u	144750-16° 144759-16"
144317-1 ^d 144316-1°	99831-16 ^f 144838-16 ^g 144847-16 ^h	99637-16 ⁱ 99657-16 ^j 144944-16 ^k 144661-16 ^l	99818-16 ^m	99108-1" 99107-1°	144621-16 ^p 144622-16 ^q 95627-16 ^r	144984-1" ^s 144985-1" ^t 144986-1" ^u	144750-16° 144759-16™
144317-1 ^d 144316-1 ^e	99831-16 ^f 144838-16 ^g 144847-16 ^h	99637-16 ⁱ 99657-16 ^j 144944-16 ^k 144661-16 ^l	99818-16 ^m	99108-1" 99107-1°	144621-16 ^p 144622-16 ^q 95627-16 ^r	144984-1" ^s 144985-1" ^t 144986-1" ^u	144750-16° 144759-16°
144317-1 ^d 144316-1°	99831-16 ^f 144838-16 ^g 144847-16 ^h	99637-16 ⁱ 99657-16 ⁱ 144944-16 ^k 144661-16 ⁱ	99818-16 ^m	99108-1 ⁿ 99107-1°	144621-16 ^p 144622-16 ^q 95627-16 ^r	144984-1" ⁵ 144985-1" ^t 144986-1" ^u	144750-16° 144759-16°
144317-1 ^d 144316-1°	99831-16 ^f 144838-16 ^g 144847-16 ^h	99637-16 ⁱ 99657-16 ⁱ 144944-16 ^k 144661-16 ⁱ	99818-16 ^m	99108-1" 99107-1°	144621-16 ^p 144622-16 ^q 95627-16 ^r	144984-1" ⁵ 144985-1" ^t 144986-1" ^u	144750-16° 144759-16°
144317-1 ^d 144316-1°	99831-16 ^f 144838-16 ^g 144847-16 ^h	99637-16 ⁱ 99657-16 ^j 144944-16 ^k 144661-16 ^l	99818-16 ^m	99108-1 ⁿ 99107-1°	144621-16 ^p 144622-16 ^q 95627-16 ^r	144984-1* ⁵ 144985-1* ^t 144986-1* ^u	144750-16° 144759-16°
144317-1 ^d 144316-1°	99831-16 ^f 144838-16 ^g 144847-16 ^h	99637-16 ⁱ 99657-16 ⁱ 144944-16 ^k 144661-16 ^l	99818-16 ^m	99108-1° 99107-1°	144621-16 ^p 144622-16 ^q 95627-16 ^r	144984-1* ⁵ 144985-1* ^t 144986-1* ^u	144750-16° 144759-16°
144317-1 ^d 144316-1°	99831-16 ^f 144838-16 ^g 144847-16 ^h	99637-16 ⁱ 99657-16 ⁱ 144944-16 ^k 144661-16 ⁱ	99818-16 ^m	99108-1 ⁿ 99107-1°	144621-16 ^p 144622-16 ^q 95627-16 ^r	144984-1 ^{*s} 144985-1 ^{*t} 144986-1 ^{*u}	144750-16° 144759-16°

- OE replacement, for use with standard GM alignment bars and standard base circle camshafts.
- For use with standard GM alignment bars, long body design for up to .715" valve lift and reduced base circle camshafts.
- Vertical locking bar hydraulic roller lifters, cylinder head removal is required.
- Contains 144838-16 dual valve springs, 144944-16 steel retainers, 144460-16 spring seats, 99818-16 valve seals, 99108-1 valve locks.
- e Contains 144838-16 dual valve springs, 144661-16 titanium retainers, 14460-16 spring seats, 99818-16 valve seals, 99108-1 valve locks.
- Single ovate wire beehive valve springs.
- Dual valve springs for up to .680" lift, requires Crane 144944-16 or 144661-16 retainers, no machining required. 2002-up cylinder heads will require Crane 144460-16 spring seats.
- Dual valve springs for up to .660" lift, XHTCS material, requires Crane 144944-16 or 144661-16 retainers, no machining required. 2002-up cylinder heads will require Crane 144460-16 spring seats.
- Titanium, for 99831-16 single valve springs.
- Titanium, for **99831-16** single valve springs, requires Crane Multi Fit valve locks.
- Steel, for **144838-16** and **144847-16** dual valve springs. Titanium, for **144838-16** and **144847-16** dual valve springs.

- m No machining required.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Pro Series one-piece, stock length.
- Pro Series one-piece, for use with Crane aluminum rocker arm kits (included in 144750-16 and 144759-16 kits).
- Pro Series one piece, stock length -.050".
- Pro Series steel billet gears and double roller chain set with vernier adjustment, for LS1 and LS6, without cam sensor trigger.
- t Pro Series steel billet gears and double roller chain set with 9 keyway crank sprocket, for early LS2, with single trigger cam sensor feature.
- Pro Series steel billet gears and double roller chain set with 9 keyway crank sprocket, for late LS2, LS3, LS7, and L92, with four trigger cam sensor feature.
- 1.7 ratio, 3/8" stud, complete kit includes rocker arms, adjusting nuts, pushrod guideplates, rocker arm studs, and pushrods.
- w 1.8 ratio, 3/8" stud, complete kit includes rocker arms, adjusting nuts, pushrod guideplates, rocker arm studs, and pushrods.

					COMPLETE CAM SPECIFICATION				ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Roller Camsha	fts										
Daily driver, for modified 5.7L thru 6.0L, choppy idle, fair fuel economy, headers and aft cat exhaust advised, 10.8+ compression ratio advised, auto trans w/2800- 3000 stall converter, computer upgrades required, good w/1.8:1 ratio rocker arms.	HR-222/3241-25-15 3A	2300- 6800	1449091*	144530-16ª 144536-16 ⁶ 144532-16 ^c		284 290	115	(1) 43 52 (4)	.000 .000		
Daily driver, for modified 5.7L thru 6.0L, choppy idle, fair fuel economy, headers and aft cat exhaust advised, 11.0+ compression ratio advised, auto trans w/3000- 3400 stall converter, computer upgrades required, good w/1.8:1 ratio rocker arms.	HR-224/3241-14	2300- 6500	1449591*	144530-16ª 144536-16 ⁶ 144532-16 ⁶		286 286	114	3 41 51 (7)	.000 .000		
Weekend driver, for modified 5.7L thru 6.0L, choppy idle, fair fuel economy, headers and aft cat exhaust advised, 10.8+ compression ratio advised, auto trans w/2800-3200 stall converter, computer upgrades required, good w/1.8:1 ratio rocker arms.	HR-224/3241-25-14 2A	2200- 6500	1449101*	144530-16ª 144536-16 ⁶ 144532-16 ^c		286 290	114	0 44 50 (2)	.000 .000		
Weekend driver, for modified 5.7L thru 7.0L, choppy idle, fair fuel economy, headers and aft cat exhaust required, 11.0+ compression ratio advised, low ratio gearing required, auto trans w/2800-3200 stall converter, computer upgrades required.	HR-224/347-25-14 4A	2300- 6500	1449111*	144536-16 ⁶ 144532-16 ⁶	224 228	280 283	114	0.5 43.5 50.5 (2.5)	.000 .000		
Weekend driver, for modified 5.7L thru 7.0L, choppy idle, fair fuel economy, headers and aft cat exhaust required, 11.0+ compression ratio advised, low ratio gearing required, auto trans w/3000-3400 stall converter, computer upgrades required.	HR-224/347-251-15 4A	2400- 6500	1449121*	144536-16 ^b 144532-16 ^c	224 232	280 287	115	0.5 44.5 53.5 (1.5)	.000 .000	.590 .590	
Weekend driver, for modified 5.7L thru 7.0L, choppy idle, fair fuel economy, headers and aft cat exhaust required, 11.5+ compression ratio advised, low ratio gearing required, auto trans w/3200-3600 stall converter, computer upgrades required.	HR-228/353-13 4A	2700- 6500	1449131*	144536-16 ^b 144532-16 ^c	228 228	290 290	115	5 43 51 (3)	.000 .000	.600 .600	
Weekend driver, for modified 5.7L thru 6.0L, choppy idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 11.5+ compression ratio advised, low ratio gearing required, auto trans w/3200-3600 stall converter, computer upgrades required, good w/1.8:1 ratio rocker arms.	HR-228/3241-25-12	2700- 6500	1449141°	144530-16ª 144536-16 ⁶ 144532-16 ⁶	228 232	290 294	112	7 41 43 (1)	.000 .000	.551 .551	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous power, torque and RPM potential. Due to their RPM capability and increased valve travel, it is HIGHLY RECOMMENDED that the appropriate Crane valve train components be installed for maximum performance and reliability.

performance and reliability.

NOTE: 1997-up Chevrolet 5.7L LS1/LS6, 1988-99 305 and 350 V-8 (and some 1987 350 V-8) engines, and the 1957-87 262-400 V-8 engines, each use different configuration camshaft cores, and cannot be interchanged.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.

Crane Cams offers many different cam lobe profiles for the GM "LS1/ LS2/LS6 Engine Family". These hydraulic roller cams are designed for applications ranging from mild street performance upgrades, serious torque and HP increases for trucks, to all-out competition profiles for LS1 powered race cars.

Crane's LS engine family's grinds are designed to take optimum advantage of the LS1/LS2/LS6's lighter valve train and

greated reduced component inertia. This low inertia allows extraordinarily quick valve acceleration rates. This actually increases the "area beneath the lift curve" in each profile. Simply put, they begin moving the valve off its seat at a much quicker rate, to initiate earlier flow. The profiles retains and lengthens this rate of acceleration during the valve-opening cycle and as it approaches maximum valve lift. They function like a much "bigger" cam (greater duration) yet they increase low-end and mid-range torque in the most often used rpm range. Peak horsepower and torque output are enhanced throughout the entire rpm range. The valve lift tables were also designed to minimize horsepower-robbing



CRANE VAL	VE TRAIN CO	MPONENTS					
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	— ALUMINUM ROCKERS - Gold Race
144317-1 ^d 144316-1 ^e	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16° 144622-16° 95627-16°	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16 ^v 144759-16 ^w
144317-1 ^d 144316-1 ^e	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ^g 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16° 144622-16° 95627-16°	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16 ^v 144759-16 ^w
144317-1 ^d 144316-1 ^e	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ⁱ	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16° 144622-16° 95627-16°	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16° 144759-16°
144317-1 ^d 144316-1 ^e	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1¹ 99107-1™	144621-16° 144622-16° 95627-16°	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16 ^v 144759-16 ^w
144317-1 ^d 144316-1 ^e	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ⁱ	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16° 144622-16° 95627-16°	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16 ^v 144759-16 ^w
144317-1 ⁴ 144316-1°	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16° 144622-16° 95627-16°	144984-1° ^q 144985-1* ^r 144986-1* ^u	144750-16° 144759-16°
144317-1 ^d 144316-1 ^e	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1 99107-1 ^m	144621-16 ⁿ 144622-16 ^o 95627-16 ^p	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16 ^v 144759-16 ^w



- OE replacement, for use with standard GM alignment bars and standard base circle camshafts.
- For use with standard GM alignment bars, long body design for up to .715" valve lift and reduced base circle camshafts.
- Vertical locking bar hydraulic roller lifters, cylinder head removal is required.
 Contains 144838-16 dual valve springs, 144944-16 steel retainers, 144460-16 spring seats, 99818-16 valve seals, 99108-1 valve locks.
- e Contains 144838-16 dual valve springs, 144661-16 titanium retainers, 14460-16 spring seats, 99818-16 valve seals, 99108-1 valve locks.
- Single ovate wire beehive valve springs.

 Dual valve springs for up to .680" lift, requires Crane 144944-16 or 144661-16 retainers, no machining required. 2002-up cylinder heads will require Crane 144460-16 spring seats.

 Dual valve springs for up to .660" lift, XHTCS material, requires Crane 144944-16 or 144661-16 retainers,
- no machining required. 2002-up cylinder heads will require Crane **144460-16** spring seats. Titanium, for **99831-16** single valve springs.
- Titanium, for 99831-16 single valve springs, requires Crane Multi Fit valve locks. Steel, for 144838-16 and 144847-16 dual valve springs.

 Titanium, for 144838-16 and 144847-16 dual valve springs.

- m No machining required.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Pro Series one-piece, stock length.
- Pro Series one-piece, for use with Crane aluminum rocker arm kits (included in **144750-16** and 144759-16 kits).
- Pro Series one piece, stock length .050". Pro Series steel billet gears and double roller chain set with vernier adjustment, for LS1 and LS6, without cam sensor trigger.
- t Pro Series steel billet gears and double roller chain set with 9 keyway crank sprocket, for early LS2, with single trigger cam sensor feature.
- Pro Series steel billet gears and double roller chain set with 9 keyway crank sprocket, for late LS2, LS3, LS7, and L92, with four trigger cam sensor feature.
- 1.7 ratio, 3/8" stud, complete kit includes rocker arms, adjusting nuts, pushrod guideplates, rocker arm studs, and pushrods.
- 1.8 ratio, 3/8" stud, complete kit includes rocker arms, adjusting nuts, pushrod guideplates, rocker arm studs, and pushrods.

					COMPLETE CAM SPECIFICATIONS					
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 294	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Lash Hot Int.	Gross Lift Int.
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.		Int/Exh	Exh.	Exh.
Hydraulic Roller Camsha	fts									
Weekend driver, for modified 5.7L thru 6.0L, choppy idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 11.5+ compression ratio advised, low ratio gearing required, auto trans w/3200-3600 stall converter, computer upgrades required.	HR-228/353-251-12	2400- 6500	1449601*	144536-16 ^b 144532-16 ^c	228 232	290 294	112	7 41 53 (1)		.600 .600
Weekend driver, for modified 5.7L thru 6.0L, choppy idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 11.0+ compression ratio advised, low ratio gearing required, auto trans w/3200-3600 stall converter, computer upgrades required.	HR-228/353-251-14 2A	2400- 6500	1449151*	144536-16 ⁶ 144532-16 ^c	228 232	290 294	114	2 46 52 0	.000	
Weekend driver, for modified 5.7L thru 6.0L, choppy idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 11.0+ compression ratio advised, low ratio gearing required, auto trans w/3200-3600 stall converter, computer upgrades required.	HR-228/347-25-15 0A	2400- 6500	1449161*	144536-16 ^b 144532-16 ^c	228 236	283 291	115	(2.5) 50.5 51.5 4.5	.000 .000	.590 .590
Weekend driver, for turbocharged 5.7L thru 6.0L, choppy idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, low ratio gearing required, auto trans w/3200-3600 stall converter, computer upgrades required.	HR-232/353-2SR-17 2A	2600- 6400	1449171*	144536-16 ^b 144532-16 ^c	232 228	294 290	117	1 51 53 (5)		.600 .600
Weekend driver, for modified 5.7L thru 6.0L, rough idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 11.5+ compression ratio advised, low ratio gearing required, auto trans w/3400-4000 stall converter, computer upgrades required.	HR-232/353-251-12 4A	2900- 6500	1449181*	144536-16 ^b 144532-16 ^c	232 236	294 298	112	8 44 54 2		.600 .600
Weekend driver, for modified 5.7L thru 6.0L, choppy idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 11.5+ compression ratio advised, low ratio gearing required, auto trans w/3600-4000 stall converter, computer upgrades required.	HR-232/353-251-14	2900- 6500	1449331*	144536-16 ^b 144532-16 ^c	232 236	294 298	114	7 45 57 (1)		.600 .600
Weekend driver, for modified 5.7L thru 6.0L, choppy idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 11.0+ compression ratio advised, low ratio gearing required, auto trans w/3200-3600 stall converter, computer upgrades required, good w/1.8:1 ratio rocker arms.	HR-232/3241-251-17 3A	2600- 6600	1449191*	144530-16ª 144536-16 ^b 144532-16 ^c	232 240	294 302	117	2 50 60 0	.000 .000	
Pro Street & Drags, for modified 5.7L - 8.0L, rough idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 12.0+ compression ratio advised, low ratio gearing required, auto trans w/3600-4400 stall converter, computer upgrades required.	HR-232/353-2S-10 0A	2900- 6600	1449201*	144536-16 ^b 144532-16 ^c	232 240	294 302	110	6 46 50 10		.600 .600

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous power, torque and RPM potential. Due to their RPM capability and increased valve travel, it is HIGHLY RECOMMENDED that the appropriate Crane valve train components be installed for maximum performance and reliability.

NOTE: 1997-up Chevrolet 5.7L LS1/LS6, 1988-99 305 and 350 V-8 (and some 1987 350 V-8) engines, and the 1957-87 262-400 V-8 engines, each use different configuration camshaft cores, and cannot be interchanged.

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Crane's LS engine family's grinds are designed to take optimum advantage of the LS1/LS2/LS6's lighter valve train and

greated reduced component inertia. This low inertia allows extraordinarily quick valve acceleration rates. This actually increases the "area beneath the lift curve" in each profile. Simply put, they begin moving the valve off its seat at a much quicker rate, to initiate earlier flow. The profiles retains and lengthens this rate of acceleration during the valve-opening cycle and as it approaches maximum valve lift. They function like a much "bigger" cam (greater duration) yet they increase low-end and mid-range torque in the most often used rpm range. Peak horsepower and torque output are enhanced throughout the entire rpm range. The valve lift tables were also designed to minimize horsepower-robbing



CRANE VAL	VE TRAIN CO	MPONENTS					
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	— ALUMINUM ROCKERS — Gold Race
144317-1 ^d 144316-1 ^e	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16° 144622-16° 95627-16°	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16° 144759-16°
144317-1 ^d 144316-1 ^e	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1¹ 99107-1™	144621-16° 144622-16° 95627-16°	144984-1° ^q 144985-1° ^r 144986-1° ^u	144750-16° 144759-16™
144317-1 ^d 144316-1°	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16 ⁿ 144622-16 ^o 95627-16 ^p	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16° 144759-16°
144317-1 ^d 144316-1 ^e	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ⁱ	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16 ⁿ 144622-16 ^o 95627-16 ^p	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16° 144759-16°
144317-1 ^d 144316-1 ^e	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1 ¹ 99107-1™	144621-16 ⁿ 144622-16° 95627-16 ^p	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16 ^v 144759-16 ^w
144317-1 ^d 144316-1 ^e	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ^g 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1 ¹ 99107-1™	144621-16 ⁿ 144622-16° 95627-16 ^p	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16 ^v 144759-16 ^w
144317-1 ^d 144316-1°	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ^g 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16 ⁿ 144622-16° 95627-16 ^p	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16° 144759-16°
144317-1 ^d 144316-1 ^e	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1¹ 99107-1™	144621-16 ⁿ 144622-16 ^o 95627-16 ^p	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16° 144759-16°



- OE replacement, for use with standard GM alignment bars and standard base circle camshafts.
- For use with standard GM alignment bars, long body design for up to .715" valve lift and reduced base circle camshafts.
- Vertical locking bar hydraulic roller lifters, cylinder head removal is required.
 Contains 144838-16 dual valve springs, 144944-16 steel retainers, 144460-16 spring seats, 99818-16 valve seals, 99108-1 valve locks.
- e Contains 144838-16 dual valve springs, 144661-16 titanium retainers, 14460-16 spring seats, 99818-16 valve seals, 99108-1 valve locks.
- 99818-16 varve seats, 99106-1 varve rocks.

 Single ovate wire beehive valve springs.

 Dual valve springs for up to .680" lift, requires Crane 144944-16 or 144661-16 retainers, no machining required. 2002-up cylinder heads will require Crane 144460-16 spring seats.

 Dual valve springs for up to .660" lift, XHTCS material, requires Crane 144944-16 or 144661-16 retainers,
- no machining required. 2002-up cylinder heads will require Crane **144460-16** spring seats. Titanium, for **99831-16** single valve springs.
- Titanium, for 99831-16 single valve springs, requires Crane Multi Fit valve locks. Steel, for 144838-16 and 144847-16 dual valve springs.

 Titanium, for 144838-16 and 144847-16 dual valve springs.

- m No machining required.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Pro Series one-piece, stock length.
- Pro Series one-piece, for use with Crane aluminum rocker arm kits (included in **144750-16** and 144759-16 kits).
- Pro Series one piece, stock length .050". Pro Series steel billet gears and double roller chain set with vernier adjustment, for LS1 and LS6, without cam sensor trigger.
- t Pro Series steel billet gears and double roller chain set with 9 keyway crank sprocket, for early LS2, with single trigger cam sensor feature.
- Pro Series steel billet gears and double roller chain set with 9 keyway crank sprocket, for late LS2, LS3, LS7, and L92, with four trigger cam sensor feature.
- 1.7 ratio, 3/8" stud, complete kit includes rocker arms, adjusting nuts, pushrod guideplates, rocker arm studs, and pushrods.
- 1.8 ratio, 3/8" stud, complete kit includes rocker arms, adjusting nuts, pushrod guideplates, rocker arm studs, and pushrods.

					COMPLETE CAM SPECIFICAT				ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Roller Camshat		IMINGE	LITIOSIOTIS COUC	LITTERS	IIIt/ EXII.	III (LAII.	Scparadon	IIIU EXII	LAII.	LAII.	
Pro Street & Drags, for modified 5.7L - 8.0L, rough idle, upgraded cylinder heads & valvetrain required, headers & aft cat exhaust required, 12.0+ compress. ratio advised, low ratio gearing required, auto trans w/3200-3600 stall converter, computer upgrades required.	HR-236/347-2S-14 0A	3000- 6800	1449211°	144536-16 ^b 144532-16 ^c	236 240	291 295	114	2.5 53.5 52.5 7.5	.000 .000		
Pro Street and Drags, for modified 5.7L thru 8.0L, rough idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 12.0+ compression ratio advised, low ratio gearing required, auto trans w/3400-4000 stall converter, computer upgrades required.	HR-236/353-2S-12	3100- 6800	1449611*	144536-16 ⁶ 144532-16 ⁶	236 240	298 302	112	11 45 57 3	.000	.600 .600	
Pro Street and Drags, for modified 5.7L thru 8.0L, rough idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 11.5+ compression ratio advised, low ratio gearing required, auto trans w/3200-3600 stall converter, computer upgrades required.	HR-236/347-2S1-15	2800- 6800	1449221*	144536-16 ^b 144532-16 ^c	236 244	291 299	115	6.5 49.5 60.5 3.5	.000		
Pro Street and Drags, for modified 5.7L thru 8.0L, rough idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 12.0+ compression ratio advised, low ratio gearing required, auto trans w/3600-4400 stall converter, computer upgrades required.	HR-236/353-2-10 OA	3200- 6800	1449231*	144536-16 ^b 144532-16 ^c	236 246	298 308	110	8 48 53 13	.000 .000		
Pro Street and Drags, for turbocharged 5.7L thru 6.0L, choppy idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 12.0+compression ratio advised, low ratio gearing required, auto trans w/3400-3600 stall converter, computer upgrades required.	HR-240/353-2SR-14	3300- 7000	1449241°	144536-16 ^b 144532-16 ^c	240 236	302 298	114	11 49 57 (1)	.000 .000		
Pro Street and Drags, for modified 5.7L thru 8.0L, rough idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 11.5+ compression ratio advised, low ratio gearing required, auto trans w/3600-4400 stall converter, computer upgrades required.	HR-240/353-2S-14 4A	3000- 7000	1449251*	144536-16 ^b 144532-16 ^c	240 246	302 308	114	10 50 61 5	.000 .000		
Pro Street and Drags, for modified 5.7L thru 8.0L, rough idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 12.0+ compression ratio advised, low ratio gearing required, auto trans w/3600-4400 stall converter, computer upgrades required.	HR-246/367-2-14	3200- 7200	1449261°	144536-16 ^b 144532-16 ^c	246 256	303 313	114	12.5 53.5 65.5 10.5	.000 .000	.624 .624	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous power, torque and RPM potential. Due to their RPM capability and increased valve travel, it is HIGHLY RECOMMENDED that the appropriate Crane valve train components be installed for maximum performance and reliability.

NOTE: 1997-up Chevrolet 5.7L LS1/LS6, 1988-99 305 and 350 V-8 (and some 1987 350 V-8) engines, and the 1957-87 262-400 V-8 engines, each use different configuration camshaft cores, and cannot be interchanged.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.

Crane Cams offers many different cam lobe profiles for the GM "LS1/ LS2/LS6 Engine Family". These hydraulic roller cams are designed for applications ranging from mild street performance upgrades, serious torque and HP increases for trucks, to all-out competition profiles for LS1 powered race cars.

Crane's LS engine family's grinds are designed to take optimum advantage of the LS1/LS2/LS6's lighter valve train and

greated reduced component inertia. This low inertia allows extraordinarily quick valve acceleration rates. This actually increases the "area beneath the lift curve" in each profile. Simply put, they begin moving the valve off its seat at a much quicker rate, to initiate earlier flow. The profiles retains and lengthens this rate of acceleration during the valve-opening cycle and as it approaches maximum valve lift. They function like a much "bigger" cam (greater duration) yet they increase low-end and mid-range torque in the most often used rpm range. Peak horsepower and torque output are enhanced throughout the entire rpm range. The valve lift tables were also designed to minimize horsepower-robbing



CRANE VALV	/E TRAIN CO	MPONENTS					
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	— ALUMINUM ROCKERS — GOLD RACE
144317-1 ^d 144316-1°	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1¹ 99107-1™	144621-16° 144622-16° 95627-16°	144984-1° ^q 144985-1° ^r 144986-1° ^u	144750-16° 144759-16°
144317-1 ^d 144316-1°	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1¹ 99107-1™	144621-16° 144622-16° 95627-16°	144984-1* ⁹ 144985-1* ⁷ 144986-1* ⁰	144750-16° 144759-16°
144317-1 ^d 144316-1°	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1¹ 99107-1™	144621-16 ⁿ 144622-16° 95627-16 ^p	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16 ^v 144759-16 ^w
144317-1 ^d 144316-1°	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16 ⁿ 144622-16° 95627-16 ^p	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16° 144759-16°
144317-1 ^d 144316-1°	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16 ⁿ 144622-16° 95627-16 ^p	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16° 144759-16™
144317-1 ^d 144316-1°	99831-16° 144838-16 ⁹ 144847-16 ^h	99637-16 ⁹ 99657-16 ^h 144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16 ⁿ 144622-16° 95627-16 ^p	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16" 144759-16"
144317-1 ^d 144316-1 ^e	144838-16 ⁹ 144847-16 ^h	144944-16 ⁱ 144661-16 ^j	99818-16 ^k	99108-1 ¹ 99107-1 ^m	144621-16° 144622-16° 95627-16°	144984-1* ^q 144985-1* ^r 144986-1* ^u	144750-16° 144759-16°

- OE replacement, for use with standard GM alignment bars and standard base circle camshafts.
- For use with standard GM alignment bars, long body design for up to .715" valve lift and reduced base circle camshafts.
- Vertical locking bar hydraulic roller lifters, cylinder head removal is required.
 Contains 144838-16 dual valve springs, 144944-16 steel retainers, 144460-16 spring seats, 99818-16 valve seals, 99108-1 valve locks.
- e Contains 144838-16 dual valve springs, 144661-16 titanium retainers, 14460-16 spring seats, 99818-16 valve seals, 99108-1 valve locks.
- Single ovate wire beehive valve springs.

 Dual valve springs for up to .680" lift, requires Crane 144944-16 or 144661-16 retainers, no machining required. 2002-up cylinder heads will require Crane 144460-16 spring seats.

 Dual valve springs for up to .660" lift, XHTCS material, requires Crane 144944-16 or 144661-16 retainers,
- no machining required. 2002-up cylinder heads will require Crane **144460-16** spring seats. Titanium, for **99831-16** single valve springs.
- Titanium, for 99831-16 single valve springs, requires Crane Multi Fit valve locks. Steel, for 144838-16 and 144847-16 dual valve springs.

 Titanium, for 144838-16 and 144847-16 dual valve springs.

- m No machining required.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Pro Series one-piece, stock length.
- Pro Series one-piece, for use with Crane aluminum rocker arm kits (included in **144750-16** and 144759-16 kits).
- Pro Series one piece, stock length .050". Pro Series steel billet gears and double roller chain set with vernier adjustment, for LS1 and LS6, without cam sensor trigger.
- t Pro Series steel billet gears and double roller chain set with 9 keyway crank sprocket, for early LS2, with single trigger cam sensor feature.
- Pro Series steel billet gears and double roller chain set with 9 keyway crank sprocket, for late LS2, LS3, LS7, and L92, with four trigger cam sensor feature.
- 1.7 ratio, 3/8" stud, complete kit includes rocker arms, adjusting nuts, pushrod guideplates, rocker arm studs, and pushrods.
- 1.8 ratio, 3/8" stud, complete kit includes rocker arms, adjusting nuts, pushrod guideplates, rocker arm studs, and pushrods.

					COMPLETE CAM S			CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Mechanical Roller Camsh	afts										
Serious Pro Street and Drags, for modified 5.7L thru 8.0L, very rough idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 12.0+compression ratio advised, low ratio gearing required, auto trans w/3600-4000 stall converter, serious computer upgrades required.	R-240/3821-25-10	3500- 7500	1448051*	144511-16 ^a 144570-16 ^b 144572-16 ^c	240 244	269 273	110	14.5 45.5 56.5 7.5	.020 .022		
Serious Pro Street and Drags, for modified 5.7L thru 8.0L, very rough idle, good with supercharger or nitrous, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 12.0+ compression ratio advised w/o supercharger, low ratio gearing required, auto trans w/3600-4600 stall converter, serious computer upgrades required.	R-242/353-2S-14	3300- 7500	1448011*	144511-16 ^a 144570-16 ^b 144572-16 ^c	242 248	273 279	114	10.5 51.5 61.5 6.5	.020 .022		
Serious Pro Street and Drags, for modified 5.7L thru 8.0L, very rough idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 12.0+ compression ratio advised, low ratio gearing required, auto trans w/3800-4200 stall converter, serious computer upgrades required.	R-244/382-2S-10	3600- 7600	1448061*	144511-16 ^a 144570-16 ^b 144572-16 ^c	244 248	273 277	110	16.5 47.5 58.5 9.5	.020 .022		
Serious Pro Street and Drags, for modified 5.7L thru 8.0L, very rough idle, good with supercharger or nitrous, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 12.0+ compression ratio advised w/o supercharger, low ratio gearing required, auto trans w/4000-4800 stall converter, serious computer upgrades required.	R-248/353-2S-10 0A	3600- 7600	1448021*	144511-16 ^a 144570-16 ^b 144572-16 ^c	248 260	279 292	110	14 54 60 20		.600 .600	
Serious Pro Street and Drags, for modified 5.7L thru 8.0L, very rough idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 12.0+ compression ratio advised, low ratio gearing required, auto trans w/4000-4800 stall converter, serious computer upgrades required.	R-262/395-2S-8	3800- 7800	1448031*	144511-16 ^a 144570-16 ^b 144572-16 ^c	262 268	296 302	108	27 55 66 22	.020 .022	.671 .671	
Serious Pro Street and Drags, for modified 5.0L thru 8.0L, very rough idle, upgraded cylinder heads and valvetrain required, headers and aft cat exhaust required, 12.0+compression ratio advised, low ratio gearing required, auto trans w/5000-5500 stall converter, serious computer upgrades required.	R-276/420-2-14	4600- 8800	1448041*	144511-16ª 144570-16 ^b 144572-16 ^c	276 286	308 318	114	28 68 82 25	.020 .022		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Roller Cams offer tremendous power, torque and RPM potential. Due to their RPM capability and increased valve travel, it is HIGHLY RECOMMENDED that the appropriate Crane valve train components be installed for maximum performance and reliability.

NOTE: 1997-up Chevrolet 5.7L LS1/LS6, 1988-99 305 and 350 V-8 (and some 1987 350 V-8) engines, and the 1957-87 262-400 Crane's roller camshafts are designed to take optimum advantage V-8 engines, each use different configuration camshaft of the LS1/LS2/LS6's lighter valve train and greated reduce cores, and cannot be interchanged.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.

Crane Cams offers many different cam lobe profiles for the GM "LS1/ LS2/LS6 Engine Family". These roller cams are designed for applications ranging from Pro Street performance, to all-out competition profiles for LS1 powered race cars.

of the LS1/LS2/LS6's lighter valve train and greated reduced component inertia. This low inertia allows extraordinarily

quick valve acceleration rates. This actually increases the area beneath the lift curve" in each profile. Simply put, these new Crane cams begin moving the valve off its seat at a much quicker rate, to initiate earlier flow. The profile retains and lengthens this rate of acceleration during the valve-opening cycle and as it approaches maximum valve lift. They function like a much "bigger" cam (greater duration) yet they increase low-end and mid-range torque in the most often used rpm range. Peak horsepower and torque output are enhanced throughout the entire rpm range. Crane valve lift tables were also designed to minimize horsepower-robbing harmonic frequency pulses when



CRANE VALV	/E TRAIN CO	MPONENTS					
See pg. 358	See pg. 337	See pg. 306	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	— ALUMINUM ROCKERS — GOLD RACE
144316-1 ^d 144314-1°	144838-16 ^f 144847-16 ^g	144944-16 ^h 144661-16 ⁱ	99818-16 ^j	99108-1 ^k	144621-16 ¹ 144622-16 ^m 95627-16 ⁿ	144984-1°° 144985-1°° 144986-1°	144750-16 [,] 144759-16 [,]
144316-1 ^d 144314-1 ^e	144838-16 ^f 144847-16 ^g	144944-16 ^h 144661-16 ⁱ	99818-16 ^j	99108-1 ^k	144621-16 ¹ 144622-16 ^m	144984-1*° 144985-1*°	144750-16' 144759-16'
					95627-16 ⁿ	144986-19	
144316-1 ^d	144838-16 ^f	144944-16 ^h	99818-16 ^j	99108-1 ^k	144621-16 ¹	144984-1*0	144750-16 ^r
144314-1°	144847-16 ⁹	144661-16 ⁱ			144622-16 ^m 95627-16 ⁿ	144985-1* ^p 144986-1 ^q	144759-16°
144316-1 ^d	144838-16 ^f	144944-16 ^h	99818-16 ^j	99108-1 ^k	144621-16 ¹	144984-1*°	144750-16 ^r
144314-1°	144847-16 ⁹	144661-16 ⁱ			144622-16 ^m 95627-16 ⁿ	144985-1* ^p 144986-1 ^q	144759-16°
					144621-16 ¹	144984-1*0	144750-16 ^r
					144622-16 ^m 95627-16 ⁿ	144985-1*P 144986-19	144759-16 ^s
					144621-16 ¹	144984-1*°	144750-16 ^r
					144622-16 ^m 95627-16 ⁿ	144985-1*p 144986-19	144759-16

- **a** For use with standard GM alignment bars, long body design for up to .715" valve lift and reduced base circle camshafts.
- **b** Ultra Pro Series vertical locking bar roller lifters.
- c Ultra Pro Series vertical locking bar roller lifters for Warhawk blocks.
- 1 Contains 144838-16 dual valve springs, 144661-16 titanium retainers, 144460-16 spring seats, 99818-16 valve seals, 99108-1 valve locks.
- e Contains 144847-16 XHTCS dual valve springs, 144661-16 titanium retainers, 144460-16 spring seats, 99818-16 valve seals, 99108-1 valve locks.
- f Dual valve springs, requires 144661-16 or 144944-16 retainers.
- **g** Dual XHTCS valve springs, requires **144661-16** or **144944-16** retainers.
- **h** Steel, for **144838-16** and **144847-16** dual valve springs.
- i Titanium, for 144838-16 and 144847-16 dual valve springs.
- No machining required.
- **k** Machined steel, heat treated.

- I Pro Series one-piece, stock length.
- m Pro Series one-piece, for use with Crane aluminum rocker arm kits (included in 144750-16 and 144759-16 kits).
- **n** Pro Series one piece, stock length -.050".
- Pro Series steel billet gears and double roller chain set with vernier adjustment, for LS1 and LS6, without cam sensor trigger.
- Pro Series steel billet gears and double roller chain set with 9 keyway crank sprocket, for early LS2, with single trigger cam sensor feature.
- q Pro Series steel billet gears and double roller chain set with 9 keyway crank sprocket, for late LS2, LS3, LS7, and L92 with four trigger cam sensor feature.
- 1.7 ratio, 3/8" stud, complete kit includes rocker arms, adjusting nuts, pushrod guideplates, rocker arm studs, and pushrods.
- 5 1.8 ratio, 3/8" stud, complete kit includes rocker arms, adjusting nuts, pushrod guideplates, rocker arm studs, and pushrods.

					COMPLETE CAM SPECIFICATIONS						
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Roller Camshat	fts										
Good daily driver, for stock or modified LS7, light choppy idle, good fuel economy, 10.5+ compression ratio advised, computer upgrades required, auto trans w/3000-3400 stall converter.	HR-220/3333-251-14 4A	2100- 6400	2039271*	144536-16 ^a 144532-16 ^b	220 238	281 299	114	0 40 57 1	.000 .000	.600 .600	
Weekend driver, for modified LS7, choppy idle, fair fuel economy, headers and aft cat exhaust advised, 11.0+compression ratio advised, computer upgrades required, auto trans w/3400-3800 stall converter and low ratio gearing required.	HR-224/347-252-12 4A	2600- 6800	2039281°	144536-16 ^a 144532-16 ^b	224 244	280 299	112	2.5 41.5 56.5 7.5	.000 .000	.625 .625	
Weekend driver, for modified LS7, choppy idle, fair fuel economy, headers and aft cat exhaust advised, 11.0+ compression ratio advised, computer upgrades required, auto trans w/3200-3600 stall converter.	HR-224/347-252-15 4A	2300- 6800	2039291*	144536-16 ^a 144532-16 ^b	224 244	280 299	115	(0.5) 44.5 59.5 4.5	.000 .000	.625 .625	
Pro Street and Drags, for modified LS7. 1.7 rockers recommended for higher RPM. Choppy to rough idle, headers and aft cat exhaust advised, 11.5+ compression ratio advised, computer upgrades required, auto trans w/3400-4000 stall converter and low ratio gearing required.	HR-228/367-251-12 4A	2800- 7000	2039341°	144536-16ª 144532-16 ^b	228 246	285 303	112	4.5 43.5 57.5 8.5	.000 .000	.661 .661	

Chevrolet V-8 07-13

6.2L LS3/L92/Vortec 6.2 (with three bolt timing gear)

Hydraulic Roller Camsha	fts									
Good daily driver, light choppy idle, good fuel economy, computer upgrades required, good w/1.8:1 rocker arms.	HR-216/347-2S-13 4A	2000- 6000	2019371*	144530-16 ^b 144536-16 ^a 144532-16 ^c	216 232	272 289	113	(2.5) 38.5 51.5 0.5	.000 .590 .000 .624	
Daily driver, light choppy idle, fair fuel economy, headers and aft cat exhaust advised, auto trans w/2400-2800 stall converter, computer upgrades required, good w/1.8:1 rocker arms.	HR-220/347-25-13 4A	2200- 6400	2019381*	144530-16 ^b 144536-16 ^a 144532-16 ^c	220 236	276 293	113	(0.5) 40.5 53.5 2.5	.000 .590 .000 .624	
Daily driver, choppy idle, fair fuel economy, headers and aft cat exhaust advised, auto trans w/3000-3400 stall converter, computer upgrades required, good w/1.8:1 rocker arms.	HR-226/367-251-14	2600- 6000	2019391*	144530-16 ^b 144536-16 ^a 144532-16 ^c	226 240	283 297	114	2.5 43.5 57.5 2.5	.000 .624 .000 .624	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous power, torque and RPM potential. Due to their RPM capability and increased valve travel, it is HIGHLY RECOMMENDED that the appropriate Crane valve train components be installed for maximum performance and reliability.

LS2/LS6 Engine Family". These hydraulic roller cams are designed for applications ranging from mild street performance upgrades, serious torque and HP increases for trucks, to all-out competition profiles for LS1 powered race cars.

Crane Cams offers many different cam lobe profiles for the GM "LS1/ Crane's LS engine family's grinds are designed to take optimum advantage of the LS1/LS2/LS6's lighter valve train and greated reduced component inertia. This low inertia allows extraordinarily quick valve acceleration rates. This actually increases the "area beneath the lift curve" in each profile. Simply put, these cams begin moving the valve off its seat at a much quicker rate, to initiate earlier flow, and are stable at higher RPM's. Peak horsepower and torque output are enhanced throughout the entire rpm range. The profiles were also designed to minimize horsepower-robbing harmonic frequency pulses when matched with the recommended Crane valve springs and pushrods.



					_		_	
CRANE VALV	E TRAIN CO	OMPONENTS						
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	— ALUMINUM	ROCKERS — PRO SERIES STUD MOUNT
	00022 16	00076 16	00010 160	00107.10		144006 1*11		
	99832-16 ^f	99976-16 ^j	99818-16°	99107-1 ^p		144986-1* ^u		
	99832-16 ^f	99976-16 ^j	99818-16°	99107-1 ^p		144986-1* ^u		
	99832-16 ^f	99976-16 ^j	99818-16°	99107-1 ^p		144986-1*u		
			99918-16°	99108-1 ^p		144986-1*u		

144317-1 ⁴ 144316-1°	99831-16 ⁹ 144838-16 ^h 144847-16 ⁱ	99637-16 ^k 99657-16 ^l 144944-16 ^m 144661-16 ⁿ	99818-16°	99108-1 ^p 99107-1 ^q	144621-16 [,] 144622-16 [,] 95627-16 [,]	144984-1" 144985-1" ^u 144986-1" ^u	201750-16 ^x 201759-16 ^{ty}
144317-1 ⁴ 144316-1 ^e	99831-16 ^g 144838-16 ^h 144847-16 ⁱ	99637-16 ^k 99657-16 ^l 144944-16 ^m 144661-16 ⁿ	99818-16°	99108-1 ^p 99107-1 ^q	144621-16 ^r 144622-16 ^s 95627-16 ^t	144984-1 [^] 144985-1 [™] 144986-1 [™]	201759-16° 201759-16' ^y
144317-1 ⁴ 144316-1°	99831-16 ⁹ 144838-16 ^h 144847-16 ⁱ	99637-16 ^k 99657-16 ^l 144944-16 ^m 144661-16 ⁿ	99818-16°	99108-1 ^p 99107-1 ^q	144621-16' 144622-16' 95627-16'	144984-1 [™] 144985-1 [™] 144986-1 [™]	201750-16 ^x 201759-16 ^{ry}

- OE replacement, for use with standard GM alignment bars and standard base circle camshafts.
- For use with standard GM alignment bars, long body design for up to .715" valve lift and reduced base circle camshafts.
- Vertical locking bar hydraulic roller lifters, cylinder head removal is required.
- Contains 144838-16 dual valve springs, 144944-16 steel retainers, 144460-16 spring seats, 99818-16 valve seals, 99108-1 valve locks.
- Contains 144838-16 dual valve springs, 144661-16 titanium retainers, 144460-16 spring seats, 99818-16 valve seals, 99108-1 valve locks.
- Single ovate wire beehive valve springs, 1.450" dia., LS3 and L92 cylinder heads will require machining.
- Single ovate wire beehive valve springs.
- Dual valve springs for up to .680" lift, requires Crane 144944-16 or 144661-16 retainers, no machining required. 2002-up cylinder heads will require Crane 144460-16 spring seats.
- Dual valve springs for up to .660" lift, XHTCS material, requires Crane 144944-16 or 144661-16 retainers, no machining required. 2002-up cylinder heads will require Crane 144460-16 spring seats.
- Steel, requires Crane Multi Fit valve locks.
- Titanium, for 99831-16 single valve springs.
- Titanium, for Crane **99631-16** single valve springs, requires Crane Multi Fit valve locks.
- m Steel, for **144838-16** and **144847-16** dual valve springs.

- Titanium, for Crane 144838-16 and 144847-16 dual valve springs.
- No machining required.
- Machined steel, heat treated, Multi Fit.
- Machined steel, heat treated.
- Pro Series one piece, stock length.
- Pro Series one piece, for use with Crane aluminum rocker arms kits (included in 144750-16 and 144759-16 kits).
- Pro Series one piece, stock length -. 050".
- Pro Series steel billet gears and double roller chain set with 9 keyway crank sprocket, for late LS2, LS3, LS7, and L92, with four trigger cam sensor features.
- Pro Series steel billet gears and double roller chain set with vernier adjustment, for LS1 and LS6, without cam sensor trigger.
- w Pro Series steel billet gears and double roller chain set with 9 keyway crank sprocket, for early LS2, with single trigger cam sensor feature.
- 1.7 ratio, 3/8" stud, for L92/LS3 heads, complete kit includes rocker arms, adjusting nuts, pushrod guideplates, rocker arm studs, and pushrods.
- 1.8 ratio, 3/8" stud, for L92/LS3 heads, complete kit includes rocker arms, adjusting nuts, pushrod guideplates, rocker arm studs, and pushrods.

Chevrolet Big Block V8 Tech Tips & Notes

1958-1965 348-409-427 (Z11) V8

Introduced in 1958, the "W" series engines were considered to be Chevrolet's first big block powerplants, referred to as Mark 1 engines within GM. Available in many power levels, from mild truck usage to multiple carbureted performance, they are noted by their offset valves, angled deck surfaces (not perpendicular to the cylinder bores), and having no combustion chambers in the cylinder heads, but instead the "chamber" was contained within the piston domes and cylinder bores. The lifter bores in the block are inline, not canted. This engine family is designated by Crane Cams' 15 prefix.

The camshaft bearing journal diameters are the same as the small block V8 family (1.868"), as is the firing order of 1-8-4-3-6-5-7-2. Engines were offered with camshafts in both hydraulic and mechanical flat faced lifter configurations. Rocker arms are adjustable stamped steel 1.75:1 ratio with ball pivots, mounted on 3/8" studs.

The 427 cu.in. Z11 limited production option was intended for drag racing only, with a unique two-piece aluminum dual four barrel intake manifold. The camshafts and valve train components remained the same basic configuration as the 348-409.

We offer hydraulic, hydraulic roller, mechanical, and mechanical roller camshafts, lifters, and most valve train components, including needle bearing roller tip rocker arms, and heat treated chromemoly tubular pushrods, for these engines. With more aftermarket components becoming available, interest in these engines is increasing, primarily in the restoration, muscle car, and street rod areas.

1963 Mark 2 427 V8

The legendary "Mystery Motor" was intended specifically for NASCAR usage, and was an evolution of the W series. The cylinder deck surfaces were made perpendicular to the bores, the combustion chambers are incorporated into the cylinder heads, and the canted valve configuration (called "Porcupine" in the press) was now employed, although the lifter bores were still inline. The camshaft journals remained at 1.868" diameter. The valve layout of the cylinder heads was changed, so special camshafts having a different lobe layout are required.

If you are extremely fortunate enough to have one of these rare pieces, we can custom produce roller camshafts, and supply roller lifters and many other valve train components for it.

1967-1990 396-402-427-454 V8

In 1965, the first of the Mark IV engines appeared, in a 396 cu.in. configuration. In 1966, a 427 cu.in version was added. The cylinder blocks were completely different from the earlier W series, with staggered lifter bores and larger camshaft journals (1.948"). The canted valve cylinder heads were now incorporated into production. The rocker arm ratio of the adjustable stamped steel units is 1.7:1. This engine is referred by Crane Cams' 13 prefix for camshafts and compo-

nents. Additional displacement versions were added throughout the years, with production line vehicle installation of the Mark IV engines ceasing in 1995 (including the Gen V iteration).

One unique feature of the camshafts used only in the 1965 and 1966 engines, was the oil groove machined into the center of the rear cam journal (3/16" wide and 7/64" deep). This was required to supply the lifter galleries and top end of the engine with oil. This was revised in 1967 by changing the machining configuration on the blocks where the rear cam bearing presses in. A different rear cam bearing was used, and the camshaft no longer required the groove. Due to a performance magazine article published in the late 1960's, an urban legend appeared (and continues today), stating if you used an early grooved camshaft in a later engine, a massive internal oil leak would occur. This is not true, there is no problem using a 1965-1966 type grooved cam in a later block. If you do have an early block with its original configuration cam bearings, the camshaft must have the groove in the rear journal. This option is available from us on request.

The Mark IV engines were equipped from the factory with camshafts having either hydraulic or mechanical flat faced lifter configurations. Certain industrial and marine versions had gear drive, reverse rotation, and gear drive reverse rotation camshafts installed. Make sure of exactly what camshaft your application requires if you have other than a standard rotation, conventional timing chain drive engine.

We offer cast hydraulic and mechanical lifter camshafts with standard bearing journals having the standard firing order (1-8-4-3-6-5-7-2) and also the optional SFO suffix firing order (1-8-7-3-6-5-4-2).

Crane Cams' retrofit hydraulic roller and mechanical roller camshafts are produced in house from steel billet material, heat treated, and finish ground in a variety of versions.

Our retrofit hydraulic roller lifters do not require any block machining, are a drop-in configuration, and incorporate a vertical locking bar. Mechanical roller lifters are also drop-in, and are available in both horizontal and vertical locking bar versions. In 2005 we increased the bar height of our roller lifters, so that most of today's blocks having taller than stock lifter bosses should have sufficient locking bar to block clearance (the height of the pushrod seat did not change). This should always be checked prior to final assembly, as machining variances in the blocks and different camshaft base circle diameters may result in unwanted contact.

For street and endurance applications, we offer hydraulic and mechanical roller camshafts equipped with a cast iron distributor drive gear and rear journal installed on the steel camshaft. These are noted by an IG suffix (Iron Gear), allowing the use of a standard type distributor gear for long term reliability.

There are a number of journal size options available for the roller camshafts, including: Standard (1.948"); Roller Bearing (1.968"/50mm) – RB suffix; Big Bearing (2.125") – BB suffix; 55mm (2.165") – 55J suffix; 60mm (2.362") – 60J suffix.



Other sizes are available on request. Camshafts having larger than stock journals incorporate a step ground on the front journal, so that a standard size camshaft sprocket can be used.

Standard firing order (1-8-4-3-6-5-7-2) and SFO (1-8-7-3-6-5-4-2) firing order hydraulic roller and mechanical roller camshafts are offered, along with other custom options for 180 degree crankshafts and other unique situations.

In some applications where large diameter camshafts are being used, this may result in the lifter sitting too high in the lifter bore for proper oiling to occur. We currently offer specific roller lifters to maintain proper oil flow. Check the Roller Lifter pages for part numbers and applications.

Drilling and tapping the rear cam journal for the Sander accessory drive is offered (RD suffix), as is gun drilling the camshaft for lightness and reduced torsional deflection (DR suffix).

1991-1995 Gen V 454 V8

This is one of the more misunderstood variations of the basic Mark IV engine configuration. During these years, Chevrolet was offering the Gen V 454 just about exclusively in truck applications, with some marine use occurring. The engine block was updated for provisions to install a camshaft thrust plate, and hydraulic roller lifter guidebars, although a hydraulic camshaft and flat faced lifters were installed. The front of the camshaft was slightly stepped down at the front, requiring a special cam sprocket, but the normal cam bolt pattern was retained. Some of these blocks had provisions for a mechanical fuel pump, while others did not. The rocker arms were no longer adjustable, as a stepped stud net-lash system was employed.

At this time, a number of different aftermarket engine suppliers began offering their own iterations of the Mark IV, which they sometimes called the "Mark V", but were not the same as the factory items. These were basically engines assembled from Mark IV type OEM or aftermarket components, and could be loosely thought of as independently continued Mark IV production. Caution needs to be used when ordering replacement components for these engines, as they could become confused with the factory Gen V items.

Most of our 13 prefix camshafts and components as used in the Mark IV engines can be applied to the Gen V. A Mark IV style timing set will be required. We offer special rocker arm studs, **99152-16**, that will thread into the Gen V cylinder heads, 3/8'' - 16 on the bottom, with a conventional 7/16'' - 20 threaded top, permitting the use of adjustable Mark IV type rocker arms, while using the Gen V pushrod quideplates.

The availability of aftermarket components and complete engines for the now legendary Big Block, in it's many versions, assures it's popularity for some time to come. Crane Cams will continue to produce new product offerings for this very prolific powerplant.

1996-2000 Gen VI 454 (7.4L) - 502 (8.2L) V8

The upgrades that Chevrolet hinted at in the Gen V engine, achieved production status in the Gen VI. This engine family is designated by Crane Cams' 16 prefix camshafts and components. A hydraulic roller camshaft was installed, incorporating a reduced diameter bolt pattern on the stepped journal front, accommodating the installed thrust plate, and hydraulic roller lifters were now standard equipment. A new timing set was required for the new configuration camshaft, and reduced depth under the standard front cover allowed room for only a single row roller timing chain. There is no provision for a mechanical fuel pump. The rocker arms were still the non-adjustable net-lash style, which could again be converted to an adjustable configuration by using our **99152-16** rocker arm studs and Mark IV type rocker arms. Cam bearing diameter was maintained at 1.948", as was the 1-8-4-3-6-5-7-2 firing order.

We offer steel billet hydraulic roller and mechanical roller camshafts that incorporate the Cast Iron distributor drive gear and rear camshaft journal (IG suffix) for these engines. Left Hand rotation camshafts for marine applications are also available.

Versions of these basic engines continue to be available through the GM Performance Parts catalog, equipped with various cylinder head combinations. Gen V blocks with Mark IV type heads being a popular assembly. Be sure of what components are needed when ordering.

2001-2008 8.1L (Vortec 8100) V8

What appears to be the final factory production Big Block, received additional upgrades in its latest version. This is a distributorless engine, incorporating a new hydraulic roller camshaft (having a 1-8-7-2-6-5-4-3 firing order), new timing set (incorporating a cam position sensor), relocated lifter oil galleries, and a different net lash rocker arm system (with the cylinder heads now tapped with 10mm threads). Our 26 prefix is used for these camshafts and components.

Crane Cams' steel billet hydraulic roller camshafts for these engines are equipped with cast iron distributor drive gears and rear journals (IG suffix) for oil pump drive gear compatibility. The 26 and 16 prefix (Gen VI) camshafts can be interchanged, with appropriate engine changes required for their different firing orders.

Due to the relocated lifter oil galleries, different lifters are required. We offer our steel billet bodied **26535-16** hydraulic roller lifters for use with the factory alignment bars to allow the use of higher than stock lift camshafts.

The rocker arms can be converted to an adjustable configuration by using our **99155-16** rocker arm studs. These have 10mm threads on the bottom, and 7/16" – 20 on the top, for use with the Mark IV style rocker arms.

					COMPLETE CAM SPECIFICATIONS					
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Lifter Camshaf	ts									
Brute low end torque, smooth idle, daily usage, towing, economy, 348 pickup special, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-200/2717-2-10	800- 4400	150061	99277-16	200 210	264 274	110	(5) 25 40 (10)	.000 .000	.475 .502
Good low and mid range torque, good idle, daily per- formance usage, mild bracket racing, 3000-3400 cruise RPM, 9.0 to 10.5 compression ratio advised.	H-218/300-2S-12	1800- 5400	150291	99277-16	218 230	288 300	112	2 36 52 (12)	.000	
Good mid range torque, fair idle, moderate perfor- mance usage, good mid-range HP, hydraulic substitute for 409 HP mechanical camshaft, 3200-3600 cruise RPM, 9.5 to 11.0 compression ratio advised.	H-224/3090-2-12	2200- 6000	150301	99277-16	224 234	294 304	112	5 39 54 0	.000 .000	.541 .569
Fair idle, moderate performance usage, good mid and upper RPM torque and HP, hydraulic substitute for 425 HP mechanical camshaft, 3600-4000 cruise RPM, 10.0 to 11.5 compression ratio advised.	H-230/3101-25-14	2800- 6400	150311	99277-16	230 234	292 296	114	6 44 56 (2)	.000	
Moderate performance usage, rough idle, good mid and upper RPM torque and HP, bracket racing, auto trans w/2500+ converter, 3800-4200 cruise RPM, good for increased displacement stroked engines, 10.5 to 12.0 compression ratio advised.	H-236/325-2-10	3000- 6000	150171	99277-16	236 246	296 306	110	13 43 58 0		.569 .588
Hydraulic Roller Camsha	fts — Retrofi	t								
Good idle, excellent low end torque and HP, daily per- formance usage, 2600-3400 cruise RPM, 9.0 to 10.5 compression ratio advised.	HR-218/332-25-10	1600- 5600	159511°	11532-16	218 226	280 288	110	4 34 48 (2)		.581 .604
Fair idle, moderate performance usage, good mid range torque and HP, auto trans w/2000+ converter, 3000-3800 cruise RPM, 9.5 to 11.0 compression ratio advised.	HR-224/319-25-10	2000- 6000	159521°	11532-16	224 230	280 286	110	7 37 50 0	.000	.558 .574
Fair idle, performance usage, good mid-range torque and HP, 3600-4400 cruise RPM, 10.0 to 11.5 compression ratio advised.	HR-230/352-2S-12	2600- 6600	159531°	11532-16	230 234	292 296	112	8 42 54 0		.616 .628

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.



CRANE VALV		MPONENTS							
 See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	96873-16 ^b	99957-16	99822-16 ^b	99098-1	15621-16 ^d 15634-16 ^e			13774-16 ^h 13744-16 ⁱ	15750-16 ⁱ 13750-16 ⁱ
	96873-16 ^b	99957-16	99822-16 ^b	99098-1	15621-16 ^d 15634-16°			13774-16 ^h 13744-16 ⁱ	15750-16 ⁱ
	96873-16 ^b	99957-16	99822-16 ^b	99098-1°	15621-16 ^d 15634-16 ^e			13774-16 ^h 13744-16 ⁱ	15750-16 13750-16
	96873-16 ^b	99957-16	99822-16 ^b	99098-1°	15621-16 ^d 15634-16 ^e			13774-16 ^h 13744-16 ⁱ	15750-16 13750-16
	96873-16 ^b	99957-16	99822-16 ^b	99098-1°	15621-16 ^d 15634-16 ^e			13774-16 ^h 13744-16 ⁱ	15750-16 13750-16
	96873-16 ^b	99969-16	99822-16 ^b	99098-1 ^c	15630-16 ^f 15640-16 ^g			13774-16 ^h 13744-16 ⁱ	15750-16 13750-16
	96873-16 ^b	99969-16	99822-16 ^b	99098-1°	15630-16 ^f 15640-16 ^g			13774-16 ^h 13744-16 ⁱ	15750-16 13750-16
	96873-16 ^b	99969-16	99822-16 ^b	99098-1 ^c	15630-16 ^f 15640-16 ^g			13774-16 ^h 13744-16 ⁱ	15750-16 13750-16

Requires cam button spacer and 11990-1 aluminum-bronze distributor drive gear

Must machine cylinder heads

Machined steel, heat treated

^{5/16&}quot; diameter, heavy wall, heat treated

^{3/8&}quot; diameter, heavy wall, heat treated

Pro Series one-piece, 5/16" diameter

Pro Series one-piece, 3/8" diameter

h Crane Classic extruded 1.7 ratio, 7/16" stud

Energizer 1.7 ratio, 7/16"stud

^{1.7} ratio, 3/8" stud

k 1.7 ratio, 7/16" stud

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Mechanical Lifter Camsh		NANGL	LITISSIONS COde	LIITERJ	IIIt/ LAII.	IIII/LXII.	эерагацоп	IIIL/ LXII	LAII.	LXII.
Excellent low and mid range torque, good idle, daily	F-228/3067-2-10	2500-	150811*	99250-16	228	268	110	9 39	.022	.537
usage, 2800-3400 cruise RPM, 8.5 to 9.75 compression ratio advised.		5800	•		238	278		54 4	.022	.560
Replacement for Factory Mark IV 409 HP 409 cu.in. camshaft.	BluePrinted	3000-	150421	99250-16	234	280	116.5	(.5) 54.5	.018	
Callistiate	3796077	6200	3		234	280		52.5 1.5	.022	.434
Replacement for Factory Mark VI 425 HP 409 cu.in. camshaft.	BluePrinted	3200-	150431	99250-16	237	274	113.5	5 52	.022	
Cantonate.	3830690	6500	3		241	281		54 7	.030	.515
Replacement for Factory Mark VII 430 HP Z-11 cam- shaft.	BluePrinted 3837735	3800- 7000	150441	99250-16	250 250	296 296	113.5	11.5 58.5 58.5 11.5	.030 .030	
SITALL.	383//33	7000	\$		230	290		38.3 11.3	.030	.555
Performance usage, good mid and upper RPM torque and HP, bracket racing, auto trans w/3000+ converter,	F-256/3412-2-10	3800- 7200	151341 [*]	99250-16	256 266	292 302	110	21 55 66 20	.026 .026	.617
11.5 minimum compression ratio advised.		7200	3		200	302		00 20	.020	.034
Mechanical Roller Camsh	nafts									
Good low and mid range torque, fair idle, moderate performance usage, 3200-3600 cruise RPM, auto trans	SR-236/350-2S-12	2600-	158511*a	15519-16	236	286 294	112	11 45 59 5		.613
w/2000+ converter, 10.5 to 11.5 compression ratio advised.		5800	3		244	294		59 5	.020	.634
Good mid range torque and HP, fair idle, performance	SR-244/362-2S-10	3000-	158171*a	15519-16	244	294	110	17 47		.634
usage, bracket racing, auto trans w/2500+ converter, 11.0 to 12.0 compression ratio advised.		6200	3		252	302		61 11.5	.020	.655
Good upper RPM torque and HP, performance usage, bracket racing, auto trans w/3500+ converter, good	SR-252/374-2S-12	3400-	158711*a	15519-16	252 260	302 310	112	19 53 67 13		.655 .655
for increased displacement stroked engines, 11.5 minimum compression ratio advised.		6800	3		200	310		67 13	.020	.000

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.



					-			_	
CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 317	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM Crane Classi Energizer	A ROCKERS — C/ GOLD RACE
	96873-16 ^b	99957-16	99822-16 ^b	99098-1 ^c	15621-16 ^d 15634-16 ^e			13774-16 ^f	15750-16 ⁹ 13750-16 ^h
	96873-16 ^b	99957-16	99822-16 ^b	99098-1	15621-16 ^d 15634-16 ^e			13774-16 ^f	15750-16 ^g 13750-16 ^h
	96873-16 ^b	99957-16	99822-16 ^b	99098-1	15621-16 ^d 15634-16 ^e			13774-16 ^f	15750-16 ⁹ 13750-16 ^h
	96873-16 ^b	99957-16	99822-16 ^b	99098-1	15621-16 ^d 15634-16 ^e			13774-16 ^f	15750-16 ⁹ 13750-16 ^h
	96873-16 ^b	99957-16	99822-16 ^b	99098-1	15621-16 ^d 15634-16 ^e			13774-16 ^f	15750-16 ⁹ 13750-16 ^h
	96870-16 ^b	99969-16	99822-16 ^b	99098-1'	15621-16 ^d 15634-16 ^e			13774-16 ^f	15750-16 ⁹ 13750-16 ^h
	96870-16 ^b	99969-16	99822-16 ^b	99098-1	15621-16 ^d 15634-16 ^e			13774-16 ^f	15750-16 ⁹ 13750-16 ^h
	96870-16 ^b	99969-16	99822-16 ^b	99098-1	15621-16 ^d 15634-16 ^e			13774-16 ^f	15750-16 ⁹ 13750-16 ^h

Requires cam button spacer and **11990-1** aluminum-bronze distributor drive gear Must machine cylinder heads
Machined steel, heat treated

d 5/16" diameter, heavy wall, heat treated

e 3/8" diameter, heavy wall, heat treated f Crane Classic extruded 1.7 ratio, 7/16" stud

g 1.7 ratio, 3/8" studh 1.7 ratio, 7/16" stud

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf	ts										
Brute low end torque, smooth idle, daily usage, fuel economy, 1200-2000 cruise RPM, 8.0 to 9.25 compression ratio advised.	H-248-2	600- 4200	133971	99277-16	192 204	248 260	110	(9) 21 37 (13)	.000 .000	.453 .484	
Improves torque and HP throughout entire power range. Proven for towing in Dualies, Crew Cabs, SS454s and Suburbans. (50 state legal, 94 and earlier, C.A.R.B. E.O. D-225-51).	2020	800- 4400	134112ª	99277-16	202 210	262 270	110	(4) 26 40 (10)	.000	.468 .485	
Brute low end torque, smooth idle, daily usage, off road, towing, 1600-2200 cruise RPM, 8.0 to 9.5 compression ratio advised.	Energizer 260 H10	1000- 4500	10303* 103032*b	99277-16	204 204	260 260	110	(3) 27 37 (13)	.000		
Excellent low end torque and HP, smooth idle, daily usage, off road, towing, economy, also mild turbo-charged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised. (50 state legal, 94 and earlier, C.A.R.B. E.O. D-225-51).	H-260-2	1000- 4800	133901 133902 ^a	99277-16	204 216	260 272	112	(5) 29 45 (9)	.000		
Good low end torque and HP, smooth idle, daily usage, fuel economy, light towing, off road, 2200-2700 cruise RPM, 8.5 to 10.0 compression ratio advised.	Energizer 266 H10	1200- 4800	10304° 103042° ^b	99277-16	210 210	266 266	110	0 30 40 (10)	.000	.499 .499	
Primarily for SS454, increased mid range to top-end HP and torque, especially 3500 RPM and up, slight decrease below 2500 RPM in stock engine. Excellent with aftermarket intake, performance heads, headers and free-flow exhaust. Good idle, daily usage, off road, towing, economy, good low and mid range torque and HP, 2400-2800 cruise RPM 8.5 to 10.0 compression ratio advised. (50 state legal, 94 and earlier, C.A.R.B. E.O. D-225-51).	2030	1200- 5000	133931 134122°	99277-16	210 218	266 274	114	(4) 34 48 (10)	.000		
Replacement for factory 350 HP 396 cu.in. camshaft.	BluePrinted 3883986	1200- 4600	969391	99277-16	214 218		115	(3) 37 49 (11)	.000		
Good mid range torque and HP, good idle, daily usage, off road, highway towing, fuel efficiency plus performance, 2600-3000 cruise RPM, 8.75 to 10.0 compression ratio advised.	Energizer 272 H10	1400- 5000	10305* 103052*b	99277-16	216 216	272 272	110	3 33 43 (7)	.000		
Excellent mid range torque and HP, good idle, daily usage and off road, towing, performance and fuel efficiency, good w/small plate nitrous system, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised. Good w/centrifugal or small Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised.	H-272-2	1600- 5400	133941* 133942*a •\$	99277-16 99377-16 ^c	216 228	272 284	112	1 35 51 (3)	.000 .000	.515 .510	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.
IMPORTANT NOTE: 1991-95 Gen V engines can use these

camshafts and components if lifter preload is checked, or if converted to use adjustable rocker arms by installing 99152-16 rocker arm studs (no machining required) and

appropriate rocker arms.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16"

wide and 7/64" deep.

NOTE: Camshafts with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap), are available on special order. Contact Crane's Performance Consultants for details. IMPORTANT NOTE: Some 1973 thru 1981 454 cu.in. engines were equipped with exhaust valve rotators. In these 99459-8 Spring Seat Spacers or 4 of 99948-2 valve spring retainers (on the exhaust valves only) to prevent excessive valve spring shimming when eliminating the rotators. Some later engines were equipped with rotators on both

the intake and exhaust valves. For these applications when using dual valve springs, use either 2 of our 99459-8 Spring Seat Spacers or our 99948-16 valve spring retainers to prevent excessive valve spring shimming when eliminating the rotators.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
13308-1 ^d 13309-1 ^e	99839-16 ^d 96801-16 ^e	99948-16 99957-16 ^f		99098-19	13634-16 ^h 13640-16 ⁱ	13975-1* ^j 13984-1* ^k 13977-1* ^l	13800-16 ^{m,n}	13774-16 ^{n,o} 13744-16 ^{n,p}	13750-16 ^{0,4} 13763TR-16 ⁶
13308-1 ⁴ 13309-1°	99839-16 ^d 96801-16 ^e	99948-16 99957-16 ^f		99098-1 ⁹	13634-16 ^h 13640-16 ⁱ	13975-1* ^j 13984-1* ^k 13977-1* ^j	13800-16 ^{m,n}	13774-16 ^{n,o} 13744-16 ^{n,p}	13750-16 ⁰⁻⁹ 13763TR-16 ⁰
13308-1 ^d 13309-1 ^e	99839-16 ^d 96801-16 ^e	99948-16 99957-16 ^f		99098-19	13634-16 ^h 13640-16 ⁱ	13975-1* ^j 13984-1* ^k 13977-1* ^l	13800-16 ^{m,n}	13774-16 ^{n,o} 13744-16 ^{n,p}	13750-16 ^{9,4} 13763TR-16
13308-1 ⁴ 13309-1°	99839-16 ^d 96801-16 ^e	99948-16 99957-16 ^f		99098-1 ⁹	13634-16 ^h 13640-16 ⁱ	13975-1* ^j 13984-1* ^k 13977-1* ^j	13800-16 ^{m,n}	13774-16 ^{n,o} 13744-16 ^{n,p}	13750-16°, 13763TR-16
13308-1 ^d 13309-1 ^e	99839-16 ^d 96801-16 ^e	99948-16 99957-16 ^f		99098-1 ⁹	13634-16 ^h 13640-16 ⁱ	13975-1* ^j 13984-1* ^k 13977-1* ^l	13800-16 ^{m,n}	13774-16 ^{n,o} 13744-16 ^{n,p}	13750-16°/ 13763TR-16
13308-1 ^d 13309-1 ^e	99839-16 ⁴ 96801-16 ^e	99948-16 99957-16 ^f		99098-19	13634-16 ^h 13640-16 ⁱ	13975-1 ⁵ 13984-1* 13977-1* ¹	13800-16 ^{m,n}	13774-16 ^{n,o} 13744-16 ^{n,p}	13750-16°/ 13763TR-16
13308-1 ⁴ 13309-1°	99839-16 ^d 96801-16 ^e	99948-16 99957-16 ^f		99098-19	13634-16 ^h 13640-16 ⁱ	13975-1* ^j 13984-1* ^k 13977-1* ^j	13800-16 ^{m,n}	13774-16 ^{n,o} 13744-16 ^{n,p}	13750-16°^ 13763TR-16
13308-1 ^d 13309-1°	99839-16 ^d 96801-16 ^e	99948-16 99957-16 ^f		99098-19	13634-16 ^h 13640-16 ⁱ	13975-1* ^j 13984-1* ^k 13977-1* ^l	13800-16 ^{m,n}	13774-16 ^{n,o} 13744-16 ^{n,p}	13750-16°.′ 13763TR-16′
13308-1 ⁴ 13309-1°	99839-16 ^d 96801-16 ^e	99948-16 99957-16 ^f		99098-19	13634-16 ^h 13640-16 ⁱ	13975-1* ^j 13984-1* ^k 13977-1* ^l	13800-16 ^{m,n}	13774-16 ^{n,o} 13744-16 ^{n,p}	13750-16% 13763TR-16



- a Cam and Lifter Kit, includes installation lubricants and Cam Sprocket Bolt Locking Plate.
- b Cam and Lifter Kit, includes assembly lubricant.
- c Optional Hi Intensity hydraulic lifters, see page 292 for details.
- d Contains standard diameter valve springs, no machining required. NOTE: 1980 and later truck 366, 402, 427 and 454 engines have a short valve spring assembly height and should use 99837-16 standard diameter valve springs and 99957-16 retainers, contained in 13309-1 spring and retainer kit.
- For 1980-95 truck 366, 402, 427 and 454 engines with short valve spring assembly height, contains standard diameter valve springs.
- **f** For 1980-95 truck 366, 402, 427 and 454 engines with short valve spring assembly height.
- g Machined steel, heat treated.
- h Heavy wall, heat treated, 3/8" diameter.

- i Pro Series one-piece, 3/8" diameter.
- Performance steel billet gears and roller chain set.Pro Series steel billet gears and roller chain set.
- I Pro Series steel billet gears and roller chain set with thrust bearing.
- m 1.7 ratio, 3/8" stud, long slot for 1.560" maximum 0.D. valve springs.
- n 1991-95 engines require the installation of 99152-167/16" rocker arm studs (no machining required) and factory pushrod guideplates.
- Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- **p** Energizer, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- q 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- r 1.7 ratio, 7/16" stud, Wide Body. Valve Train Stabilizer available, see page 363.

						СОМ	PLETE C	AM SPE	CIFICA	TION	IS		
	Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe	Open/Clo @ .050 Cam Lif Int/Ext	" Ho t In	ot t.	Gross Lift Int. Exh.	
	Hydraulic Lifter Camshaf		KANGE	ETHISSIONS COde	LIFIERS	IIIL/EXII.	IIII/EXII.	Separation	IIIL/EXI	I EX	п.	EXII.	
	Good mid range torque and HP, fair idle, performance usage, serious off road, mild bracket racing w/heavy car, 9.5 to 10.75 compression ratio advised.	H-222/3114-251-8	1800- 5600	130201°	99277-16 99377-16 ^d	222 234	278 290	108	8 34 50 4		00 . 00 .	.529 .525	
	Good mid range torque and HP, good idle, daily per- formance usage, mild bracket racing, 3000-3400 cruise RPM, marine applications, primarily used in up to 350 HP near-stock engines for mild performance applications w/standard marine exhaust systems, 9.5 to 10.75 compression ratio advised.	H-278-2	2000- 5800	133801* 133802*a	99277-16 99377-16 ^d	222 234	278 290	114	2 40 56 (2)0. ()0. (00 . 00 .		
7117	Fair idle, moderate performance usage, good mid range to upper RPM torque and HP, mild bracket rac- ing, Street, Heavy, Pro ET, Street ET, etc., auto trans w/2500+ converter, 3000-3400 cruise RPM, oval track; Street Stock, Enduro, Hobby, etc., 1/4-3/8 mile, serious off road, 9.5 to 11.0 compression ratio advised.	Energizer 282 H08	2200- 5600	10307° 103072°b 133072°c	99277-16 99377-16 ^d	226 226	282 282	108	7 39 43		00 . 00 .		
	Good mid range torque & HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, good w/plate or manifold nitrous system, marine applications; primarily used in 350+ HP mildly modified engines with free-flowing above water exhaust systems for performance applications, responds well to improved cylinder heads. 3200-3600 cruise RPM, 9.5 to 11.5 compression ratio advised. Good w/centrifugal or Roots supercharger, 10 lbs. max. boost w/8.5 max. compression ratio advised.	H-286-2	2400- 6200	134241* 134242*a	99277-16 99377-16 ^d	226 236	286 296	112	6 40 55		00 . 00 .		
,	Good mid range to upper RPM torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 9.5 to 11.0 compression ratio advised.	Energizer 284 H12	2800- 6200	10306* 103062*b	99277-16 99377-16 ^d	228 228	284 284	112	7 4 ² 51 (3			.544 .544	
	Fair idle, standard camshaft for Mercruiser 400, 405, 420, 425 HP & 525SC-454 cu.in. engines, applicable to 350, 365, 370 HP mildly modified engines with free-flowing above water exhaust systems for performance applications, 9.5 to 11.5 compression ratio advised.	H-228/312-25-14 T1.2	2800- 6600	132561*	99277-16 99377-16 ^d	228 236	298 306	114	5 53 57 (1		00 . 00 .		
	Good mid range to upper RPM torque and HP, rough idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3600-4000 cruise RPM, 9.75 to 11.0 compression ratio advised.	H-230/318-2-10	3000- 6600	130211*	99277-16 99377-16 ^d	230 240	290 300	110	10 40 55 5		00 . 00 .		
,	Performance usage, good mid and upper RPM torque and HP, bracket racing; Heavy, Pro ET, Super ET, etc., auto trans w/3000+ converter, oval track; Street Stock, Enduro, Hobby, etc., 3/8-1/2 mile, 10.0 to 11.5 compression ratio advised.	Saturday Night Special H-236/325-2-10	3000- 6600	134551° 134552°°	99277-16 99377-16 ^d	236 246	296 306	110	13 43 58 8		00 . 00 .		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: 1991-95 Gen V engines can use these camshafts and components if lifter preload is checked, or if converted to use adjustable rocker arms by installing 99152-16 rocker arm studs (no machining required) and appropriate rocker arms.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

NOTE: Camshafts with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap), are available on special order. Contact Crane's Performance Consultants for details.

IMPORTANT NOTE: Some 1973 thru 1981 454 cu.in. engines were equipped with exhaust valve rotators. In these instances when using dual valve springs, use either our 99459-8 Spring Seat Spacers or 4 of 99948-2 valve spring retainers (on the exhaust valves only) to prevent excessive valve spring shimming when eliminating the rotators. Some later engines were equipped with rotators on both the intake and exhaust valves. For these applications when using dual valve springs, use either 2 of our 99459-8 Spring Seat Spacers or our 99948-16 valve spring retainers to prevent excessive valve spring shimming when eliminating the rotators.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classio Energizer	A ROCKERS — C/ Gold Race
13308-1 ^e 13309-1 ^f	99839-16° 96801-16 ^f	99948-16 99957-16 ^h		99098-1 ^k	13634-16 ¹ 13640-16 ^m	13975-1* ⁿ 13984-1* ^o 13977-1* ^p	13800-16 ^{q,r}	13774-16 ^{r,u} 13744-16 ^{r,v}	13750-16 ^{r,w} 13763TR-16 ^{r,x}
13308-1° 13309-1 ^f	99839-16 ^e 96801-16 ^f	99948-16 99957-16 ^h		99098-1 ^k	13634-16 ¹ 13640-16 ^m	13975-1 ^{*n} 13984-1 ^{*o} 13977-1 ^{*p}	13800-16 ^{q,r}	13774-16 ^{r,u} 13744-16 ^{r,v}	13750-16 ^{r.w} 13763TR-16 ^{r.x}
13308-1° 13309-1 ^f	99839-16° 96801-16 ^f	99948-16 99957-16 ^h		99098-1 ^k	13634-16 ¹ 13640-16 ^m	13975-1* ⁿ 13984-1* ^o 13977-1* ^p	13800-16 ^{q,r}	13774-16 ^{r,u} 13744-16 ^{r,v}	13750-16 ^{r,w} 13763TR-16 ^{r,x}
13308-1° 13309-1 ^f	99839-16° 96801-16 ^f	99948-16 99957-16 ^h		99098-1 ^k	13634-16 ¹ 13640-16 ^m	13975-1** 13984-1*° 13977-1**	13800-16 ^{4,r}	13774-16 ^{r,u} 13744-16 ^{r,v}	13750-16 ^{r,w} 13763TR-16 ^{r,w}
13308-1° 13309-1 ^f	99839-16° 96801-16 ^f	99948-16 99957-16 ^h		99098-1 ^k	13634-16 ¹ 13640-16 ^m	13975-1*n 13984-1*° 13977-1*p	13800-16 ^{q,r}	13774-16 ^{r,u} 13744-16 ^{r,v}	13750-16 ^{r.w} 13763TR-16 ^{r.x}
	99893-16 96896-16 ⁹	99954-16 99955-16 ⁱ	99822-16 ^j	99098-1 ^k	13634-16¹ 13640-16™	13975-1* ⁿ 13984-1* ^o 13977-1* ^p	13801-16 ^{r,s} 13801C-16 ^{r,t}	13774-16 ^{r,u} 13744-16 ^{r,v}	13750-16 ^{r,w} 13763TR-16 ^{r,}
	99893-16 96896-16 ⁹	99954-16 99955-16 ⁱ	99822-16 ^j	99098-1 ^k	13634-16 ¹ 13640-16 ^m	13975-1*n 13984-1*° 13977-1*p	13801-16 ^{r,s} 13801C-16 ^{r,t}	13774-16 ^{r,u} 13744-16 ^{r,v}	13750-16 ^{r,w} 13763TR-16 ^{r,}
	99893-16 96896-16 ⁹	99954-16 99955-16 ⁱ	99822-16 ^j	99098-1 ^k	13634-16 ¹ 13640-16 ^m	13975-1*n 13984-1*° 13977-1*p	13801-16 ^{r,s} 13801C-16 ^{r,t}	13774-16 ^{r,u} 13744-16 ^{r,v}	13750-16 ^{r,w} 13763TR-16 ^{r,w}



- Cam and Lifter Kit, includes installation lubricants and Cam Sprocket Bolt Locking Plate.
- Cam and Lifter Kit, includes assembly lubricant.
- Cam, lifter and valve spring kit, includes installation lubricants.
- Optional HI Intensity hydraulic lifters, see page 292 for details.
- Contains standard diameter valve springs, no machining required. NOTE: 1980 and later truck 366, 402, 427 and 454 engines have a short valve spring assembly height and should use **99837-16** standard diameter valve springs and 99957-16 retainers, contained in 13309-1 spring and
- For 1980-95 truck 366, 402, 427 and 454 engines with short valve spring assembly height, contains s standard diameter valve springs.
- Optional harmonic frequency optimized valve springs for street, marine, and endurance applications. Requires 99955-16 retainers.
- For 1980-95 truck 366, 402, 427 and 454 engines with short valve spring assembly height.
- For 99896-16 valve springs.
- Must machine cylinder heads.
- Machined steel, heat treated.

- Heavy wall, heat treated.
- Pro Series one-piece, 3/8" diameter.
- Performance steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set with thrust bearing.
- 1.7 ratio, 7/16" stud, long slot for 1.560" maximum 0.D. valve springs.
- 1991-95 engines require the installation of **99152-16** 7/16" rocker arm studs (no machining required) and factory pushrod guideplates.

 1.7 ratio, extra long slot for 1.560" maximum 0.D. valve springs.
- 1.7 ratio, Nitro Carb, extra long slot for 1.560" maximum 0.D. valve springs.
- Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- Energizer, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363
- 1.7 ratio, 7/16" stud, Wide Body. Valve Train Stabilizer available, see page 363.

					СОМ	PLETE C	AM SPE	CIFICAT	ONS		
Application	Camshaft Series/ Grind Number	rpm Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf	ts										
Fair idle, performance usage, good mid range HP, mild bracket racing, auto trans w/3000+ converter, marine performance for 500+ cu.in. modified engines w/center riser type exhaust system & 4" outlets, requires large oval or rectangular port cylinder heads for performance applications, 3800-4200 cruise RPM, good w/manifold nitrous system, 10.0 to 11.5 compression ratio advised. Good w/ Roots supercharger, 15 lbs. max. boost w/8.0 max. compression ratio advised.	H-296-2	3000- 6800	134561*	99277-16 99377-16 ^b	236 246	296 306	114	9 47 62 4	.000 .000		
Rough idle, performance usage, good mid range HP, bracket racing, auto trans w/3000+ converter, 3800-4200 cruise RPM, 10.0 to 11.5 compression ratio advised. Good w/Roots supercharger, 15 lbs. max. boost w/8.0 max. compression ratio advised.	Energizer 294-304 H14	3200- 6800	10313*	99277-16 99377-16 ^b	238 248	294 304	114	10 48 63 5	.000 .000		
Rough idle, performance usage, good mid to upper RPM torque and HP, bracket racing, auto trans w/3200+ converter, marine performance, 3800-4200 cruise RPM, 10.5 to 11.75 compression ratio advised.	H-240/329-25-12	3000- 6800	130221*	99277-16 99377-16 ^b	240 246	300 306	112	13 47 60 6	.000 .000		
Rough idle, performance usage, good upper RPM torque and HP, Pro Street 500+ cu.in., bracket racing, auto trans w/3500+ converter, marine performance, 4000-4400 cruise RPM, good w/manifold nitrous system, 11.0 to 12.5 compression ratio advised. Good w/ Roots supercharger, 16 lbs. maximum boost w/8.0 maximum compression ratio advised.	H-242/322-2-14	3200- 7000	130231*	99277-16 99377-16 ^b	242 252	322 332	114	12 50 65 7	.000		
Performance usage, good upper RPM torque and HP, bracket racing; Heavy, Pro ET, Super ET, etc., auto trans w/3500+ converter, also oval track; Street Stock, Enduro, Hobby, etc., 3/8-1/2 mile, 10.5 to 12.0 compression ratio advised.	Saturday Night Special 328 H08	3400- 6800	133101* 133102*a	99277-16 99377-16 ^b	246 246	328 328	108	17 49 53 13	.000 .000		
Rough idle, performance usage, good upper RPM HP, bracket racing, auto trans w/3500+ converter, marine performance, 4000-4400 cruise RPM, good w/ manifold nitrous system, 10.5 to 12.0 compression ratio advised. Good w/Roots supercharger, 18 lbs. max. boost w/8.0 max. compression ratio advised.	Н-306-2	3400- 7000	134571*	99277-16 99377-16 ^b	246 254	306 314	112	16 50 64 10	.000 .000		
Performance usage, good mid & upper RPM HP, for large displacement engines (500 cu.in.+), bracket racing, auto trans w/race converter, good w/large manifold nitrous system, radical marine performance, 10.75 to 12.5 compression ratio advised. Good w/large Roots supercharger, 20 lbs. maximum boost w/8.0 maximum compression ratio advised.	H-248/3500-25-14	3600- 7000	130241*	99277-16 99377-16 ^b	248 256	304 312	114	15 53 67 9	.000		
Performance usage, good mid & upper RPM HP, for large displacement engines (500 cu.in.+), bracket racing, auto trans w/race converter, also w/large manifold nitrous system, marine performance, 10.5 to 12.0 compression ratio advised. Good w/large Roots supercharger, 22 lbs. maximum boost w/8.0 maximum compression ratio advised.	H-254/344-2S-14	3800- 7200	130721*	99277-16 99377-16 ^b	254 262	314 322	114	18 56 70 12	.000 .000		
Performance usage, good upper RPM HP, for large displacement engines (500 cu.in.+), bracket racing, auto trans w/race converter, also nitrous and radical marine performance, 11.5 min. compression ratio advised.	H-262/353-25-14	4000- 7200	130731°	99277-16 99377-16 ^b	262 270	322 330	114	22 60 74 16	.000 .000		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: 1991-95 Gen V engines can use these

camshafts and components if lifter preload is checked, or if converted to use adjustable rocker arms by installing 99152-16 rocker arm studs (no machining required) and appropriate rocker arms.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: In order to use these cams in 65-66 engines, you must

groove the center of the rear cam bearing journal, 3/16"

wide and 7/64" deep.

NOTE: Camshafts with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap), are available on special order. Contact Crane's Performance Consultants for details.

IMPORTANT NOTE: Some 1973 thru 1981 454 cu.in. engines were equipped with exhaust valve rotators. In these instances when using dual valve springs, use either our 99459-8 Spring Seat Spacers or 4 of **99948-2** valve spring retainers (on the exhaust valves only) to prevent excessive valve

spring shimming when eliminating the rotators. Some later engines were equipped with rotators on both the intake and exhaust valves. For these applications when using dual valve springs, use either 2 of our **99459-8** Spring Seat Spacers or our 99948-16 valve spring retainers to prevent excessive valve spring shimming when eliminating the rotators.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC ENERGIZER	
	99893-16 96896-16 ^c	99954-16 99955-16 ^d	99822-16°	99098-1 ^f	13634-16 ^g 13640-16 ^h	13975-1* ⁱ 13984-1* ^j 13977-1* ^k	13801-16 ^{I,m} 13801C-16 ^{m,n}	13774-16 ^{m,} ° 13744-16 ^{m,} °	13750-16 ^{m,q} 13763TR-16 ^{m,q}
	99893-16 96896-16°	99954-16 99955-16 ^d	99822-16°	99098-1 ^f	13634-16 ⁹ 13640-16 ^h	13975-1* ⁱ 13984-1* ^j 13977-1* ^k	13801-16 ^{l,m} 13801C-16 ^{m,n}	13774-16 ^{m,o} 13744-16 ^{m,p}	13750-16 ^{m,q} 13763TR-16 ^{m,r}
	99893-16 96896-16 ^c	99954-16 99955-16 ^d	99822-16°	99098-1 ^f	13634-16 ⁹ 13640-16 ^h	13975-1*i 13984-1* ^j 13977-1*k	13801-16 ^{l,m} 13801C-16 ^{m,n}	13774-16 ^{m,o} 13744-16 ^{m,p}	13750-16 ^{m,q} 13763TR-16 ^{m,t}
	99893-16 96896-16 ^c	99954-16 99955-16 ^d	99822-16°	99098-1 ^f	13634-16 ^g 13640-16 ^h	13975-1*i 13984-1* ^j 13977-1* ^k	13801-16 ^{l,m} 13801C-16 ^{m,n}	13774-16 ^{m,o} 13744-16 ^{m,p}	13750-16 ^{m,q} 13763TR-16 ^{m,t}
	99893-16 96896-16 ^c	99954-16 99955-16 ^d	99822-16°	99098-1 ^f	13634-16 ⁹ 13640-16 ^h	13975-1"i 13984-1"i 13977-1" ^k	13801-16 ^{l,m} 13801C-16 ^{m,n}	13774-16 ^{m,o} 13744-16 ^{m,p}	13750-16 ^{m,q} 13763TR-16 ^{m,}
	99893-16 96896-16 ^c	99954-16 99955-16 ^d	99822-16°	99098-1 ^f	13634-16 ^g 13640-16 ^h	13975-1* ⁱ 13984-1* ^j 13977-1* ^k	13801-16 ^{l,m} 13801C-16 ^{m,n}	13774-16 ^{m,o} 13744-16 ^{m,p}	13750-16 ^{m,q} 13763TR-16 ^{m,}
	99893-16 96896-16	99954-16 99955-16 ^d	99822-16°	99098-1 ^f	13634-16 ⁹ 13640-16 ^h	13975-1*i 13984-1* ^j 13977-1* ^k	13801-16 ^{l,m} 13801C-16 ^{m,n}	13774-16 ^{m,o} 13744-16 ^{m,p}	13750-16 ^{m,q} 13763TR-16 ^{m,q}
	99893-16 96896-16 ^c	99954-16 99955-16 ^d	99822-16 ^e	99098-1 ^f	13634-16 ⁹ 13640-16 ^h	13975-1* ⁱ 13984-1* ^j 13977-1* ^k	13801-16 ^{l,m} 13801C-16 ^{m,n}	13774-16 ^{m,o}	
	99893-16 96896-16 ^c	99954-16 99955-16 ^d	99822-16°	99098-1 ^f	13634-16 ⁹ 13640-16 ^h	13975-1*i 13984-1*i 13977-1*k	13801-16 ^{l,m} 13801C-16 ^{m,n}	13774-16 ^{m,o}	13750-16 ^{m,q} 13763TR-16 ^{m,}

- Cam, lifter and valve spring kit, includes installation lubricants.
- Optional HI Intensity hydraulic lifters, see page 292 for details.
- Optional harmonic frequency optimized valve springs for street, marine, and endurance applications. Requires **99955-16** retainers. For **99896-16** valve springs.
- Must machine cylinder heads.
- Machined steel, heat treated.
- Heavy wall, heat treated.
- Pro Series one-piece, 3/8" diameter.
- Performance steel billet gears and roller chain set.

- Pro Series steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set with thrust bearing.

 1.7 ratio, extra long slot for 1.560" maximum 0.D. valve springs.

 1991-95 engines require the installation of **99152-16** 7/16" rocker arm studs (no machining
- required) and factory pushrod guideplates.
 1.7 ratio, Nitro Carb, extra long slot for 1.560" maximum 0.D. valve springs.
 Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- Energizer, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- 1.7 ratio, 7/16" stud, Wide Body. Valve Train Stabilizer available, see page 363.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 294	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
Hydraulic Roller Camsha		000	420404*>	42,022,44	204	260	112	(5) 20	222	106	
Brute low end torque, smooth idle, daily usage, fuel economy, 1200-2000 cruise RPM, 8.0 to 9.25 compression ratio advised.	HR-204/286-2-12 IG	800- 4600	139601*ª	13532-16 ^b	204 214	260 270	112	(5) 29 44 (10)	.000		
Excellent low end torque & HP, good idle, daily usage, off road, towing, performance & fuel efficiency, 2600-3000 cruise RPM, marine applications: primarily used in 454 cu.in. near-stock engines for mild performance applications w/ free-flowing above water exhaust systems. 8.75 to 10.5 compression ratio advised.	ZHR-276-2S-10 IG	1200- 5000	139001*a	13532-16 ^b	214 222	276 284	110	2 32 46 (4)	.000 .000	.553 .576	
Good low end torque & HP, good idle, daily usage, w/plate nitrous system, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised. Good w/centrifugal or Roots supercharger, 8 lbs. max. boost w/8.5 max. compression ratio advised.	HR-214/325-25-12 IG	1200- 5200	139351**	13532-16 ^b	214 222	276 284	112	0 34 48 (6)		.553 .576	
Good low end torque and HP, good idle, daily usage, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised. Crate motor upgrade. Good w/small centrifugal or Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised.	HR-218/3001-25-14 IG	1400- 5200	139611*ª	13532-16 ^b	218 224	278 284	114	(1) 39 50 (6)	.000 .000		
Good low end and mid range torque and HP, fair idle, daily usage, off road, 2600-3000 cruise RPM, 9.0 to 10.5 compression ratio advised.	HR-222/339-25-10 IG	1600- 5400	139761*a	13532-16 ^b	222 230	284 292	110	6 36 50 0	.000 .000		
Excellent mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, good w/plate or manifold nitrous system, marine applications: for 454-502 cu.in. modified engines in performance applications with aftermarket high flow above water exhaust systems. 3000-3400 cruise RPM, 9.5 to 11.0 compression ratio advised. Good w/centrifugal or Roots supercharger, 10 lbs. maximum boost w/8.5 compression ratio advised.	ZHR-288-25-12 IG	1800- 5600	139011°a	13532-16 ^b	226 234	288 296	112	6 40 54 0		.587 .610	
Good mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, marine applications: for 502+ cu.in. modified engines in performance applications with aftermarket high flow above water exhaust systems. 3200-3600 cruise RPM, 9.75 to 11.25 compression ratio advised.	HR-230/352-251-14 IG	2000- 5800	139771**	13532-16 ^b	230 236	292 298	114	6 44 57 (1)	.000 .000	.598 .610	
Good mid range torque & HP, fair idle, performance usage, mild bracket racing, good w/manifold nitrous system, auto trans w/3000+ converter, marine applications: for 454-502+ cu.in. modified engines in performance applications w/ aftermarket dry pipe exhaust systems. 3400-3800 cruise RPM, 10.0 to 11.5 compression ratio advised. Good w/Roots supercharger, 15 lbs. max. boost w/8.0 max. compression ratio advised.	ZHR-296-2S-12 IG	2200- 6000	139021*a	13532-16 ⁶	234 242	296 304	112	10 44 58 4	.000	.610 .632	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.
IMPORTANT: Adjustable Vacuum Advance Kits available. See page

333 for details.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

NOTE: The 1991-95 Gen V engines can use these camshafts and components if they are converted to adjustable rocker arms by installing 99152-16 rocker arm studs (no machining required) and appropriate rocker arms. Custom length pushrods can also be made to achieve correct lifter preload if

standard non-adjustable rocker arms are retained. See page 305 for special pushrod ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Camshafts with SFO firing order (1-8-7-3-6-5-4-2, or

4/7 swap), are available on special order. Contact Crane's Performance Consultants for details.

IMPORTANT NOTE: Some 1973 thru 1981 454 cu.in. engines were equipped with exhaust valve rotators. In these instances when using dual valve springs, use either our 99459-8 Spring Seat Spacers or 4 of **99948-2** valve spring retainers (on the exhaust valves only) to prevent excessive valve spring shimming when eliminating the rotators. Some later

engines were equipped with rotators on both the intake and exhaust valves. For these applications when using dual valve springs, use either 2 of our **99459-8** Spring Seat Spacers or our 99948-16 valve spring retainers to prevent excessive valve spring shimming when eliminating the rotators.

NOTE: Left Hand rotation camshafts are available on special order.

Contact Crane's Performance Consultants for details. Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



					_			_	
CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL Rocker Arms	— ALUMINUM Crane Classio Energizer	A ROCKERS — C/ Gold Race
	99896-16 99832-16 ⁹	99955-16 99976-16'	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1* ^h 13984-1* ⁱ 13977-1* ^j	13801-16 ^{k,l}	13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^{l,p}
	99896-16 99832-16 ^q	99955-16 99976-16'	99822-16 ^c	99098-1 ^d	13628-16° 13642-16°,f 13629-16° 13643-16 ^{f,g}	13975-1 ^{*h} 13984-1 ^{*i} 13977-1 ^{*j}	13801-16 ^{k,l}	13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^{l,p}
	99896-16 99832-16 ^q	99955-16 99976-16'	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^{"h} 13984-1 ^{*i} 13977-1 ^{*j}		13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^{l,p}
	99896-16 99832-16 ^q	99955-16 99976-16'	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^{*h} 13984-1 ^{*i} 13977-1 ^{*j}		13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^{l,p}
	99896-16 99832-16 ^q	99955-16 99976-16'	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1*h 13984-1*i 13977-1*j		13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^{l,p}
	99896-16 99832-16 ^q	99955-16 99976-16'	99822-16 ^c	99098-14	13628-16° 13642-16°.f 13629-16 ^g 13643-16 ^f	13975-1* ^h 13984-1* ⁱ 13977-1* ^j		13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{Lo} 13763TR-16 ^{Lp}
	99896-16 99832-16 ^q	99955-16 99976-16 ^r	99822-16 ^c	99098-1 ^d	13628-16° 13642-16°,f 13629-16° 13643-16 ^{f,g}	13975-1*h 13984-1*i 13977-1*j		13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^{l,p}
	99896-16 99832-16 ^q	99955-16 99976-16'	99822-16 ^c	99098-1 ^d	13628-16° 13642-16°,f 13629-16 ^g 13643-16 ^{f,g}	13975-1*h 13984-1*i 13977-1*j		13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^{l,p}



- Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear.

 Vertical locking bar hydraulic roller lifters, no machining required.

- Must machine cylinder heads.
 Machined steel, heat treated.
 Heavy wall, heat treated, for standard deck height blocks.
- Pro Series, one piece.
- Heavy wall, heat treated, for +.400" deck height "Tall Blocks".

 Performance steel billet gears and roller chain set.

 Per Sories steel billet

- Pro Series steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set with thrust bearing.

- k 1.7 ratio, extra long slot for 1.560" maximum 0.D. valve springs.
- 1.7 ratio, extra long slot for 1.500° maximum 0.D. Valve springs.
 1991-95 engines require the installation of **99152-16** 7/16″ rocker arm studs (no machining required) and factory pushrod guideplates.
 Crane Classic extruded, 1.7 ratio, 7/16″ stud. Valve Train Stabilizer available, see page 363.
 Energizer, 1.7 ratio, 7/16″ stud. Valve Train Stabilizer available, see page 363.
 1.7 ratio, 7/16″ stud, Wide Body, Valve Train Stabilizer available, see page 363.
 Out to use hopeling scripting requires 1997/6.18 extrainers.

- Ovate wire beehive spring, requires **99976-16** retainers. Steel, for **99832-16** beehive springs.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
	Camshaft Series/	RPM POWER		See pg. 294	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Lift Int.
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.
lydraulic Roller Camsha										
Good mid range torque and HP, fair idle, performance usage, bracket racing, good with manifold nitrous system, auto trans w/3000+ converter, 3400-3800 cruise RPM, best in 502+ cu.in. engines. 10.0 to 11.5 compression ratio advised. Good w/supercharger, 16 lbs. max. boost w/8.0 max. compression ratio advised.	HR-236/359-2S-14 IG	2200- 6000	139671* ^a	13532-16 ^b	236 244	298 306	114	9 47 61 3		.610 .632
Excellent mid range to upper RPM torque & HP, rough idle, performance usage, bracket racing, auto trans w/3000+ converter, 3600-4000 cruise RPM, marine usage: for 500+ modified engines w/dry aftermarket exhaust. 10.5 to 12.0 compression ratio advised.	HR-240/365-2S-12 IG	2600- 6200	139681*a	13532-16 ^b	240 248	302 310	112	13 47 61 7		.621 .632
Good mid range to upper RPM torque, rough idle, performance usage, bracket racing, auto trans w/3500+converter, marine performance for 480+ cu.in. modified engines in performance applications with aftermarket dry pipe exhaust systems, or tube headers, 3600-4000 cruise RPM, for 500+ cu.in. engines. 10.5 to 12.0 compression ratio advised.	HR-244/372-25-10 IG	2800- 6200	139781**	13532-16 ^b	244 256	306 318	110	17 47 63 13		.632 .632
Good mid range to upper RPM torque & HP, rough idle, performance usage, bracket racing, auto trans w/3500+ converter, marine performance for 500+ cu.in. modified engines in performance applications w/aftermarket dry pipe exhaust systems, or tube headers, good w/manifold nitrous system, 3800-4200 cruise RPM, for 500+ cu.in. engines. 10.5 to 12.5 compression ratio advised. Good w/Roots supercharger, 18 lbs. max. boost w/8.0 max. compression ratio advised.	HR-306-25-14 IG	3000- 6400	139651**	13532-16 ^b	244 256	306 318	114	13 51 67 9		.632 .632
Good mid range to upper RPM torque and HP, rough idle, performance usage, Pro Street, bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, for 500+ cu.in. engines. 11.0 to 12.5 compression ratio advised. Good w/Roots supercharger, 18 lbs. max. boost w/8.0 max. compression ratio advised.	HR-246/400-2S-14 IG	3200- 6400	139791*a	13532-16 ^b	246 254	316 324	114	13.5 52.5 65.5 8.5		.680 .680
Good mid range to upper RPM torque, rough idle, performance usage, bracket racing, auto trans w/3500+converter, 3600-4000 cruise RPM, for 500+cu.in. engines. 11.0 to 12.5 compression ratio advised.	HR-248/372-2S-10 IG	3000- 6400	139801*a	13532-16 ^b	248 256	310 318	110	19 49 63 13		.632 .632
Excellent upper RPM torque and HP, performance usage, bracket racing, good w/manifold nitrous system, auto trans w/3500+ converter, best in 540+ cu. in. engines. 11.0 to 12.5 compression ratio advised. Good w/supercharger, 20 lbs. maximum boost, w/8.0 maximum compression ratio advised.	HR-248/372-2S-14 IG	3200- 6400	139691*a	13532-16 ^b	248 256	310 318	114	15 53 67 9		.632 .632
Performance usage, bracket racing, good w/manifold nitrous system, auto trans w/race converter, best in 540+ cu.in. engines. 11.5 to 13.0 compression ratio advised. Good w/supercharger, 20 lbs. maximum boost, w/8.0 maximum compression ratio advised.	HR-250/400-251-14 IG	3200- 6400	139811" ^a	13532-16 ^b	250 258	320 328	114	15.5 54.5 68 10		.680 .680

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.
IMPORTANT: Adjustable Vacuum Advance Kits available. See page

333 for details.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

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NOTE: The 1991-95 Gen V engines can use these camshafts and components if they are converted to adjustable rocker arms by installing 99152-16 rocker arm studs (no machining required) and appropriate rocker arms. Custom length pushrods can also be made to achieve correct lifter preload if

standard non-adjustable rocker arms are retained. See page 305 for special pushrod ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Camshafts with SFO firing order (1-8-7-3-6-5-4-2, or

4/7 swap), are available on special order. Contact Crane's Performance Consultants for details.

IMPORTANT NOTE: Some 1973 thru 1981 454 cu.in. engines were equipped with exhaust valve rotators. In these instances when using dual valve springs, use either our 99459-8 Spring Seat Spacers or 4 of **99948-2** valve spring retainers (on the exhaust valves only) to prevent excessive valve spring shimming when eliminating the rotators. Some later

engines were equipped with rotators on both the intake and exhaust valves. For these applications when using dual valve springs, use either 2 of our **99459-8** Spring Seat Spacers or our 99948-16 valve spring retainers to prevent excessive valve spring shimming when eliminating the rotators.

NOTE: Left Hand rotation camshafts are available on special order.

Contact Crane's Performance Consultants for details. Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classi Energizer	M ROCKERS — C/ Gold Race
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16'	99098-1 ^d	13628-16° 13642-16°,f 13629-16° 13643-16 ^{f,g}	13975-1 ^{*h} 13984-1* ⁱ 13977-1* ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1*h 13984-1*i 13977-1*j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16° 13642-16°,f 13629-16 ⁹ 13643-16 ^{6,g}	13975-1 ^{*h} 13984-1* ⁱ 13977-1 ^{*j}		13774-16 ^{k,I} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1*h 13984-1*i 13977-1*j		13774-16 ^{k,i} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16° 13642-16°,f 13629-16° 13643-16 ^{f,g}	13975-1*h 13984-1*i 13977-1*j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e, f} 13629-16 ^g 13643-16 ^{f, g}	13975-1* ^h 13984-1* ⁱ 13977-1* ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16'	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^{*h} 13984-1*i 13977-1* ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e, f} 13629-16 ^g 13643-16 ^{f, g}	13975-1 ^{*h} 13984-1 ^{*i} 13977-1 ^{*j}		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}



- Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear.
- pumps, ruel pump pusnod 11985-11s nignly recommended to p Vertical locking bar hydraulic roller lifters, no machining required. Must machine cylinder heads. Machined steel, heat treated. Heavy wall, heat treated, for standard deck height blocks.

- Pro Series, one piece.
- Heavy wall, heat treated, for +.400" deck height "Tall Blocks". Performance steel billet gears and roller chain set.

- Pro Series steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set with thrust bearing.

- k 1991-95 engines require the installation of 99152-167/16" rocker arm studs (no machining required) and factory pushrod guideplates. Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.

- Crane Classic extruded, 1.7 ratio, 7/16 stud. Valve Train Stabilizer available, see
 m Energizer, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
 n 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
 o 1.7 ratio, 7/16" stud, Wide Body. Valve Train Stabilizer available, see page 363.
 p Ovate wire beehive spring, requires 99976-16 retainers.
 g Steel, for 99832-16 beehive springs.

					COM	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Camsha			21111001011010		,		- Серинино.	, 2,		
Performance usage, good upper RPM torque & HP, bracket racing, good w/large manifold nitrous system, auto trans w/3500+ converter, best in 540+ cu.in. engines w/prepared cylinder heads. 12.0 min. com- pression ratio advised. Good w/large supercharger, 22 lbs. max. boost w/8.5 max. compression ratio advised.	HR-254/400-2S-14 IG	3400- 6600	139701°°	13532-16 ^b	254 262	324 332	114	17.5 56.5 69.5 12.5	.000 .000	.680 .680
Good upper RPM torque and HP, bracket racing, auto trans w/3500+ converter, best in 540+ cu.in. engines w/prepared cylinder heads. 12.0 minimum compression ratio advised.	HR-256/372-2S-10 IG	3400- 6600	139821*a	13532-16 ^b	256 264	318 326	110	23 53 67 17	.000 .000	
Performance usage, good upper RPM HP, bracket racing, good w/large manifold nitrous system, auto trans w/3500+ converter, marine performance, 4000-4400 cruise RPM, for 540+ cu.in. engines. 11.0 minimum compression ratio advised. Good w/large Roots supercharger, good upper RPM HP, 480+ cu.in., 22 lbs. max. boost w/8.0 max. compression ratio advised.	HR-318-2S-14 IG	3600- 6600	139661*ª	13532-16 ^b	256 264	318 326	114	19 57 71 13	.000	.632 .632
Competition only, bracket racing, good w/large manifold nitrous system, auto trans w/race converter, 4000-4400 cruise RPM, for 540+ cu.in. engines. 12.0 min. compression ratio advised. Good w/large Roots supercharger, good upper RPM HP, 480+ cu.in., 22 lbs. max. boost w/8.0 max. compression ratio advised.	HR-258/4001-25-14 IG	3600- 6600	139831*a	13532-16 ^b	258 266	328 336	114	19.5 58.5 71.5 14.5	.000	.680 .680
Competition only, bracket, Super Gas, Super Comp racing, auto trans w/race converter, best in 540+ cu.in. engines w/prepared cylinder heads, 12.5 minimum compression ratio advised.	HR-262/400-252-14 IG	3800- 6600	139841*a	13532-16 ^b	262 266	332 336	114	21.5 60.5 71.5 14.5	.000 .000	.680 .680
Competition only, bracket, Super Gas, Super Comp racing, auto trans w/race converter, best in 572+ cu.in. engines w/prepared cylinder heads, good w/large manifold nitrous system, 12.5 minimum compression ratio advised. Good w/large supercharger, 26 lbs. max. boost w/8.5 max. compression ratio advised.	HR-262/400-251-14 IG	3800- 6600	139711*a	13532-16 ^b	262 270	332 340	114	21.5 60.5 73.5 16.5	.000 .000	.680 .680
Competition only, best in 572+ cu.in. high torque applications: drag, marine, radical Pro Street, 13.0 minimum compression ratio advised.	HR-264/420-2S-15 IG	4000- 6800	139861°a	13532-16 ^b	264 272	328 336	115	21 63 75 17	.000	
Competition only, best in 572+ cu.in., high torque and RPM applications: drag, radical Pro Street, good w/ large manifold nitrous system, 13.0 minimum compression ratio advised. Good w/large supercharger, 28 lbs. maximum boost w/9.0 maximum compression ratio advised.	HR-270/400-25-14 IG	4400- 6800	139851*a	13532-16 ^b	270 282	340 347	114	25.5 64.5 79 23	.000 .000	.680 .680

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.
IMPORTANT: Adjustable Vacuum Advance Kits available. See page

333 for details.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

NOTE: The 1991-95 Gen V engines can use these camshafts and components if they are converted to adjustable rocker arms by installing 99152-16 rocker arm studs (no machining required) and appropriate rocker arms. Custom length pushrods can also be made to achieve correct lifter preload if

standard non-adjustable rocker arms are retained. See page 305 for special pushrod ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Camshafts with SFO firing order (1-8-7-3-6-5-4-2, or

4/7 swap), are available on special order. Contact Crane's Performance Consultants for details.

IMPORTANT NOTE: Some 1973 thru 1981 454 cu.in. engines were equipped with exhaust valve rotators. In these instances when using dual valve springs, use either our 99459-8 Spring Seat Spacers or 4 of **99948-2** valve spring retainers (on the exhaust valves only) to prevent excessive valve spring shimming when eliminating the rotators. Some later

engines were equipped with rotators on both the intake and exhaust valves. For these applications when using dual valve springs, use either 2 of our **99459-8** Spring Seat Spacers or our 99948-16 valve spring retainers to prevent excessive valve spring shimming when eliminating the rotators.

NOTE: Left Hand rotation camshafts are available on special order.

Contact Crane's Performance Consultants for details. Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM Crane Classi Energizer	M ROCKERS — C/ Gold Race
	99896-16	99955-16	99822-16'	99098-1 ^d	13628-16° 13642-16°,f 13629-16° 13643-16 ^{f,g}	13975-1" ^h 13984-1" ⁱ 13977-1" ^j		13774-16 ^{k,l}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^{°h} 13984-1 ^{°i} 13977-1 ^{°j}		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16° 13642-16°, ^f 13629-16 ⁹ 13643-16 ^{f,g}	13975-1" ^h 13984-1" ⁱ 13977-1" ^j		13774-16 ^{k,1} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16° 13642-16°,f 13629-16° 13643-16 ⁶ ,g	13975-1 ^{*h} 13984-1 ^{*i} 13977-1 ^{*j}		13774-16 ^{k,i}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16° 13642-16°,f 13629-16° 13643-16 ^{f,g}	13975-1*h 13984-1*i 13977-1*j		13774-16 ^{k,i}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^{*h} 13984-1 ^{*i} 13977-1 ^{*j}		13774-16 ^{k,i}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1° ^h 13984-1° ⁱ 13977-1° ^j		13774-16 ^{k,i}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16° 13642-16°, ^f 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^{*h} 13984-1 ^{*i} 13977-1 ^{*j}		13774-16 ^{k,i}	13750-16 ^{k,n} 13763TR-16 ^{k,o}

- Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear. Vertical locking bar hydraulic roller lifters, no machining required.

 Must machine cylinder heads.

 Machined steel, heat treated.

 Heavy wall, heat treated, for standard deck height blocks.

- Pro Series, one piece.
- Heavy wall, heat treated, for +.400" deck height "Tall Blocks". Performance steel billet gears and roller chain set.

- Pro Series steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set with thrust bearing.

- k 1991-95 engines require the installation of 99152-167/16" rocker arm studs (no machining required) and factory pushrod guideplates. Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.

- Crane Classic extruded, 1.7 ratio, 7/16 stud. Valve Train Stabilizer available, see
 m Energizer, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
 n 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
 o 1.7 ratio, 7/16" stud, Wide Body. Valve Train Stabilizer available, see page 363.
 p Ovate wire beehive spring, requires 99976-16 retainers.
 g Steel, for 99832-16 beehive springs.

						СОМ	PLETE C	AM SPE	CIFIC	ATIC	ONS		
		Camshaft Series/	RPM POWER		See pg. 293	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Cl @ .05 Cam L	0″ ift	Hot Int.	Lift Int.	
ĺ	Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Ex	(h	Exh.	Exh.	
	Mechanical Lifter Camsho Excellent low end and mid range torque and HP, fair		2600	424404*2	00350.16	220	200	100	16	12	022	F44	
	idle, moderate performance usage, bracket racing w/heavy car, off road, auto trans w/2000+ converter, 3200-3600 cruise RPM, 10.5 to 11.5 compression ratio advised.	F-238/3200-2-8	2600- 6200	131101*a	99250-16	238 248	300 310	108	16 4 57 1		.022 .022		
	Good low end and mid range torque and HP, fair idle, moderate performance usage, bracket racing, auto trans w/2000+ converter, also w/plate or manifold nitrous system, 3400-3800 cruise RPM, 10.5 to 11.5 compression ratio advised. Good w/centrifugal or Roots supercharger, 10 lbs. maximum boost w/8.5 maximum compression ratio advised.	F-304-2	2800- 6600	133841	99250-16	238 248	304 314	114		48 5	.022 .022		
7170	Replacement for factory 375 HP 396 cu.in., 425 HP 427 cu.in., 435 HP 427 cu.in., 460 HP 454 cu.in. camshaft.	BluePrinted 3863143	3000- 6400	969961	99250-16	242 242		114		19 1	.024 .028		
	Good low end and mid range torque and HP, fair idle, moderate performance usage, bracket racing, auto trans w/2000+ converter, 3600-4000 cruise RPM, 10.5 to 11.5 compression ratio advised.	F-244/3454-2S-8	3200- 6600	131111"	99250-16	244 252	280 288	108	18 ⁴ 58 1		.026 .026		
	Good mid range torque and HP, fair idle, moderate performance usage, bracket racing, auto trans w/2500+ converter, good w/plate or manifold nitrous system, 3600-4000 cruise RPM, 10.75 to 12.0 compression ratio advised. Good w/centrifugal or Roots supercharger, 14 lbs. maximum boost w/8.5 maximum compression ratio advised.	F-244/3454-2S-14	3400- 6800	131121*	99250-16	244 252	280 288	114	12 5 64	52 8	.026 .026		
,	Good mid range torque & HP, rough idle, moderate performance usage, auto trans w/2500+ converter, 3800-4200 cruise RPM, bracket racing: Pro E.T., Super E.T., Super Pro, Hot Rod, auto trans w/race converter; oval track; Street Stock, Modified, etc., 1/4-3/8 mile, & marine performance usage in 454-502 cu.in. modified engines w/aftermarket high flow above water exhaust systems. 11.0 to 12.0 compression ratio advised.	Saturday Night Special F-314-2	3400- 7000	134781* 134782*a	99250-16	248 258	314 324	110	19 4 64 1		.022 .022		
	Good mid range torque and HP, performance usage, fair idle, bracket racing, auto trans w/3000+ converter, 4000-4400 cruise RPM, 11.25 to 12.25 compression ratio advised.	F-252/3574-25-8	3600- 7000	131131"	99250-16	252 260	288 296	108		51 19	.026 .026		
,	Good mid range torque and HP, performance usage, fair idle, bracket racing, auto trans w/3000+ converter, 4000-4400 cruise RPM, good w/manifold nitrous system, 11.5 to 12.5 compression ratio advised. Good w/Roots supercharger, 18 lbs. max. boost w/8.0 max. compression ratio advised.	F-252/3574-2S-14	3600- 7200	131271°	99250-16	252 260	288 296	114	16 5 68 1	56 12	.026 .026		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: 1991-95 Gen V engines can use these camshafts and components if they are converted to adjustable rocker arms by machining the cylinder heads for **99157-16** 7/16" screw-in studs and **13650-1** pushrod guideplates, and installing appropriate rocker arms.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

NOTE: Camshafts with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap), are available on special order. Contact Crane's Performance Consultants for details.

IMPORTANT NOTE: Some 1973 thru 1981 454 cu.in. engines were equipped with exhaust valve rotators. In these instances when using dual valve springs, use either our **99459-8** Spring Seat Spacers or 4 of **99948-2** valve spring retainers (on the exhaust valves only) to prevent excessive valve spring shimming when eliminating the rotators. Some later engines were equipped with rotators on both the intake and exhaust valves. For these applications when using dual valve springs, use either 2 of our **99459-8** Spring Seat Spacers or

our **99948-16** valve spring retainers to prevent excessive valve spring shimming when eliminating the rotators.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



					-				
CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINU Crane Classi Energizer	M ROCKERS — C/ Gold Race
	99893-16	99954-16	99822-16 ^b	99098-1°	13634-16 ^d 13640-16 ^e	13975-1*f 13984-1*g 13977-1*h	13801-16 ^{i,j} 13801C-16 ^{j,k}	13774-16 ^{j,1}	13750-16 ^{j,m} 13763TR-16 ^{j,n}
	99893-16	99954-16	99822-16 ^b	99098-1°	13634-16 ^d 13640-16 ^e	13975-1*f 13984-1* ^g 13977-1*h	13801-16 ^{i,j} 13801C-16 ^{j,k}	13774-16 ^{j,1}	13750-16 ^{j,m} 13763TR-16 ^{j,n}
	99893-16	99954-16	99822-16 ^b	99098-1	13634-16 ^d 13640-16 ^e	13975-1*f 13984-1* ⁹ 13977-1*h	13801-16 ^{i,j} 13801C-16 ^{j,k}	13774-16 ^{j,1}	13750-16 ^{j,m} 13763TR-16 ^{j,n}
	99893-16	99954-16	99822-16 ^b	99098-1	13634-16 ^d 13640-16 ^e	13975-1*f 13984-1*g 13977-1*h	13801-16 ^{i,j} 13801C-16 ^{j,k}	13774-16 ^{j,1}	13750-16 ^{j,m} 13763TR-16 ^{j,n}
	99893-16	99954-16	99822-16 ^b	99098-1	13634-16 ^d 13640-16 ^e	13975-1°f 13984-1°9 13977-1°h	13801-16 ^{i,j} 13801C-16 ^{j,k}	13774-16 ^{j,1}	13750-16 ^{j,m} 13763TR-16 ^{j,n}
	99890-16	99974-16	99822-16 ^b	99098-1	13634-16 ^d 13640-16 ^e	13975-1* ^f 13984-1* ^g 13977-1* ^h		13774-16 ^{j,1}	13750-16 ^{j,m} 13763TR-16 ^{j,n}
	99890-16ª	99974-16	99822-16 ^b	99098-1	13634-16 ^d 13640-16 ^e	13975-1*f 13984-1*g		13774-16 ^{j,1}	13750-16 ^{j,m} 13763TR-16 ^{j,n}
						13977-1*h			
	99890-16ª	99974-16	99822-16 ^b	99098-1	13634-16 ^d 13640-16 ^e	13975-1°f 13984-1° ^g 13977-1° ^h		13774-16 ^{j,1}	13750-16 ^{j,m} 13763TR-16 ^{j,n}



- Cam, lifter, valve spring and retainer kit, includes installation lubricants. Must machine cylinder heads. Machined steel, heat treated.

- Heavy wall, heat treated.

 Heavy wall, heat treated.

 Pro Series, one piece.

 Performance steel billet gears and roller chain set.

 Pro Series steel billet gears and roller chain set.

 Pro Series steel billet gears and roller chain set with thrust bearing.

- i 1.7 ratio, extra long slot for 1.560" maximum 0.D. valve springs.
 j 1991-95 engines require the installation of 99157-16 7/16" rocker arm studs and 13650-1 pushrod guideplates (machining required).
 k 1.7 ratio, Nitro Carb, extra long slot for 1.560" maximum 0.D. valve springs.
 l Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
 m 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
 n 1.7 ratio, 7/16" stud, Wide Body. Valve Train Stabilizer available, see page 363.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Mechanical Lifter Camsh		TUTTOL	ETTISSIOTIS COUC	Eli TElis	III Ç ZAII	IIIQ EXIII	эсраницон	III Ç	EATH	ЕЖП
_	F-326-2	3800- 7400	134261*	99250-16	252 262	326 336	110	21 51 66 16	.022 .024	
Good mid range and upper RPM torque and HP, per- formance usage, bracket racing, auto trans w/race converter, marine performance usage in 500+ cu.in. modified engines with aftermarket dry pipe exhaust system or tube headers, also replacement cam for Mercruiser 575 HP 540 cu.in. engines. 11.5 to 12.5 compression ratio advised.	F-256/3634-25-8	4000- 7400	131311'	99250-16	256 264	292 300	108	23 53 63 21	.026 .026	
Good mid range and upper RPM torque and HP, per- formance usage, auto trans w/3000+ converter, 4200- 4600 cruise RPM, bracket racing; Pro, Pro E.T., Super E.T., Super Pro, Hot Rod, auto trans w/race converter; oval track; Street Stock, Modified, etc., 3/8-1/2 mile, 11.5 to 12.5 compression ratio advised.	Saturday Night Special F-290-2	4000- 7500	134691° 134692°a	99250-16	256 266	290 300	110	23 53 68 18		.580 .600
Strong mid range torque and HP, performance usage, bracket racing, auto trans w/race converter, oval track; Street Stock, Modified, etc., 3/8-1/2 mile, marine, radical performance usage in 540+ cu.in. modified engines with ported cylinder heads and tube headers, 12.0 minimum compression ratio advised.	F-260/3694-25-8	4200- 7600	131441*	99250-16	260 268	296 304	108	25 55 65 23	.026 .026	.628 .648
Rough idle, performance usage, good upper RPM HP, 480+ cu.in., Pro Street, bracket racing, auto trans w/3500+ converter, 4400-4800 cruise RPM, also good w/manifold nitrous system, good upper RPM HP, 12.0 minimum compression ratio advised. Good w/large Roots supercharger, 20 lbs. maximum boost w/8.0 maximum compression ratio advised.	F-260/3694-2S-14	4200- 7800	131281*	99250-16	260 268	296 304	114	19 61 71 17	.026 .026	
Replacement for factory 430 HP 427 cu.in. (2nd design L88), ZL1 427 cu.in., LS7 454 cu.in. camshaft.	BluePrinted 3959180	4400- 7200	131141*	99250-16	262 272		110	24 58 69 23	.022 .024	
Replacement for 400 HP 427 cu.in. (1st design L88) camshaft.	BluePrinted 3925535	4400- 7200	968561	99250-16	264 269		112	24 60 70.5 18.5	.024 .026	.560 .580
Moderate competition only, good upper RPM torque and HP, bracket racing: Super Pro, Hot Rod, auto trans w/race converter, oval track; Street Stock, Modified, etc., 3/8-1/2 mile. 12.0 minimum compression ratio advised.	Saturday Night Special F-310-2	4400- 7800	134761* 134762*a	99250-16	266 276	310 320	110	28 58 73 23		.600 .620

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: 1991-95 Gen V engines can use these camshafts and components if they are converted to adjustable

shafts and components if they are converted to adjustable rocker arms by machining the cylinder heads for **99157-16**7/16" screw-in studs and **13650-1** pushrod guideplates, and installing appropriate rocker arms.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

NOTE: Camshafts with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap), are available on special order. Contact Crane's Performance Consultants for details.

IMPORTANT NOTE: Some 1973 thru 1981 454 cu.in. engines were equipped with exhaust valve rotators. In these instances when using dual valve springs, use either our 99459-8 Spring Seat Spacers or 4 of 99948-2 valve spring retainers (on the exhaust valves only) to prevent excessive valve spring shimming when eliminating the rotators. Some later engines were equipped with rotators on both the intake and exhaust valves. For these applications when using dual valve springs, use either 2 of our 99459-8 Spring Seat Spacers or

our **99948-16** valve spring retainers to prevent excessive valve spring shimming when eliminating the rotators.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINU Crane Classi Energizer	M ROCKERS — C/ Gold Race
	99890-16	99974-16	99822-16 ^b	99098-1°	13634-16 ^d 13640-16 ^e	13975-1*f 13984-1* ^g 13977-1*h		13774-16 ^{j,l}	13750-16 ^{j,m} 13763TR-16 ^{j,n}
	99890-16	99974-16	99822-16 ⁶	99098-1 ^c	13634-16 ⁴ 13640-16 ^e	13975-1" ^f 13984-1" ^g 13977-1" ^h		13774-16 ^{j,1}	13750-16 ^{j,m} 13763TR-16 ^{j,n}
	99890-16	99974-16	99822-16 ^b	99098-1°	13634-16 ^d 13640-16 ^e	13975-1*f 13984-1*g 13977-1*h		13774-16 ^{j,1}	13750-16 ^{j.m} 13763TR-16 ^{j.n}
	99890-16	99974-16	99822-16 ^b	99098-1°	13634-16 ^d 13640-16 ^e	13975-1°f 13984-1°9 13977-1°h		13774-16 ^{j,1}	13750-16 ^{j,m} 13763TR-16 ^{j,n}
	99890-16	99974-16	99822-16 ^b	99098-1 ^c	13634-16 ^d 13640-16 ^e	13975-1"f 13984-1" ⁹ 13977-1"h		13774-16 ^{j,1}	13750-16 ^{j.m} 13763TR-16 ^{j.n}
	99893-16	99954-16	99822-16 ^b	99098-1	13634-16 ^d 13640-16 ^e	13975-1*f 13984-1*g 13977-1*h	13801-16 ^{i,j} 13801C-16 ^{j,k}	13774-16 ^{j,1}	13750-16 ^{j,m} 13763TR-16 ^{j,n}
	99893-16	99954-16	99822-16 ^b	99098-1	13634-16 ^d 13640-16 ^e	13975-1*f 13984-1*g 13977-1*h	13801-16 ^{i,j} 13801C-16 ^{j,k}	13774-16 ^{j,l}	13750-16 ^{j,m} 13763TR-16 ^{j,n}
	99890-16	99974-16	99822-16 ^b	99098-1°	13634-16 ^d 13640-16 ^e	13975-1 ^{*f} 13984-1 ^{*g} 13977-1 ^{*h}		13774-16 ^{j,l}	13750-16 ^{j,m} 13763TR-16 ^{j,n}



- Cam, lifter, valve spring and retainer kit, includes installation lubricants. Must machine cylinder heads. Machined steel, heat treated.

- Heavy wall, heat treated.

 Pro Series, one piece.

 Performance steel billet gears and roller chain set.

 Pro Series steel billet gears and roller chain set.

 Pro Series steel billet gears and roller chain set with thrust bearing.

- i 1.7 ratio, extra long slot for 1.560" maximum 0.D. valve springs.
 j 1991-95 engines require the installation of 99157-16 7/16" rocker arm studs and 13650-1 pushrod guideplates (machining required).
 k 1.7 ratio, Nitro Carb, extra long slot for 1.560" maximum 0.D. valve springs.
 l Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
 m 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
 n 1.7 ratio, 7/16" stud, Wide Body. Valve Train Stabilizer available, see page 363.

					СОМ	PLETE C	AM SPE	CIFICA	TION:	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Clo @ .050" Cam Lift Int/Exh	Hot	Lift Int.
Mechanical Lifter Camsh	afts									
Moderate competition only, good upper RPM HP, 454+ cu.in., bracket racing, auto trans w/race con- verter, also good w/large manifold nitrous system, 12.0 minimum compression ratio advised. Good w/ large Roots supercharger, 20 lbs. maximum boost w/8.0 maximum compression ratio advised.	F-266/3528-2-14	4400- 8000	131151*	99250-16	266 276	302 312	114	22 64 75 21		.600 .620
Moderate competition only, good upper RPM HP, bracket racing, auto trans w/race converter, 12.0 minimum compression ratio advised.	F-268/3814-2S-8	4600- 7800	131541*	99250-16	268 276	304 312	108	29 59 69 27		.648 .669
Moderate competition only, good upper RPM HP, 460+ cu.in. bracket racing, auto trans w/race converter, 12.5 minimum compression ratio advised.	F-270/3867-2S-10	4600- 8000	131161*	99250-16	270 276	300 312	110	29 61 71 25		.657 .620
Moderate competition only, good upper RPM HP, bracket racing, auto trans w/race converter, 12.5 minimum compression ratio advised.	F-316-2	4800- 8000	134771*	99250-16	272 280	316 324	110	30 62 74 26		.659 .679
Competition only, good upper RPM HP, 500+ cu.in., bracket racing, auto trans w/race converter, also good w/large manifold nitrous system, 12.5 minimum compression ratio advised. Good w/large Roots supercharger, 22 lbs. maximum boost w/8.0 maximum compression ratio advised.	F-272/3874-25-14	4600- 8200	131291°	99250-16	272 280	308 316	114	26 66 78 22		6.659 6.679
Competition only, good upper RPM HP, bracket racing, auto trans w/race converter, 12.5 minimum compression ratio advised.	F-276/3934-2S-8 F-276/3934-2S-8 SFO	4800- 8200	131641* 131171*	99250-16	276 284	312 320	108	34 62 74 30		.669 .689
Radical competition only, good high RPM HP, flat tap- pet restricted classes, 540+ cu.in., 13.0 minimum compression ratio advised.	F-280/3994-2S-10	5000- 8400	131761°	99250-16	280 288	316 324	110	33 67 77 31		.679 .699
Radical competition only, good high RPM HP, flat tappet restricted classes, 540+ cu.in., good w/manifold ntrous system, 13.0 minimum compression ratio advised. Good w/Roots supercharger, 26 lbs. maximum boost w/8.5 maximum compression ratio advised.	F-280/3994-2S-14	5200- 8400	131181*	99250-16	280 288	316 324	114	30 70 82 26		.679 .699

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: 1991-95 Gen V engines can use these camshafts and components if they are converted to adjustable rocker arms by machining the cylinder heads for **99157-16** 7/16" screw-in studs and **13650-1** pushrod guideplates, and installing appropriate rocker arms.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

NOTE: Camshafts with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap), are available on special order. Contact Crane's Performance Consultants for details.

IMPORTANT NOTE: Some 1973 thru 1981 454 cu.in. engines were equipped with exhaust valve rotators. In these instances when using dual valve springs, use either our **99459-8** Spring Seat Spacers or 4 of **99948-2** valve spring retainers (on the exhaust valves only) to prevent excessive valve spring shimming when eliminating the rotators. Some later engines were equipped with rotators on both the intake and exhaust valves. For these applications when using dual valve springs, use either 2 of our **99459-8** Spring Seat Spacers or

our **99948-16** valve spring retainers to prevent excessive valve spring shimming when eliminating the rotators.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUI Crane Classi Energizer	
	99890-16	99974-16	99822-16ª	99098-1 ^b	13634-16° 13640-16 ^d	13975-1*° 13984-1*f 13977-1*9		13774-16 ^{h,i}	13750-16 ^{h,j} 13763TR-16 ^h
	99890-16	99974-16	99822-16ª	99098-1 ^b	13634-16°	13975-1*e		13774-16 ^{h,i}	13750-16 ^{h,j}
	77070 10	7777 10	77022 10	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	13640-16 ^d	13984-1*f 13977-1* ⁹		1377110	13763TR-16 ^h
	99890-16	99974-16	99822-16ª	99098-1 ^b	13634-16° 13640-16 ^d	13975-1 ^{°e} 13984-1 ^{°f} 13977-1 ^{°g}		13774-16 ^{h,i}	13750-16 ^{h,j} 13763TR-16 ^h
	99890-16	99974-16	99822-16ª	99098-1 ^b	13634-16 ^c 13640-16 ^d	13975-1*e 13984-1*f 13977-1*g		13774-16 ^{h,i}	13750-16 ^{h,j} 13763TR-16 ^h
	99890-16	99974-16	99822-16ª	99098-1 ^b	13634-16° 13640-16ª	13975-1° ^e 13984-1° ^f 13977-1° ^g		13774-16 ^{h,i}	13750-16 ^{h,j} 13763TR-16 ^h
	99890-16	99974-16	99822-16ª	99098-1 ^b	13634-16 ^c 13640-16 ^d	13975-1° ^e 13984-1° ^f 13977-1° ^g		13774-16 ^{h,i}	13750-16 ^{h,j} 13763TR-16 ^h
	99890-16ª	99974-16	99822-16ª	99098-1 ^b	13634-16 ^c 13640-16 ^d	13975-1*e 13984-1*f 13977-1*9		13774-16 ^{h,i}	13750-16 ^{h,j} 13763TR-16 ^h
	99890-16ª	99974-16	99822-16ª	99098-1 ^b	13634-16° 13640-16 ^d	13975-1*e 13984-1*f 13977-1*g		13774-16 ^{h,i}	13750-16 ^{h,j} 13763TR-16 ^h

<sup>a Must machine cylinder heads.
b Machined steel, heat treated.
c Heavy wall, heat treated.
d Pro Series, one piece.
e Performance steel billet gears and roller chain set.
f Pro Series steel billet gears and roller chain set.</sup>

pro Series steel billet gears and roller chain set with thrust bearing.
 1991-95 engines require the installation of 99157-16 7/16" rocker arm studs and 13650-1 pushrod guideplates (machining required).
 Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
 1.7 ratio, 7/16" stud. Wide Body. Valve Train Stabilizer available, see page 363.

						СОМ	PLETE C	AM SPE	CIFICAT	IONS		
	Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration	Degrees Lobe Separation	Open/Clos @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
	Mechanical Roller Camsh		NANGL	LITISSIOTS COde	LITTERS	IIIt/LXII.	III(/LXII.	Separation	III(/LXII	LXII.	LXII.	
	Excellent low end and mid range torque and HP, good idle, moderate performance usage, marine performance, mild bracket racing, auto trans w/3000+ converter, good with plate nitrous system, 3400-3800 cruise RPM, 10.5 to 11.5 compression ratio advised. Good w/supercharger, 10 lbs. maximum boost w/8.5 maximum compression ratio advised.		2800- 6600	138551°a	13519-16° 13570-16 ^d	238 246	288 296	112	12 46 60 6		.595 .615	
	Good low end and mid range torque and HP, fair idle, moderate performance usage, marine performance, radical off road, bracket racing, auto trans w/3500+converter, 3800-4200 cruise RPM, 10.5 to 12.0 compression ratio advised.	SR-246/362-2S-10 IG	3000- 6800	138601°a	13519-16 ^c 13570-16 ^d	246 254	296 304	110	18 48 62 12		.615 .636	
	Excellent mid range torque & HP, fair idle, moderate performance usage, marine performance, good w/manifold nitrous system, mild bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.5 to 12.0 compression ratio advised. Good w/supercharger, 16 lbs. max. boost w/8.0 max. compress. ratio advised.	SR-246/362-2S-14 IG	3200- 6800	138781*a	13519-16 ^c 13570-16 ^d	246 254	296 304	114	14 52 66 8		.615 .636	
_	Excellent mid range torque & HP, fair idle, performance usage, good w/manifold nitrous system, mild bracket racing, auto trans w/3500+ converter, 10.5 to 12.0 compression ratio advised. Good w/supercharger, 16 lbs. max. boost w/8.0 max. compress. ratio advised.	R-246/420-2-14 IG	3200- 7000	138141*	13519-16° 13570-16 ^d	246 256	278 288	114	13 53 66 10		.714 .714	
	Good mid range torque and HP, performance usage, bracket racing, Heavy, Pro, etc., auto trans w/race converter, 11.0 to 12.5 compression ratio advised.	R-250/420-2S-10	3200- 7000	138871" ^b	13519-16 ^c 13570-16 ^d	250 258	282 290	110	19 51 63 15		.714 .714	
	Good mid range to upper RPM torque & HP, rough idle, performance usage, marine performance, bracket racing, auto transmission w/4000+ converter, 4200-4600 cruise RPM, 11.0 minimum compression ratio advised, 480+ cu.in., mild supercharged and/or nitrous.	SR-254/374-2S-12 IG	3400- 7200	138631*a	13519-16 ^c 13570-16 ^d	254 262	304 312	112	20 54 68 14		.636 .636	
	Performance usage, good low and mid range torque and HP, bracket racing, auto trans w/3500+ converter, 11.0 to 12.5 maximum compression ratio advised. Good w/manifold nitrous system. Good w/Roots supercharger, 18 lbs. maximum boost w/8.0 maxi- mum compression ratio advised.	R-254/420-2S1-12 IG	3600- 7200	138101°a	13519-16 ^c 13570-16 ^d	254 262	286 294	112	19 55 67 15		.714 .714	
	Good mid range to upper RPM torque & HP, rough idle, performance usage, 480+ cu.in., radical marine performance, Pro Street, bracket racing, auto trans w/3500+ converter, 4200-4600 cruise RPM, 11.0 min. compression ratio advised. Good w/manifold nitrous system. Good w/Roots supercharger, 20 lbs. maximum boost w/8.0 maximum compression ratio advised.	SR-254/374-2S-14 IG	3600- 7200	138791*a	13519-16 ^c 13570-16 ^d	254 262	304 312	114	18 56 70 12		.636 .636	
	Performance usage, bracket racing, good mid range torque and HP, Heavy, Pro, etc., auto trans w/race con- verter, 11.0 to 12.5 compression ratio advised.	R-254/420-2-10	3800- 7200	138881*b	13519-16 ^c 13570-16 ^d	254 264	286 296	110	21 53 66 18	.020 .020	.714 .714	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

IMPORTANT NOTE: 1991-95 Gen V engines can use these camshafts and components if they are converted to adjustable rocker arms by machining the cylinder heads for 99157-16 7/16" screw-in studs and 13650-1 pushrod guideplates, and installing appropriate rocker arms.

NOTE: Many options are available for these camshafts, and any of our custom ground camshafts. An iron distributor drive gear and rear journal can be specified. SF0 firing order (4/7 swap) is offered. Optional journal sizes are: Roller Bearing (1.968"), 2.125", and 55mm (2.165"). Gun drilling (where applicable) is available. Camshafts for the GM DRCE family of V-8's are also offered in 55mm and 60mm journal versions.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUI Crane Classi Energizer	M ROCKERS — C/ Gold Race
	99876-16 ^e 96883-16 ^{e,f} 99832-16 ^w	99955-16 99676-16 ^g 99678-16 ^h 99976-16 ^x	99822-16 ^{e,i} 99820-16 ^{e,j}	99098-1 ^k 99094-1 ^l 99097-1 ^m	13634-16° 13640-16°	13975-1* ^p 13984-1* ^q 13977-1* ^r		13774-16 ^{s,t}	13750-16 ^{t,u} 13763TR-16 ^{t,v}
	99876-16° 96883-16°,f 99832-16 ^w	99955-16 99676-16 ⁹ 99678-16 ^h 99976-16 ^x	99822-16 ^{e,i} 99820-16 ^{e,j}	99098-1 ^k 99094-1 ^l 99097-1 ^m	13634-16° 13640-16°	13975-1*p 13984-1*q 13977-1*r		13774-16 ^{s,t}	13750-16 ^{t,u} 13763TR-16 ^{t,v}
	99876-16 ^e 96883-16 ^{e,f} 99832-16 ^w	99955-16 99676-16 ^g 99678-16 ^h 99976-16 ^x	99822-16 ^{e,i} 99820-16 ^{e,j}	99098-1 ^k 99094-1 ^l 99097-1 ^m	13634-16° 13640-16°	13975-1 ^{°p} 13984-1 ^{°q} 13977-1 ^{°r}		13774-16 ^{s,t}	13750-16 ^{t,u} 13763TR-16 ^{t,v}
	96886-16°	99955-16 99676-16 ⁹ 99678-16 ^h	99822-16 ^{e,i} 99820-16 ^{e,j}	99098-1 ^k 99094-1 ^l 99097-1 ^m	13634-16 ⁿ 13640-16°	13975-1*p 13984-1*q 13977-1*r		13774-16 ^{s,t}	13750-16 ^{t,u} 13763TR-16 ^{t,v}
	96886-16°	99955-16 99676-16 ⁹ 99678-16 ^h	99822-16 ^{e,i} 99820-16 ^{e,j}	99098-1 ^k 99094-1 ^l 99097-1 ^m	13634-16° 13640-16°	13975-1° ^p 13984-1° ^q 13977-1° ^r		13774-16 ^{s,t}	13750-16 ^{t,u} 13763TR-16 ^{t,v}
	99876-16 ^e 96883-16 ^{e,f} 99832-16 ^w	99955-16 99676-16 ⁹ 99678-16 ^h 99976-16 ^x	99822-16 ^{e,i} 99820-16 ^{e,j}	99098-1 ^k 99094-1 ^l 99097-1 ^m	13634-16° 13640-16°	13975-1° ^p 13984-1° ^q 13977-1° ^r		13774-16 ^{s,t}	13750-16 ^{t,} 13763TR-16 ^t
	96886-16°	99955-16 99676-16 ⁹ 99678-16 ^h	99822-16 ^{e,i} 99820-16 ^{e,j}	99098-1 ^k 99094-1 ^l 99097-1™	13634-16° 13640-16°	13975-1 ^{*p} 13984-1 ^{*q} 13977-1* ^r		13774-16 ^{s,t}	13750-16 ^{t,u} 13763TR-16 ^{t,v}
	99876-16 ^e 96883-16 ^{e,f} 99832-16 ^w	99955-16 99676-16 ⁹ 99678-16 ^h 99976-16 ^x	99822-16 ^{e,i} 99820-16 ^{e,j}	99098-1 ^k 99094-1 ^l 99097-1 ^m	13634-16° 13640-16°	13975-1 ^{*p} 13984-1 ^{*q} 13977-1 ^{*r}		13774-16 ^{s,t}	13750-16 ^{t,u} 13763TR-16 ^{t,v}
	96886-16°	99955-16 99676-16 ⁹ 99678-16 ^h	99822-16 ^{e,i} 99820-16 ^{e,j}	99098-1 ^k 99094-1 ^l 99097-1™	13634-16° 13640-16°	13975-1° ^p 13984-1° ^q 13977-1° ^r		13774-16 ^{s,t}	13750-16 ^{t,u} 13763TR-16 ^{t,v}



- Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod **11985-1** is highly recommended to prevent fuel pump lobe wear.
- Requires cam button spacer and a 11990-1 (.489" I.D.) or 11989-1 (.500" I.D. Accel) aluminumbronze distributor drive gear. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear.
- Vertical locking bar roller lifters.
- Ultra Pro Series vertical locking bar roller lifters.
- Must machine cylinder heads.
- For supercharged applications, use **99679-16** or **99678-16** retainers.
- Titanium for 3/8" dia. valve stems, must use **99098-1** valve stem locks, included with the retainers.
- Titanium for 11/32" dia. valve stems, must use **99097-1** valve stem locks, included with the retainers. For 3/8" dia. valve stems.
- For 11/32" dia. valve stems.
- Machined steel, heat treated for 3/8" dia. valve stems.

- Machined steel, heat treated, for 11/32" diameter valve stems, Multi Fit.
- Machined steel, heat treated for 11/32" dia. valve stems.
- Heavy wall, heat treated.
- Pro Series one-piece.
- Performance steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set with thrust bearing.

 1991-95 engines require the installation of **99157-16** 7/16" rocker arm studs and **13650-1** pushrod
- guideplates (machining required).
 Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.

- 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.

 1.7 ratio, 7/16" stud. Wide Body. Valve Train Stabilizer available, see page 363.
- Ovate wire beehive spring, requires **99976-16** retainers. Steel, for **99832-16** beehive springs.

					COM	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Mechanical Roller Camsl	hafts										
Performance usage, good upper RPM torque and HP, radical marine performance, bracket racing, auto trans w/race converter, 12.0 min. compression ratio advised.	R-258/420-251-14 IG	4000- 7200	138681 ^{*a}	13519-16 ^d 13570-16 ^e	258 262	290 294	114	19 59 69 13	.020 .020		
Performance usage, bracket racing, good mid range torque and HP, Heavy, Pro, etc., auto trans w/race con- verter, 12.0 minimum compression ratio advised.	R-258/420-25-8	4000- 7200	138891*b	13519-16 ^d 13570-16 ^e	258 266	290 298	108	25 53 65 21	.020 .020		
Good upper RPM HP, rough idle, performance usage, marine performance, bracket racing, auto trans w/4000+ converter, 4400-4800 cruise RPM, 11.5 minimum compression ratio advised, 540+ cu.in. Good w/large manifold nitrous system. Good w/large Roots supercharger, 22 lbs. maximum boost w/8.0 maximum compression ratio advised.	SR-262/374-251-14 IG	4200- 7400	138641°a	13519-16 ^d 13570-16 ^e	262 270	312 320	114	22 60 74 16	.020 .020		
Performance usage, good mid range torque and HP, 480+ cu.in., bracket racing, auto trans w/4000+ con- verter, 11.5 minimum compression ratio advised. Good w/large manifold nitrous system. Good w/large Roots supercharger, 20 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-262/420-251-14 IG	4200- 7600	138131°a	13519-16 ^d 13570-16 ^e	262 270	294 302	114	21 61 73 17	.020 .020		
Performance usage, bracket racing, w/heavy car, good mid range torque and HP, Pro, Super Pro, oval track, Modified, etc., auto trans w/race converter, 12.0 mini- mum compression ratio advised.	R-262/420-2-6	4200- 7200	138801 ^{*b}	13519-16 ^d 13570-16 ^e	262 272	294 304	106	28 54 65 27	.020 .020		
Performance usage, bracket racing, good mid to upper RPM torque and HP, Pro, Super Pro, etc., auto trans w/ race converter, oval track, Modified, etc., 12.0 mini- mum compression ratio advised.	R-262/420-2-10	4200- 7400	138811" ^b	13519-16 ^d 13570-16 ^e	262 272	294 304	110	25 57 70 22	.020 .020		
Performance usage, bracket racing w/heavy car, good mid to upper RPM torque and HP, Pro, Super Pro, etc., auto trans w/race converter, oval track, Modified, etc., 12.0 minimum compression ratio advised.	R-268/420-25-8 R-268/420-25-8 SF0	4400- 7600	138831"b 138671"b,c	13519-16 ^d 13570-16 ^e	268 272	300 304	108	30 58 68 24	.020 .020		
Competition only, good upper RPM HP, 480+ cu.in., bracket racing, auto trans w/race converter, good w/ large manifold nitrous system, 12.5 minimum com- pression ratio advised. Good w/large Roots super- charger, 22 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-270/420-252-14	4400- 7800	138661*b	13519-16 ^d 13570-16 ^e	270 278	302 310	114	25 65 77 21	.020 .020		
Performance usage, bracket racing, good mid to upper RPM torque and HP, Super Pro, etc., auto trans w/race converter, oval track, Super Modified, 12.5 minimum compression ratio advised.	R-272/420-251-10	4400- 7800	138841″ ^b	13519-16 ^d 13570-16 ^e	272 278	304 310	110	30 62 73 25	.020 .020		
Competition only, bracket racing, good upper RPM torque and HP, Super Pro, Super Gas, Super Comp, auto transmission w/race converter, 12.5 minimum com- pression ratio advised.	R-274/4334-2S-10 R-274/4334-2S-10 SFO	4600- 8000	138291°b 138301°b,c	13519-16 ^d 13570-16 ^e 13574-16 ^f	274 284	314 324	110	30 64 75 29	.026 .026		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.
IMPORTANT NOTE: 1991-95 Gen V engines can use these cam-

IMPORTANT NOTE: 1991-95 Gen V engines can use these camshafts and components if they are converted to adjustable rocker arms by machining the cylinder heads for **99157-16** 7/16" screw-in studs and **13650-1** pushrod guideplates, and installing appropriate rocker arms.

NOTE: Many options are available for these camshafts, and any of our custom ground camshafts. An iron distributor drive gear and rear journal can be specified. SFO firing order (4/7 swap) is offered. Optional journal sizes are: Roller Bearing (1.968"), 2.125", and 55mm (2.165"). Gun drilling (where applicable) is available. Camshafts for the GM DRCE family of V-8's are also offered in 55mm and 60mm journal versions.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	96886-16 ⁹	99955-16 99676-16 ⁱ 99678-16 ^j	99822-16 ^{9,k} 99820-16 ^{9,l}	99098-1" 99094-1" 99097-1°	13634-16 ^p 13640-16 ^q	13975-1* ^r 13984-1* ^s 13977-1* ^t			13750-16 ^{u,w} 13763TR-16 ^{u,x}
	96886-16 ⁹	99955-16 99676-16 ⁱ 99678-16 ^j	99822-16 ^{g,k} 99820-16 ^{g,l}	99098-1 ^m 99094-1 ⁿ 99097-1°	13634-16 ^p 13640-16 ^q	13975-1* ^r 13984-1* ^s 13977-1* ^t			13750-16 ^{u,w} 13763TR-16 ^{u,x}
	99876-16 ⁹ 96883-16 ^{g,h}	99955-16 99676-16 ⁱ 99678-16 ^j	99822-16 ^{g,k} 99820-16 ^{g,l}	99098-1" 99094-1" 99097-1°	13634-16 ^p 13640-16 ^q	13975-1*r 13984-1* ^s 13977-1* ^t		13774-16 ^{u,v}	13750-16 ^{u,w} 13763TR-16 ^{u,x}
	96886-16 ⁹	99955-16 99676-16 ⁱ 99678-16 ^j	99822-16 ^{g,k} 99820-16 ^{g,l}	99098-1 ^m 99094-1 ⁿ 99097-1°	13634-16 ^p 13640-16 ^q	13975-1* ^r 13984-1* ^s 13977-1* ^t			13750-16 ^{u,w} 13763TR-16 ^{u,x}
	96886-16 ⁹	99955-16 99676-16 ⁱ 99678-16 ^j	99822-16 ^{g,k} 99820-16 ^{g,l}	99098-1 ^m 99094-1 ⁿ 99097-1°	13634-16 ^p 13640-16 ^q	13975-1*r 13984-1*s 13977-1*t			13750-16 ^{u,w} 13763TR-16 ^{u,x}
	99876-16 ⁹ 96883-16 ^{9,h}	99955-16 99676-16 ⁱ 99678-16 ^j	99822-16 ^{g,k} 99820-16 ^{g,l}	99098-1 ^m 99094-1 ⁿ 99097-1°	13634-16 ^p 13640-16 ^q	13975-1*r 13984-1*s 13977-1*t			13750-16 ^{u,w} 13763TR-16 ^{u,x}
	96886-16 ⁹	99955-16 99676-16 ⁱ 99678-16 ^j	99822-16 ^{g,k} 99820-16 ^{g,l}	99098-1 ^m 99094-1 ⁿ 99097-1°	13634-16 ^p 13640-16 ^q	13975-1*r 13984-1*s 13977-1*t			13750-16 ^{u,w} 13763TR-16 ^{u,x}
	96886-16 ⁹	99955-16 99676-16 ⁱ 99678-16 ^j	99822-16 ^{g,k} 99820-16 ^{g,l}	99098-1 ^m 99094-1 ⁿ 99097-1°	13634-16 ^p 13640-16 ^q	13975-1* ^r 13984-1* ^s 13977-1* ^t			13750-16 ^{u,w} 13763TR-16 ^{u,x}
	96886-16 ⁹	99955-16 99676-16 ⁱ 99678-16 ⁱ	99822-16 ^{9,k} 99820-16 ^{9,l}	99098-1 ^m 99094-1 ⁿ 99097-1°	13634-16 ^p 13640-16 ^q	13975-1*r 13984-1*s 13977-1*t			13750-16 ^{u,w} 13763TR-16 ^{u,x}
	96886-16 ⁹ 961226-16 ^{9,y}	99955-16 99676-16 ⁱ 99678-16 ^j 99661-16 ^z	99822-16 ^{g,k} 99820-16 ^{g,l}	99098-1 ^m 99094-1 ⁿ 99097-1°	13634-16 ^p 13640-16 ^q	13975-1*r 13984-1*s 13977-1*t			13750-16 ^{u,w} 13763TR-16 ^{u,x}

- Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear. Requires cam button spacer and a 11990-1 (.489"I.D.) or 11989-1 (.500"I.D. Accel) aluminum-
- bronze distributor drive gear. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear.
- Camshaft has SFO firing order, with 4/7 swap. Vertical locking bar roller lifters.

- Ultra Pro Series vertical locking bar roller lifters.
 Ultra Pro Series vertical locking bar roller lifters for .904" diameter lifter bores.
 Must machine cylinder heads.
- For supercharged applications, use 99679-16 or 99678-16 retainers.
- Titanium for 3/8" dia. valve stems, must use **99098-1** valve stem locks, included with the retainers. Titanium for 11/32" dia. valve stems, must use **99097-1** valve stem locks, included with the retainers.
- For 3/8" dia. valve stems. For 11/32" dia. valve stems.

- m Machined steel, heat treated for 3/8" dia. valve stems.
- Machined steel, heat treated, for 11/32" diameter valve stems, Multi Fit.
- Machined steel, heat treated for 11/32" dia. valve stems.
- Heavy wall, heat treated.
- Pro Series one-piece.
- Performance steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set.

 Pro Series steel billet gears and roller chain set.

 Pro Series steel billet gears and roller chain set with thrust bearing.
- 1991-95 engines require the installation of **99157-16** 7/16" rocker arm studs and **13650-1** pushrod guideplates (machining required).

 Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.

 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.

 1.7 ratio, 7/16" stud, Wide Body, Valve Train Stabilizer available, see page 363.

- Requires **99661-16** titanium retainers.
- Titanium, requires Crane Multi Fit valve stem locks.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Mechanical Roller Camsh											
Competition only, good upper RPM HP, 500+ cu.in., bracket racing, auto trans w/race converter, good w/ large manifold nitrous system, 12.5 minimum compression ratio advised. Good w/large Roots supercharger, 24 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-274/4334-25-14 R-274/4334-25-14 SFO	4600- 8200	138351*a 138361*a,b	13570-16 ^d 13574-16 ^e	274 284	314 324	114	26 68 79 25	.026 .026		
Radical competition only, good upper RPM HP, 500+ cu.in., bracket racing, Pro Street, auto trans w/race converter, intended for large manifold nitrous system, 12.5 minimum compression ratio advised.	R-274/5002-2S-14 SFO	4600- 8600	138931*a,b	13570-16 ^d 13574-16 ^e	274 300	304 331	114	28 66 89 31	.020 .016		
Competition only, good upper RPM torque and HP, 540+ cu.in., bracket racing w/heavy car, auto trans w/race converter, marine performance, good w/manifold nitrous system, 12.5 minimum compression ratio advised. Good w/large Roots supercharger, 24 lbs. maxi- mum boost w/8.0 maximum compression ratio advised.	R-276/420-2S1-14 R-276/420-2S1-14 IG	4600- 8200	138451*a 138461*¢	13570-16 ^d 13574-16 ^e	276 280	308 312	114	28 68 78 22	.020 .020		
Competition only, bracket racing, good upper RPM torque and HP, Super Pro, Super Gas, Super Comp, etc., 427-468 cu.in., auto trans w/race converter, 12.5 minimum compression ratio advised.	R-278/420-25-10	4600- 8000	138851*a	13570-16 ^d 13574-16 ^e	278 282	310 314	110	33 65 75 27	.020 .020		
Competition only, good upper RPM torque and HP, 540+ cu.in., bracket racing, auto trans w/race converter, good w/manifold nitrous system, 12.5 minimum compression ratio advised. Good w/large Roots supercharger, 26 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-278/420-2-14 IG	4600- 8200	138471°	13570-16 ^d 13574-16 ^e	278 288	310 320	114	29 69 82 26	.020 .020		
Competition only, bracket racing, good upper RPM HP, Super Pro, Super Comp, etc., 454+ cu.in., auto trans w/race converter, 12.5 minimum compression ratio advised.	R-282/420-2-12	4800- 8200	138861*a	13570-16 ^d 13574-16 ^e	282 292	314 324	112	33 69 81 31	.020 .020		
Radical competition only, good upper RPM HP, 540+ cu.in., bracket racing, Pro Street, auto trans w/race converter, intended for large manifold nitrous system, 13.5 minimum compression ratio advised.	R-282/490-252-13 SFO	4800- 8600	138941*a,b	13570-16 ^d 13574-16 ^e	282 304	318 339	113	33 69 88.5 35.5	.026 .022		
Competition only, drag racing Super Stock, 396-427 high compression. Lift with 1.75 intake, 1.7 exhaust rockers.	R-282/5002-25-10 SFO	5000- 8200	138711*a,b	13570-16 ^d 13574-16 ^e	282 286	312 330	110	36 66 78 28	.020 .030		
Competition only, good upper RPM HP, single 4-bbl, Comp. Elim., 427+ cu.in., strong mid range for 540+ cu.in. Super Gas and Super Comp, auto transmission w/race converter, 13.0 minimum compression ratio advised.	R-284/456-251-10 R-284/456-251-10 SFO	4800- 8200	138591 ^{*a} 138701 ^{*a,b}	13570-16 ^d 13574-16 ^e	284 292	324 332	110	35 69 79 33	.026 .026		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

IMPORTANT NOTE: 1991-95 Gen V engines can use these cam-

MPORTANT NOTE: 1991-95 Gen V engines can use these camshafts and components if they are converted to adjustable rocker arms by machining the cylinder heads for 99157-16 7/16" screw-in studs and 13650-1 pushrod guideplates, and installing appropriate rocker arms.

NOTE: Many options are available for these camshafts, and any of our custom ground camshafts. An iron distributor drive gear and rear journal can be specified. SFO firing order (4/7 swap) is offered. Optional journal sizes are: Roller Bearing (1.968"), 2.125", and 55mm (2.165"). Gun drilling (where applicable) is available. Camshafts for the GM DRCE family of V-8's are also offered in 55mm and 60mm journal versions.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN COI	MPONENTS						
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM ROCKERS — Crane Classic/ Gold Energizer Race
	96886-16 ^f 96848-16 ^{f,g} 961226-16 ^{f,w}	99955-16 99676-16 ^h 99678-16 ⁱ 99661-16 ^y	99822-16 ^{9,j} 99820-16 ^{9,k}	99098-1 ¹ 99094-1 ^m 99097-1 ⁿ	13634-16° 13640-16°	13975-1* ¹ 13984-1* ^r 13977-1* ⁵		13750-16 ^{t.} 13763TR-16 ^{t.}
	96848-16 ^{t,g} 961356 ⁻ 16 ^x	99676-16 ^h 99678-16 ⁱ 99663-16 ^z	99822-16 ^{9,j} 99820-16 ^{9,k}	99098-1 ¹ 99097-1 ⁿ	13640-16 ^p	13984-1* ^r 13977-1* ^s		13763TR-16 ^t *
	96886-16 ^f 96848-16 ^{f,g}	99955-16 99676-16 ^h 99678-16 ⁱ	99822-16 ^{9,j} 99820-16 ^{9,k}	99098-1 ¹ 99094-1 ^m 99097-1 ⁿ	13634-16° 13640-16°	13975-1* ^q 13984-1* ^r 13977-1* ^s		13750-16 ^{t,} 13763TR-16 ^{t,}
	96886-16 ^f 96848-16 ^{f,g}	99955-16 99676-16 ^h 99678-16 ⁱ	99822-16 ^{9,j} 99820-16 ^{9,k}	99098-1 ¹ 99094-1 ^m 99097-1 ⁿ	13634-16° 13640-16°	13975-1*q 13984-1*r 13977-1*s		13750-16 ^{t,u} 13763TR-16 ^{t,v}
	96886-16 ^f 96848-16 ^{f,g}	99955-16 99676-16 ^h 99678-16 ⁱ	99822-16 ^{9,j} 99820-16 ^{9,k}	99098-1 ¹ 99094-1 ^m 99097-1 ⁿ	13634-16° 13640-16°	13975-1° ¹ 13984-1° ¹ 13977-1° ⁵		13750-16 ^{t.} " 13763TR-16 ^{t.} "
	96886-16 ^f 96848-16 ^{f,g}	99955-16 99676-16 ^h 99678-16 ⁱ	99822-16 ^{9,j} 99820-16 ^{9,k}	99098-1 ¹ 99094-1 ^m 99097-1 ⁿ	13634-16° 13640-16°	13975-1*q 13984-1*r 13977-1*s		13750-16 ^{t,u} 13763TR-16 ^{t,v}
	96848-16 ^{fg} 961356 ⁻ 16 ^x	99676-16 ^h 99678-16 ⁱ 99663-16 ^z	99822-16 ^{9,j} 99820-16 ^{9,k}	99098-1 ¹ 99097-1 ⁿ	13640-16 ^p	13984-1*r 13977-1*s		13763TR-16 ^t
	96848-16 ^{f,g} 961356 ⁻ 16 ^x	99676-16 ^h 99678-16 ⁱ 99663-16 ^z	99822-16 ^{9,j} 99820-16 ^{9,k}	99098-1 ¹ 99097-1 ⁿ	13640-16 ^p	13984-1* ^r 13977-1* ^s		13763TR-16 ^{t.} *
	96886-16 ^f 96848-16 ^{f,g} 961226-16 ^{f,w}	99955-16 99676-16 ^h 99678-16 ⁱ 99661-16 ^y	99822-16 ^{9,j} 99820-16 ^{9,k}	99098-1 ¹ 99094-1 ^m 99097-1 ⁿ	13634-16° 13640-16°	13975-1° ^q 13984-1° ^r 13977-1° ^s		13750-16 ^{t,u} 13763TR-16 ^{t,v}



- Requires cam button spacer and a 11990-1 (.489" I.D.) or 11989-1 (.500" I.D. Accel) aluminumbronze distributor drive gear. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear.
- Camshaft has SFO firing order, with 4/7 swap.

 Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear.
- Ultra Pro Series vertical locking bar roller lifters.
 Ultra Pro Series vertical locking bar roller lifters for .904" diameter lifter bores.
 Must machine cylinder heads.
- For supercharged applications, use 99679-16 or 99678-16 retainers.
- Titanium for 3/8" dia. valve stems, must use **99098-1** valve stem locks, included with the retainers.
- Titanium for 11/32" dia. valve stems, must use 99097-1 valve stem locks, included with the retainers.
- For 3/8" dia. valve stems. For 11/32" dia. valve stems.
- Machined steel, heat treated for 3/8" dia. valve stems.

- m Machined steel, heat treated, for 11/32" diameter valve stems, Multi Fit.
- Machined steel, heat treated for 11/32" dia. valve stems.
- Heavy wall, heat treated.
- Pro Series one-piece. Performance steel billet gears and roller chain set.

- Pro Series steel billet gears and roller chain set.

 Pro Series steel billet gears and roller chain set.

 Pro Series steel billet gears and roller chain set with thrust bearing.

 1991–95 engines require the installation of 99157-16 7/16" rocker arm studs and 13650-1 pushrod guideplates (machining required). 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363. 1.7 ratio, 7/16" stud, Wide Body. Valve Train Stabilizer available, see page 363.

- Requires 99661-16 titanium retainers
- For 2.100" assembly height, requires 99663-16 titanium retainers.
- Titanium, for **961226-16** valve springs, requires Crane Multi Fit valve stem locks.
- Titanium, for 961356-16 valve springs, requires Crane Multi Fit valve stem locks.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 296	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
Mechanical Roller Camsh Competition only, strong mid range and top end for	R-284/456-255-14	5000-	138391*a	13570-16°	284	324	114	31 73	026	.775	
572+ cu.in. Super Gas and Super Comp, good upper RPM HP, 540+ cu.in., drag racing, auto transmission w/race converter, 12.5 minimum compression ratio advised. Good w/large manifold nitrous system. Good w/large Roots supercharger, 30 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-284/456-255-14 SFO	8400	138401*a,b	13574-16 ^d	296	336	1117	85 31		.740	
Competition only, 600+ cu.in., Top Sportsman, Quick 16, Top Dragster, auto transmission w/race converter, 13.0 minimum compression ratio advised.	R-286/490-251-14 SFO	5000- 8000	138771 ^{*a,b}	13570-16 ^c 13574-16 ^d	286 306	326 352	114	34 72 92 34	.026 .030		
Competition only, 640+ cu.in., Top Sportsman, Quick 16, Top Dragster, auto transmission w/race converter, 14.0 minimum compression ratio advised.	R-286/500-253-16 SFO	5000- 7600	138951 ^{*a,b}	13570-16 ^c 13574-16 ^d	286 298	326 348	116	30 76 89 29	.026 .030		
Radical competition only, good upper RPM HP, 640+ cu.in., bracket racing, Pro Street, auto trans w/race converter, intended for large manifold nitrous system, 14.5 minimum compression ratio advised.	R-286/5151-2S-16 SFO	6000- 8400	138961 ^{*a,b}	13570-16 ^c 13574-16 ^d	286 310	320 344	116	31 75 94 36	.024 .026		
Competition only, maximum performance applications, 500+ cu.in., Super Quick, etc., auto transmission w/race converter, 13.0 minimum compression ratio advised.	321-334-10R	5000- 8200	19315*a	13570-16 ^c 13574-16 ^d	287 292	321 334	110	37.5 69.5 80 32		.723 .714	
Competition only, maximum performance applications, 500+ cu.in., Super Comp, Super Quick, etc., stick or auto transmission w/race converter, 14.0 minimum compression ratio advised.	333-344-14R	5000- 8400	19333*a	13570-16 ^c 13574-16 ^d	287 297	333 344	114	33.5 73.5 87.5 29.5	.035 .030		
Competition only, maximum performance applications, 560+ cu.in., Super Comp, Super Quick, etc., stick or auto transmission w/race converter, 14.0 minimum compression ratio advised.	R-288/5002-252-12 SF0	5000- 8400	138971 ^{*a,b}	13570-16 ^c 13574-16 ^d	288 300	318 332	112	37 71 87 33	.020 .022		
Competition only, large cu.in. Top Sportsman, Pro Stock, Quick 16, good also w/large manifold nitrous systems, auto transmission w/race converter, 14.5 minimum compression ratio advised.	R-288/515-252-16 SFO	5000- 8400	138911 ^{*a,b}	13570-16 ^c 13574-16 ^d	288 312	322 352	116	31 77 96 36	.024 .030	.876 .800	
Competition only, IHRA Pro Stock, unlimited Street, very large cu.in. applications, also good w/large manifold nitrous systems, 14.5 minimum compression ratio advised.	R-288/515-253-18 SFO	5200- 8400	138921*a,b	13570-16 ^c 13574-16 ^d	288 316	318 348	118	30 78 100 36	.020 .022		
Competition only, Supercharged Unlimited Street, very large cu.in. applications, for 55mm bearing journals. Also good w/large manifold nitrous systems.	R-292/5152-2S-17 SFO 55.	J 5800- 8600	138981 ^{*a,b}	13570-16 ^c 13574-16 ^d	292 310	322 342	117	34 78 97 33	.020 .022		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

IMPORTANT NOTE: 1991-95 Gen V engines can use these camshafts and components if they are converted to adjustable rocker arms by machining the cylinder heads for 99157-16 7/16" screw-in studs and 13650-1 pushrod guideplates, and installing appropriate rocker arms.

NOTE: Many options are available for these camshafts, and any of our custom ground camshafts. An iron distributor drive gear and rear journal can be specified. SF0 firing order (4/7 swap) is offered. Optional journal sizes are: Roller Bearing (1.968"), 2.125", and 55mm (2.165"). Gun drilling (where applicable) is available. Camshafts for the GM DRCE family of V-8's are also offered in 55mm and 60mm journal versions.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



VALVE SPRING VALVE VALVE TIMING CHAIN STEEL <u>Alun</u> and retainer valve stem stem and gear rocker crane ci		
VALVE SPRING AND RETAINER VALVE STEM STEM STEM LOCKS PUSHRODS ASSEMBLY ARMS CRAILED CRAIL LOCKS PUSHRODS ASSEMBLY ARMS CRAILED		
AND RETAINER VALVE STEM STEM STEM AND GEAR ROCKER CRAINE CI LOCKS PUSHRODS ASSEMBLY ARMS ENERGY POSHRODS ASSEMBLY ASSEMBLY ASSEMBLY ASSEMBLY ARMS ENERGY POSHRODS ASSEMBLY	See pg. 315	See pg. 317
961226-16**4 99681-16* 99820-16**1 99097-1* 13640-16* 13984-1*** 96848-16* 99676-16* 99820-16**1 99098-1* 13640-16* 13984-1*** 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 13640-16* 13984-1*** 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 13640-16* 13984-1*** 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 13640-16* 13984-1*** 978777777777777	ALUMINUN ANE CLASSIC ENERGIZER	
961226-16**4 99681-16* 99820-16**1 99097-1* 13640-16* 13984-1*** 96848-16* 99676-16* 99820-16**1 99098-1* 13640-16* 13984-1*** 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 13640-16* 13984-1*** 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 13640-16* 13984-1*** 96848-16* 99676-16* 99820-16**1 99097-1* 96848-16* 99676-16* 99820-16**1 13640-16* 13984-1*** 978777777777777		
961356-16 ^{e,t} 99663-16 ^t 99820-16 ^{e,t} 99097-1 ^k 13977-1 th 96848-16 ^e 99676-16 ^t 99820-16 ^{e,t} 99098-1 th 13640-16 th 13984-1 th 96848-16 ^e 99676-16 th 99820-16 ^{e,th} 99098-1 th 13640-16 th 13984-1 th 96848-16 ^e 99681-16 ^g 99820-16 ^{e,th} 99098-1 th 13640-16 th 13984-1 th 96848-16 ^e 9963-16 th 99820-16 ^{e,th} 99098-1 th 13640-16 th 13984-1 th 96848-16 ^e 99681-16 ^g 99820-16 ^{e,th} 99098-1 th 13640-16 th 13984-1 th 96848-16 ^e 99681-16 ^g 99820-16 ^{e,th} 99098-1 th 13640-16 th 13984-1 th 96848-16 ^e 99681-16 ^g 99820-16 ^{e,th} 99098-1 th 13640-16 th 13984-1 th 96848-16 ^e 99661-16 th 99820-16 ^{e,th} 99098-1 th 13640-16 th 13984-1 th 96848-16 ^e 99681-16 ^g 99820-16 ^{e,th} 99098-1 th 13640-16 th 13984-1 th 96848-16 ^e 99681-16 ^g 99820-16 ^{e,th} 99098-1 th 13640-16 th 13984-1 th 96848-16 ^e 99681-16 ^g 99820-16 ^{e,th} 99097-1 th 13977-1 th		13763TR-16°
961356-16° ¹ 99681-16 ⁹ 99820-16° ¹ 99097-1 ^k 13977-1° ⁿ 96848-16° 99681-16 ⁹ 99820-16° ¹ 99820-16° ¹ 13640-16 ¹ 13984-1° ^m 961356-16° ¹ 99681-16 ⁹ 99820-16° ¹ 99097-1 ^k 13640-16 ¹ 13984-1° ^m 96848-16° 99681-16 ⁹ 99820-16° ¹ 99097-1 ^k 13977-1° ⁿ 96848-16° 99681-16 ⁹ 99820-16° ¹ 99097-1 ^k 13977-1° ⁿ 96848-16° 99681-16 ⁹ 99820-16° ¹ 99098-1 ¹ 13640-16 ¹ 13984-1° ^m 961226-16° ⁴ 99681-16 ⁹ 99820-16° ¹ 99097-1 ^k 13977-1° ⁿ 96848-16° 99681-16° 99820-16° ¹ 99097-1 ^k 13977-1° ⁿ 96848-16° 99681-16° 99820-16° ¹ 99097-1 ^k 13977-1° ⁿ		13763TR-16°
961356-16°-r 99681-16° 99820-16°-i 99097-1k 13977-1°n 96848-16° 99676-16¹ 99822-16°-h 99098-1i 13640-16¹ 13984-1°m 961226-16°-q 99681-16° 99820-16°-i 99098-1i 13640-16¹ 13984-1°m 96848-16° 99676-16¹ 99822-16°-h 99098-1i 13640-16¹ 13984-1°m 961226-16°-q 99681-16° 99820-16°-i 99097-1k 13977-1°n 96848-16° 99681-16° 99820-16°-i 99098-1i 13640-16¹ 13984-1°m 961356-16°-r 99681-16° 99820-16°-i 99098-1i 13640-16¹ 13984-1°m 961356-16°-r 99681-16° 99820-16°-i 99098-1i 13640-16¹ 13984-1°m 961356-16°-r 99681-16° 99820-16°-i 99098-1i 13640-16¹ 13984-1°m 13977-1°n		13763TR-16°
961226-16°-4 99681-16° 99820-16°-i 99097-1k 13977-1°n 96848-16° 99676-16 ^f 99822-16°-h 99098-1j 13640-16¹ 13984-1°m 96848-16° 99681-16° 99820-16°-i 99097-1k 13977-1°n 96848-16° 99676-16 ^f 99822-16°-h 99098-1j 13640-16¹ 13984-1°m 96848-16° 99681-16° 99820-16°-i 99098-1j 13640-16¹ 13984-1°m 961356-16°-r 99681-16° 99820-16°-i 99097-1k 13977-1°n		13763TR-16°
961226-16°- ⁴ 99681-16 ^g 99820-16°- ⁱ 99097-1 ^k 13977-1* ⁿ 99661-16 ^c 99822-16°- ^h 99098-1 ^j 13640-16 ^l 13984-1* ^m 961356-16°- ^l 99681-16 ^g 99820-16°- ⁱ 99097-1 ^k 13977-1* ⁿ		13763TR-16°
961356-16 ^{e,r} 99681-16 ^g 99820-16 ^{e,i} 99097-1 ^k 13977-1* ⁿ		13763TR-16°
		13763TR-16°
96848-16° 99676-16 ^f 99822-16°. ^h 99098-1 ^j 13640-16 ^l 13984-1 ^{*m} 961356-16°. ^r 99681-16 ^g 99820-16°. ^j 99097-1 ^k 13977-1 ^{*n} 99663-16 ^t		13763TR-16°
96848-16° 99676-16 ^f 99822-16°. ^h 99098-1 ^j 13640-16 ^l 13984-1 ^{*m} 961356-16°. ^r 99681-16 ^g 99820-16°. ^j 99097-1 ^k 13977-1 ^{*n} 99663-16 ^t		13763TR-16%
96848-16° 99676-16 ^f 99822-16°. ^h 99098-1 ^j 13640-16 ^l 13984-1 ^{*m} 961356-16°. ^r 99681-16 ^g 99820-16°. ^j 99097-1 ^k 13977-1 ^{*n} 99663-16 ^t		13763TR-16°

- Requires cam button spacer and a 11990-1 (.489" I.D.) or 11989-1 (.500" I.D. Accel) aluminumbronze distributor drive gear. For engines equipped with mechanical fuel pumps, fuel pump pushrod 11985-1 is highly recommended to prevent fuel pump lobe wear.

 Camshaft has SFO firing order, with 4/7 swap.

 Pro Series vertical locking bar roller lifters.

 Ultra Pro Series vertical locking bar roller lifters for .904" diameter lifter bores.

- Must machine cylinder heads.

 Titanium for 3/8" dia. valve stems, must use **99098-1** valve stem locks, included with the retainers.

 Titanium for 11/32" dia. valve stems, must use **99097-1** valve stem locks, included with the retainers.

 For 3/8" dia. valve stems.
- For 11/32" dia. valve stems. Machined steel, heat treated for 3/8" dia. valve stems.

- **k** Machined steel, heat treated for 11/32" dia. valve stems.
- Pro Series one-piece.
- **m** Pro Series steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set.

 Pro Series steel billet gears and roller chain set with thrust bearing.

 1991-95 engines require the installation of **99157-16** 7/16" rocker arm studs and **13650-1** pushrod guideplates (machining required).

 1.7 ratio, 7/16" stud, Wide Body. Valve Train Stabilizer available, see page 363.

 Requires **99661-16** titanium retainers

- For 2.100" assembly height, requires **99663-16** titanium retainers.

 Titanium, for **961226-16** valve springs, requires Crane Multi Fit valve stem locks.

 Titanium, for **961356-16** valve springs, requires Crane Multi Fit valve stem locks.

COMPLETE CAM SPECIFICATIONS										
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Camsha	fts									
Brute low end torque and HP, smooth idle, daily usage, fuel efficiency, towing, 2000-2600 cruise RPM, 8.5 to 9.5 compression ratio advised. Good cam for Tuner.		800- 5000	168711" ^a	26535-16 ^b 13532-16 ^c	204 214	260 270	112	(5) 29 44 (10)	.000	
Excellent low end & mid range torque and HP, good idle, daily usage, off road, towing, performance & fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised. Good cam for Tuner.	HR-214/325-25-12 IG	1200- 5000	168721*a	26535-16 ^b 13532-16 ^c	214 220	276 282	112	0 34 47 (7)	.000 .000	.553 .564
Good low end and mid range torque and HP, good idle, moderate performance usage, auto trans w/2000+ converter, 2800-3200 cruise RPM, 9.0 to 10.75 com- pression ratio advised. Also mild marine performance w/performance exhaust.	HR-222/339-25-12 IG	1400- 5400	168781°a	26535-16 ^b 13532-16 ^c	222 230	284 292	112	4 38 52 (2)	.000 .000	.576 .598
Excellent mid range torque and HP, fair idle, moderate performance usage, crate motor upgrade, mild bracket racing, auto trans w/2500+ converter, mild marine performance, mild supercharged, 3000-3400 cruise RPM, 9.5 to 11.0 compression ratio advised. Good cam for Tuner.	HR-226/345-25-12 IG	1600- 5600	168731*a	26535-16 ^b 13532-16 ^c	226 236	288 298	112	6 40 55 1		.587 .610
Excellent mid range torque and upper RPM HP, fair idle, moderate performance usage, crate motor upgrade, auto trans w/2800+ converter, mild supercharged, 3200-3600 cruise RPM, 9.75 to 11.25 compression ratio advised. Good cam for Tuner.	HR-226/345-2S-14 IG	1800- 5800	168791*a	26535-16 ^b 13532-16 ^c	226 236	288 298	114	4 42 57 (1)	.000 .000	
Good mid range torque and HP, fair idle, moderate performance usage, crate motor upgrade, good mid range HP, mild bracket racing, auto trans w/2500+converter, marine performance, mild supercharged, 3200-3600 cruise RPM, 10.0 to 11.5 compression ratio advised.	HR-230/352-2S-12 IG	2000- 5800	168761*a	26535-16 ^b 13532-16 ^c	230 236	292 298	112	8 42 57 (1)	.000 .000	.598 .610
Excellent mid range and upper RPM torque and HP, rough idle, performance usage, mild bracket racing w/heavy car, auto trans w/3000+ converter, 3400-3800 cruise RPM, 10.0 to 11.25 compression ratio advised.	HR-236/359-2S-10 IG	2200- 5800	168801*a	26535-16 ^b 13532-16 ^c	236 244	298 306	110	13 43 57 7		.610 .632
Good mid range and upper RPM torque and HP, rough idle, performance usage, crate motor upgrade, mild bracket racing, auto trans w/3000+ converter, marine performance, 3400-3800 cruise RPM, 10.5 to 11.75 compression ratio advised.	HR-236/359-2S-12 IG	2200- 6000	168741*a	26535-16 ^b 13532-16 ^c	236 244	298 306	112	11 45 59 5		.610 .632

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous power, torque and RPM potential. Due to their RPM capability and increased valve travel it is HIGHLY RECOMMENDED that the appropriate Crane valve train components be installed for maximum performance and reliability.

valve train components be installed for maximum performance and reliability.

NOTE: The 1996-00 Gen VI engines can use these camshafts and components if they are converted to adjustable rocker arms by installing 99152-16 rocker arm studs (no machining required) and factory pushrod guideplates, providing open valve spring pressures do not exceed 480 pounds. Custom length pushrods can also be made to achieve correct lifter

preload if standard non-adjustable rocker arms are retained. See page 305 for special pushrod ordering instructions and page 374 for checking your hydraulic lifter preload. NOTE: Left Hand rotation camshafts are available on special order.

Contact Crane's Performance Consultants for details.
Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	99896-16 99832-16 ^d	99955-16 99976-16°	99822-16 ^f	99098-19	13628-16 ^h 13642-16 ^{h,i} 13629-16 ^j 13643-16 ^{j,i}	16977-1* ^k	13801C-16 ^{l,m}	13774-16 ^{m,n} 13744-16 ^{m,o}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16 99832-16 ^d	99955-16 99976-16°	99822-16 ^f	99098-1 ⁹	13628-16 ^h 13642-16 ^{h,i} 13629-16 ^j 13643-16 ^{j,i}	16977-1 ^{*k}	13801C-16 ^{l,m}	13774-16 ^{m,n} 13744-16 ^{m,o}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16 99832-16 ^d	99955-16 99976-16°	99822-16 ^f	99098-19	13628-16 ^h 13642-16 ^{h,i} 13629-16 ^j 13643-16 ^{j,i}	16977-1* ^k	13801C-16 ^{I,m}	13774-16 ^{m,n} 13744-16 ^{m,o}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16 99832-16 ^d	99955-16 99976-16°	99822-16 ^f	99098-19	13628-16 ^h 13642-16 ^{h,i} 13629-16 ^j 13643-16 ^{j,i}	16977-1" ^k	13801C-16 ^{l,m}	13774-16 ^{m,n} 13744-16 ^{m,o}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16 99832-16 ^d	99955-16 99976-16°	99822-16 ^f	99098-19	13628-16 ^h 13642-16 ^{h,i} 13629-16 ^j 13643-16 ^{j,i}	16977-1* ^k	13801C-16 ^{l,m}	13774-16 ^{m,n} 13744-16 ^{m,o}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16 99832-16 ^d	99955-16 99976-16°	99822-16 ^f	99098-19	13628-16 ^h 13642-16 ^{h,i} 13629-16 ^j 13643-16 ^{j,i}	16977-1* ^k	13801C-16 ^{l.m}	13774-16 ^{m,n} 13744-16 ^{m,o}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16 99832-16 ^d	99955-16 99976-16°	99822-16 ^f	99098-19	13628-16 ^h 13642-16 ^{h,i} 13629-16 ^j 13643-16 ^{j,i}	16977-1* ^k		13774-16 ^{m,n} 13744-16 ^{m,o}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16 99832-16 ^d	99955-16 99976-16°	99822-16 ^f	99098-19	13628-16 ^h 13642-16 ^{h,i} 13629-16 ^j 13643-16 ^{j,i}	16977-1* ^k		13774-16 ^{m,n} 13744-16 ^{m,o}	13750-16 ^{m,p} 13763TR-16 ^{m,q}





- Camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required.
- For use with standard GM alignment bars. Required for use with camshafts having greater than stock lobe lift.
- Vertical locking bar hydraulic roller lifters, no machining required.
- Ovate wire beehive spring, requires **99976-16** retainers. Steel, for **99832-16** beehive springs.
- Must machine cylinder heads. Machined steel, heat treated.
- Heavy wall, heat treated, for standard deck height blocks with adjustable rocker arms and hydraulic roller lifters.
- Pro Series one piece.

- Heavy wall, heat treated, for +.400" deck height "Tall Blocks" with adjustable rocker arms and hydraulic roller lifters.
- **k** Pro Series steel billet gears and roller chain set with thrust bearing.
- 1.7 ratio, Nitro Carb, extra long slot for 1.560" maximum 0.D. valve springs. m Gen VI cylinder heads require the installation of 99152-16 7/16" rocker arm studs (no machining
- required) and factory pushrod guideplates.

 n Crane Classic extruded, 1.7 ratio. Valve Train Stabilizer available, see page 363.

- Energizer, 1.7 ratio. Valve Train Stabilizer available, see page 363.
 1.7 ratio. Valve Train Stabilizer available, see page 363.
 1.7 ratio Wide Body. Valve Train Stabilizer available, see page 363.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/		Camshaft PART NUMBER/	See pg. 294	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	int/Exn.	Separation	Int/Exh	Exh.	Exh.	
Hydraulic Roller Camshar Good mid range & upper RPM HP, rough idle, perfor-	HR-240/365-2S-14 IG	2600-	168771*a	26535-16 ^b	240	302	114	11 49	.000	(21	
mance usage, bracket racing, manifold nitrous system, auto trans w/3500+ converter, marine performance for 540+ engines, 3800-4200 cruise RPM, 10.5 to 12.5 compression ratio advised. Good w/supercharger 18 lbs. max. boost w/8.0 max. compression ratio advised.	nn-240/303-23-14 lu	6200	\$	13532-16 ^c	248	310	114	63 5	.000		
Good mid range to upper RPM torque, rough idle, performance usage, bracket racing, auto trans w/3500+ converter, marine perf. w/aftermarket dry pipe exhaust systems or tube headers, 3600-4000 cruise RPM, best for 540+ cu.in. engines, 11.0 to 12.75 compression ratio advised.	HR-242/372-25-12 IG	2800- 6200	168811*a	26535-16 ⁶ 13532-16 ^c	242 246	304 308	112	14 48 60 6	.000		
Good mid range to upper RPM torque and HP, rough idle, performance usage, bracket racing, auto trans w/3500+converter, marine perf. for 540+ cu.in. modified engines in performance applications w/aftermarket dry pipe exhaust systems or tube headers. Good w/manifold nitrous system, 3800-4200 cruise RPM, best for 540+cu.in. engines, 11.5 minimum compression ratio advised. Good w/Roots supercharger, 20 lbs. max. boost w/8.0 max. compression ratio advised.	HR-244/372-252-14 IG	3000- 6400	169651°a	26535-16 ⁶ 13532-16 ⁶	244 256	306 318	114	13 51 67 9	.000 .000		
Excellent upper RPM torque and HP, performance usage, bracket racing, good w/manifold nitrous system, auto trans w/3500+ converter, best in 540+ cu.in. engines. 11.5 to 12.75 compression ratio advised. Good w/supercharger, 20 lbs. maximum boost, w/8.0 maximum compression ratio advised.	HR-248/372-25-14 IG	3200- 6400	169691*a	26535-16 ^b 13532-16 ^c	248 256	310 318	114	15 53 67 9	.000 .000		
Performance usage, good upper RPM torque and HP, bracket racing, Pro, Super Pro, etc., auto trans w/4000+converter, best in 540+ cu.in., 12.5 minimum compression ratio advised.	HR-254/400-252-10 IG	3400- 6600	168831*a	26535-16 ^b 13532-16 ^c	254 262	324 332	110	21.5 52.5 66.5 16.5		.680 .680	
Performance usage, good upper RPM torque and HP, bracket racing, good w/large manifold nitrous system, auto trans w/race converter, best in 540+ cu.in. engines w/prepared cylinder heads. 12.5 minimum compression ratio advised. Good w/large supercharger, 22 lbs. maximum boost w/8.5 maximum compression ratio advised.	HR-254/400-2S4-14 IG	3600- 6800	168841*a	26535-16 ^b 13532-16 ^c	254 262	324 332	114	17.5 56.5 69.5 12.5	.000 .000		
Performance usage, good upper RPM torque and HP, bracket racing, Super Gas, Super Comp, auto trans w/race converter, best in 572+ cu.in. engines w/prepared cylinder heads, 12.5 minimum compression ratio advised.	HR-262/400-2S-14 IG	3800- 6800	168851*a	26535-16 ^b 13532-16 ^c	262 264	332 326	114	21.5 60.5 71 13	.000 .000		
Performance usage, good upper RPM HP, bracket racing, Super Gas, Super Comp, auto trans w/4000+ converter, best in 572+ cu.in. engines w/prepared cylinder heads, good w/large manifold nitrous system, 12.5 min. com- pression ratio advised. Good w/large supercharger 26 lbs. max. boost w/8.5 max. compression ratio advised.	HR-262/400-251-14 IG	3800- 7000	169711*a	26535-16 ⁶ 13532-16 ^c	262 270	332 340	114	21.5 60.5 73.5 16.5	.000		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous power, torque and RPM potential. Due to their RPM capability and increased valve travel it is HIGHLY RECOMMENDED that the appropriate Crane valve train components be installed for maximum performance and reliability.

NOTE: The 1996-00 Gen VI engines can use these camshafts and components if they are converted to adjustable rocker arms by installing 99152-16 rocker arm studs (no machining required) and factory pushrod guideplates, providing open valve spring pressures do not exceed 480 pounds. Custom length pushrods can also be made to achieve correct lifter preload if standard non-adjustable rocker arms are retained. See page 305 for special pushrod ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Left Hand rotation camshafts are available on special order. Contact Crane's Performance Consultants for details.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



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CRANE VALV	E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	99896-16 99832-16 ^d	99955-16 99976-16°	99822-16 ^f	99098-19	13628-16 ^h 13642-16 ^{h,i} 13629-16 ^j 13643-16 ^{j,i}	16977-1* ^k		13774-16 ^{m,n} 13744-16 ^{m,o}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16 99832-16 ^d	99955-16 99976-16°	99822-16 ^f	99098-1 ⁹	13628-16 ^h 13642-16 ^{h,i} 13629-16 ^j 13643-16 ^{j,i}	16977-1" ^k			13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16 99832-16 ^d	99955-16 99976-16°	99822-16 ^f	99098-19	13628-16 ^h 13642-16 ^{h, i} 13629-16 ^j 13643-16 ^{j, i}	16977-1* ^k		13774-16 ^{m,n} 13744-16 ^{m,o}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16 99832-16 ^d	99955-16 99976-16°	99822-16 ^f	99098-19	13628-16 ^h 13642-16 ^{h,i} 13629-16 ^j 13643-16 ^{j,i}	16977-1* ^k		13774-16 ^{m,n} 13744-16 ^{m,o}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16	99955-16	99822-16 ^f	99098-1 ⁹	13642-16 ^{h,i} 13643-16 ^{j,i}	16977-1* ^k		13774-16 ^{m,n}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16	99955-16	99822-16 ^f	99098-1 ⁹	13642-16 ^{h,i} 13643-16 ^{j,i}	16977-1* ^k		13774-16 ^{m,n}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16	99955-16	99822-16 ^f	99098-19	13642-16 ^{h,i} 13643-16 ^{j,i}	16977-1*k		13774-16 ^{m,n}	13750-16 ^{m,p} 13763TR-16 ^{m,q}
	99896-16	99955-16	99822-16 ^f	99098-1 ⁹	13642-16 ^{h,i} 13643-16 ^{j,i}	16977-1* ^k		13774-16 ^{m,n}	13750-16 ^{m,p} 13763TR-16 ^{m,q}

- Camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required.
- For use with standard GM alignment bars. Required for use with camshafts having greater than stock lobe lift.
- Vertical locking bar hydraulic roller lifters, no machining required.
- Ovate wire beehive spring, requires **99976-16** retainers. Steel, for **99832-16** beehive springs.

- Must machine cylinder heads.

 Machined steel, heat treated.

 Heavy wall, heat treated, for standard deck height blocks with adjustable rocker arms and hydraulic roller lifters.

 Must machine cylinder heads.

 Energizer, 1.7 ratio. Valve Train Stabilizer available, see page 363.

 p 1.7 ratio Wide Body. Valve Train Stabilizer available, see page 363.
- Pro Series one piece.

- Heavy wall, heat treated, for +.400" deck height "Tall Blocks" with adjustable rocker arms and hydraulic roller lifters.
- **k** Pro Series steel billet gears and roller chain set with thrust bearing.
- 1.7 ratio, Nitro Carb, extra long slot for 1.560" maximum 0.D. valve springs.
- m Gen VI cylinder heads require the installation of 99152-16 7/16" rocker arm studs (no machining required) and factory pushrod guideplates.

 n Crane Classic extruded, 1.7 ratio. Valve Train Stabilizer available, see page 363.

	COMPLETE CAM SPECIFICATIONS									
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Mechanical Roller Camsh	afts									
Excellent low end and mid range torque and HP, fair idle, moderate performance usage, marine performance, bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 10.5 to 11.5 compression ratio advised. Also mild supercharged, 10 lbs. maximum boost w/8.5 maximum compression ratio advised.	SR-238/350-25-12 IG	2800- 6600	168551*a	16510-16 ^b 13570-16 ^c	238 246	288 296	112	12 46 60 6	.020 .020	
Good low end and mid range torque and HP, fair idle, moderate performance usage, marine performance, bracket racing, auto trans w/3000+ converter, 3800- 4200 cruise RPM, 10.5 to 12.0 compression ratio advised.	SR-246/362-2S-10 IG	3000- 6800	168601*a	16510-16 ^b 13570-16 ^c	246 254	296 304	110	18 48 62 12		.615 .636
Good mid range to upper RPM torque and HP, rough idle, performance usage, marine performance, bracket racing, auto trans w/4000 + converter, 4200-4600 cruise RPM, 11.0 to 12.5 compression ratio advised.	SR-254/374-2S-12 IG	3400- 7200	168631*a	16510-16 ^b 13570-16 ^c	254 262	304 312	112	19 55 67 15	.020 .020	.636 .636
Performance usage, good low and mid range torque and HP, rough idle, bracket racing, auto trans w/3500+ converter, 11.0 to 12.5 compression ratio advised. Good w/manifold nitrous system. Also supercharged, 18 lbs. maximum boost w/ 8.0 maximum compression ratio advised.	R-254/420-25-12 IG	3600- 7200	168401*a	16510-16 ^b 13570-16 ^c	254 262	286 294	112	19 55 67 15	.020 .020	
Performance usage, bracket racing, good mid to upper RPM Torque and HP, Pro, Super Pro, etc., auto trans w/ race converter, 12.0 minimum compression ratio advised.	R-264/420-2S-10 IG	4200- 7400	168411*a	16510-16 ^b 13570-16 ^c	264 270	296 302	110	26 58 69 21	.020 .020	
Competition only, bracket racing, good upper RPM Torque and HP, Super Pro, Super Gas, Super Comp, etc., auto trans w/race converter, 12.5 minimum compression ratio advised.	R-274/4334-2S-10 IG	4600- 8000	168291*a	16510-16 ^b 13570-16 ^c	274 284	314 324	110	30 64 75 29	.026 .026	
Competition only, good upper RPM HP, 500+ cu.in., bracket racing, auto trans w/race converter, good w/large manifold nitrous system, 12.5 minimum compression ratio advised. Good w/large Roots supercharger, 24 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-274/4334-25-14 IG	4800- 8200	168351*a	16510-16 ^b 13570-16 ^c	274 284	314 324	114	26 68 79 25	.026 .026	

RPM range shown is for average usage. These cam profiles

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: The 1996-00 Gen VI engines can use these camshafts and components if they are converted to adjustable rocker arms by installing 99152-16 rocker arm studs (no machining required) and factory pushrod guideplates, providing open valve spring pressures do not exceed 480 pounds.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



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CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE Springs	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classio Energizer	
	99876-16 ^d 99832-16 ^e	99955-16 99676-16 ^f 99976-16 ^g	99822-16 ^d	99098-1 ^h	13634-16 ⁱ 13640-16 ^j 13635-16 ^k	16977-1* ¹		13774-16 ^{m,n}	13750-16 ^{m,o} 13763TR-16 ^{m,p}
	99876-16 ^d 99832-16 ^e	99955-16 99676-16 ^f 99976-16 ^g	99822-16 ^d	99098-1 ^h	13634-16 ⁱ 13640-16 ^j 13635-16 ^k	16977-1* ¹		13774-16 ^{m,n}	13750-16 ^{m,o} 13763TR-16 ^{m,p}
	99876-16 ^d 99832-16 ^e	99955-16 99676-16¹ 99976-16³	99822-16 ^d	99098-1 ^h	13634-16 ⁱ 13640-16 ^j 13635-16 ^k	16977-1* ⁱ		13774-16 ^{m,n}	13750-16 ^{m,o} 13763TR-16 ^{m,p}
	96886-16 ^d	99955-16 99676-16 ^f	99822-16 ^d	99098-1 ^h	13634-16 ⁱ 13640-16 ^j 13635-16 ^k	16977-1* ¹		13774-16 ^{m,n}	13750-16 ^{m,o} 13763TR-16 ^{m,p}
	96886-16 ^d	99955-16 99676-16 ^f	99822-16 ^d	99098-1 ^h	13634-16 ⁱ 13640-16 ^j 13635-16 ^k	16977-1* ¹		13774-16 ^{m,n}	13750-16 ^{m,o} 13763TR-16 ^{m,p}
	96886-16 ^d	99955-16 99676-16 ^f	99822-16 ^d	99098-1 ^h	13634-16 ⁱ 13640-16 ^j 13635-16 ^k	16977-1* ¹		13774-16 ^{m,n}	13750-16 ^{m,o} 13763TR-16 ^{m,p}
	96886-16 ^d	99955-16 99676-16 ^f	99822-16 ^d	99098-1 ^h	13634-16 ⁱ 13640-16 ^j 13635-16 ^k	16977-1* ¹		13774-16 ^{m,n}	13750-16 ^{m,o} 13763TR-16 ^{m,p}
					15055 10				

- Camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required.
- For use with standard GM alignment bars.
 Ultra Pro Series vertical locking bar roller lifters, no machining required.
- Must machine cylinder heads.
- Ovate wire beehive spring, requires 99976-16 retainers.

 Titanium, must use 99098-1 valve stem locks, included with the retainers.
- Steel, for **99832-16** beehive springs.
- Machined steel, heat treated.
- Heavy wall, heat treated.

- k Heavy wall, heat treated, for +.400" deck height "Tall Blocks".
 Pro Series steel billet gears and roller chain set with thrust bearing.
 m Crane Classic extruded, 1.7 ratio. Valve Train Stabilizer available, see page 363.
- Gen VI cylinder heads require the installation of 99152-167/16" rocker arm studs (no machining required) and factory pushrod guideplates. 480 pounds maximum valve spring pressure advised.
 1.7 ratio. Valve Train Stabilizer available, see page 363.
- **p** 1.7 ratio Wide Body. Valve Train Stabilizer available, see page 363.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Roller Camsha	fts										
Brute low end torque, smooth idle, daily usage, fuel economy, towing, mild marine usage, 1600-2200 cruise RPM, 8.0 to 9.5 compression ratio advised.	HR-208/292-25-16 IG	800- 4600	268701°a	26535-16 ^b	208 214	264 270	116	(7) 35 48 (14)	.000 .000		
Excellent low end torque and HP, good idle, daily usage, off road, towing, performance and fuel efficiency, computer upgrades may be required, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised. Marine performance usage with free flowing above water exhaust system.	HR-216/325-25-14 IG	1200- 5000	268711*a	26535-16 ^b	214 220	276 241	114	(2) 36 49 (9)		.553 .564	
Good mid range torque and HP, good idle, moderate performance usage, mild supercharged, computer upgrades required, 8.75 to 10.5 compression ratio advised. Marine performance usage with free flowing above water exhaust system.	HR-222/339-25-12 IG	1400- 5400	268721*a	26535-16 ^b	222 230	284 292	112	4 38 52 (2)		.576 .598	
Good mid range torque and HP, fair idle, moderate performance usage, mild supercharged, computer upgrades required, 9.0 to 11.0 compression ratio advised. Marine performance usage in modified engines with aftermarket high flow abovve water exhaust systems.	HR-226/345-2S-14 IG	1600- 5600	268731*a	26535-16 ^b	226 234	288 296	114	4 42 56 (2)		.587 .610	
Good mid range HP, fair idle, performance usage, computer upgrades required, 9.5 to 11.0 compression ratio advised. Marine performance usage w/ modified engines having aftermarket dry pipe exhaust systems.	HR-230/352-25-14 IG	1800- 5800	268761*a	26535-16 ^b	230 236	292 298	114	6 44 57 (1)	.000 .000	.598 .610	
Good mid range HP, rough idle, performance usage, mild supercharged, computer upgrades required, 10.0 to 11.5 compression ratio advised. Marine performance usage with modified engines having aftermarket dry pipe exhaust systems.	HR-236/359-251-14 IG	2200- 6000	268741*a	26535-16 ^b	236 244	298 306	114	9 47 61 3		.610 .632	
Good upper RPM HP, rough idle, performance usage for increased displacement engines, computer upgrades required, 10.0 to 11.0 compression ratio advised. Marine performance for highly modified engines with aftermarket dry pipe exhaust or tube headers.	HR-240/365-2S-12 IG	2600- 6200	268771*a	26535-16 ^b	240 248	302 310	112	13 47 61 7		.621 .632	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Crane Hydraulic Roller Cams offer tremendous power, torque and RPM potential. Due to their RPM capability and increased valve travel it is HIGHLY RECOMMENDED that the appropriate Crane valve train components be installed for maximum performance and reliability.

NOTE: For best performance and reliability, these engines should be converted to adjustable rocker arms by installing 99155-16 rocker arm studs (no machining required) and appropriate rocker arms. Custom length pushrods can also be made to achieve correct lifter preload if standard non-adjustable rocker arms are retained. See page 305 for special pushrod ordering instructions and page 374 for checking your hydraulic lifter preload.

your hydraulic lifter preload.
Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



					-			-	
CRANE VALV	/E TRAIN CC	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUI Crane Classi Energizer	M ROCKERS — C/ Gold Race
	99896-16 99832-16 ^c	99964-16 99976-16 ^d	99822-16°	99098-1 ^f	26640-16 ⁹	26977-1 ^{*h}		13774-16 ^{i,j} 13744-16 ^{i,k}	13750-16 ^{i,I} 13763TR-16 ^{i,m}
	99896-16 99832-16 ^c	99964-16 99976-16 ^d	99822-16°	99098-1 ^f	26640-16 ⁹	26977-1*h		13774-16 ^{i,j} 13744-16 ^{i,k}	13750-16 ^{i,I} 13763TR-16 ^{i,m}
	99896-16 99832-16 ^c	99964-16 99976-16 ^d	99822-16°	99098-1 ^f	26640-16 ⁹	26977-1*h		13774-16 ^{i,j} 13744-16 ^{i,k}	13750-16 ^{i,l} 13763TR-16 ^{i,m}
	99896-16 99832-16 ^c	99964-16 99976-16 ^d	99822-16°	99098-1 ^f	26640-16 ⁹	26977-1" ^h		13774-16 ^{i,j} 13744-16 ^{i,k}	13750-16 ^{i,I} 13763TR-16 ^{i,m}
	99896-16 99832-16 ^c	99964-16 99976-16 ^d	99822-16 ^e	99098-1 ^f	26640-16 ⁹	26977-1*h		13774-16 ^{i,j} 13744-16 ^{i,k}	13750-16 ^{i,I} 13763TR-16 ^{i,m}
	99896-16 99832-16 ^c	99964-16 99976-16 ^d	99822-16°	99098-1 ^f	26640-16 ^g	26977-1*h		13774-16 ^{i,j} 13744-16 ^{i,k}	13750-16 ^{i,I} 13763TR-16 ^{i,m}
	99896-16 99832-16 ^c	99964-16 99976-16 ^d	99822-16°	99098-1 ^f	26640-16 ⁹	26977-1*h		13774-16 ^{i,j} 13744-16 ^{i,k}	13750-16 ^{i,l} 13763TR-16 ^{i,m}

- Camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required.
- **b** For use with standard GM alignment bars. Required for use with camshafts having greater than stock lobe lift (.335").
- Ovate wire beehive spring, requires **99976-16** retainers. Steel, for **99832-16** beehive springs.
- Must machine cylinder heads.
- Machined steel, heat treated.
- Pro Series one piece.

- h Pro Series steel billet gears and roller chain set with thrust bearing.
 8.1L cylinder heads require the installation of 99155-167/16" rocker arm studs (no machining required) and factory pushrod guideplates. Crane Classic extruded, 1.7 ratio, 7/16" stud.
- Energizer, 1.7 ratio, 7/16" stud. 1.7 ratio, 7/16" stud.
- m 1.7 ratio Wide Body.

					СОМ	PLETE C	AM SPE	CIFICATION	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 286 FOLLOWERS	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Valve Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Roller Follower	Camshafts										
Good idle, performance usage, good mid to upper RPM HP, street, drag race, OK with nitrous, aftermarket intake/exhaust advised.	CHR-242-25-6	1000- 6500	158-0010°		196 200	242 250	106	(11) 27 27 (7)	.000 .000		
Good idle, performance usage, for use with turbo, good upper RPM HP, intercooler advised, aftermarket intake/low restriction exhaust required.	CHR-250-2SR-8	1500- 6800	158-0012*		204 200	250 250	108	(9) 33 29 (9)	.000		
Performance usage, primarily drag race, good upper RPM HP, good with turbo, intercooler advised, high flowing cylinder head/intake/large exhaust advised, aftermarket ECM required, 12.0+ minimum compression ratio required.	CHR-262-2SR-8	2500- 7500	158-0014*		216 212	262 262	108	(3) 39 35 (3)		.355 .345	
Performance usage, drag race, good upper RPM HP, for use with turbo, intercooler advised, high flowing cylinder head/intake/large exhaust advised, aftermarket ECM required, 12.0+ minimum compression ratio required.	CHR-272-25-14	3000- 7800	158-0016*		226 226	272 282	114	1 45 52 (6)	.000 .000	.355 .345	
Competition only, radical drag race, good upper RPM HP, turbo with intercooler, high flowing cylinder head/intake/large exhaust advised, aftermarket ECM required, 12.0+ minimum compression ratio required.	CHR-232/400-2SR-10	3200- 8000	158-0018*a		232 230	280 285	110	7 45 50 0	.000 .000	.400 .400	
Competition only, radical drag race, good high RPM HP, turbo with intercooler, high flowing cylinder head/intake/large exhaust advised, aftermarket ECM required, 12.0+ minimum compression ratio required.	CHR-236/440-2SR-12	3500- 8500	158-0020*a		236 230	280 285	112	8 48 52 (2)	.000		
	Stock (For comparison purposes only)				192 198	247 265	110		.000 .000	.309 .275	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING BELT AND SPROCKET ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC/ ENERGIZER	ROCKERS — GOLD RACE
903-2003 ^b	158830-16 ^c	158660-16 ^d		lr	ntake CHR-226		-232/400*	CHR-236/440*	
903-2003 ^b	158830-16 ^c	158660-16 ^d			xhaust CHR-226 Requires Ferrea lash c		-230/400*		
903-2003 ^b	158830-16 ^c	158660-16 ^d							
903-2003 ^b	158830-16 ^c	158660-16 ^d							
903-2003 ^b	158830-16 ^c	158660-16 ^d							
903-2003 ^b	158830-16 ^c	158660-16 ^d							

a Requires Ferrea lash caps, part no. C10008.b Includes valve springs and titanium retainers.

c Requires 158660-16 retainers.d Titanium, for use with standard valve locks.

					COM	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 286 FOLLOWERS	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Valve Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Follower	Camshafts									
Good idle, daily usage, good mid range HP, perfor-	CHR-242-6 ^a	1000-	180-0010*a		200	242	106	(3) 23	.000	.354
mance upgrade for stock engine, aftermarket intake/ exhaust and ECM advised.	411D 0 40 40h	6500	•		200	242	110	29 (9)	.000	.354
exitadist and Ecivi adviscu.	CHR-242-10 ^b	1000- 6500	193-0010*b		200 200	242 242	110	(7) 27 33 (13)	.000	.354 .354
Good idle, performance usage, for use with turbo,	CHR-246-2SR-6ª	1500-	180-0014*a		204	246	106	1 23	.000	.364
good upper RPM HP, intercooler advised, aftermarket	CIIII-240-25II-0	6800	3		196	238	100	29 (13)	.000	.345
intake/low restriction exhaust required.	CHR-246-2SR-10b	1500-	193-0014*b		204	246	110	(3) 27	.000	.364
		6800	•		196	238		33 (17)	.000	.345
Good idle, performance usage, street, drag race, intended for use with nitrous, aftermarket intake/	CHR-246-8 ^a	1500- 6800	180-0012*a		204 204	246	108	(3) 27	.000	.364 .364
exhaust and ECM advised.	CHR-246-12 ^b	1500-	193-0012b		204	246 246	112	33 (9) (7) 31	.000	.364
		6800	€		204	246		37 (13)	.000	.364
Performance usage, drag race, turbocharger with	CHR-250-2SR-6ª	2200-	180-0015*a		208	250	106	(2) 30	.000	.374
intercooler, good upper RPM HP, high flowing cylinder head/intake/large exhaust advised, 11.0+ minimum	CUD 250 250 ch	7500	402 004 F*h		204	246	106	28 (4)	.000	.364
compression ratio and aftermarket ECM required.	CHR-250-2SR-6 ^b	2200- 7500	193-0015*b		208 204	250 246	106	(2) 30 28 (4)	.000	.374 .364
Fair idle, performance usage, drag race, good mid and	CHR-250-6ª	2000-	180-0016*a		208	250	106	2 26	.000	.374
upper RPM HP, high flowing cylinder head/intake/	CIII 250 0	7200	€		208	250	100	34 (6)	.000	.374
exhaust and aftermarket ECM advised.	CHR-250-10 ^b	2000-	193-0016*b		208	250	110	(2) 30	.000	.374
		7200	•		208	250		38 (10)	.000	.374
Performance usage, drag race, good upper RPM HP, high flowing cylinder head/intake/large exhaust	CHR-258-8ª	2500- 7500	180-0018*a		216 216	258 258	108	4 32 40 (4)	.000	.394 .394
advised, 12.0+ minimum compression ratio and after-	CHR-258-12 ^b	2500-	193-0018*b		216	258	112	0 36	.000	.394
market ECM required.		7500	€		216	258		44 (8)	.000	.394
Competition only, drag race, good upper RPM HP, high	CHR-266-10ª	2800-	180-0020*a		224	266	110	2 42	.000	.413
flowing cylinder head/intake/large exhaust advised, 12.5+ minimum compression ratio and aftermarket	din saa ask	7800	•		224	266	440	42 2	.000	.413
ECM required.	CHR-266-10 ^b	2800- 7800	193-0020 ^{*b} €		224 224	266 266	110	2 42 42 2	.000	.413 .413
Competition only, drag race, good high RPM HP, high	CHR-274-10a	3200-	180-0022*a		232	274	110	6 46	.000	.433
flowing cylinder head/intake/large exhaust advised,	CIII 274 10	8000	€		232	274	110	46 6	.000	.433
13.0+ minimum compression ratio and aftermarket ECM required.	CHR-274-10 ^b	3200-	193-0022*b		232	274	110	6 46	.000	.433
<u> </u>		8000	•		232	274		46 6	.000	.433
Competition only, drag race, good high RPM HP, high flowing cylinder head/intake/large exhaust advised,	CHR-282-6 ^a	3600- 8200	180-0024*a		240 240	282 282	106	18 42 50 10	.000	.453 .453
13.0+ minimum compression ratio and aftermarket	CHR-282-6 ^b	3600-	193-0024*b		240	282	106	18 42	.000	.453
ECM required.		8200	€		240	282	* =	50 10	.000	.453
Competition only, radical drag race, high RPM HP, high	CHR-290-6ª	4000-	180-0026*a		248	290	106	22 46	.000	.472
flowing cylinder head/intake/large exhaust advised,	CIID 200 Ch	8600	402 002 C*h		248	290	100	54 14	.000	.472
13.0+ minimum compression ratio and aftermarket — ECM required.	CHR-290-6 ^b	4000- 8600	193-0026*b		248 248	290 290	106	22 46 54 14	.000	.472 .472
<u> </u>	CHR-296-6 ^a	4400-	180-0028*a		256	290	106	26 50	.000	.472
flowing cylinder head/intake/large exhaust advised,	CIIN-270-0	8800	10U-UU20 °		256	296 296	100	58 18	.000	.492
13.5+ minimum compression ratio and aftermarket — ECM required.	CHR-296-6 ^b	4400-	193-0028*b		256	296	106	26 50	.000	.492
LCIVI IEQUIIEU.		8800	€		256	296		58 18		.492
	Stock				196	243	108		.000	
	(For comparison purposes only)				196	243			.000	.315
	Stock				194	248	113		UUU	325
	Stock (For comparison purposes only)				194 196	248 248	113		.000	.325 .259

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING BELT AND SPROCKET ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM R Crane Classic/ Energizer	ROCKERS — Gold Race
903-2002 ^c	180830-16 ^d	158660-16°			Custom grinds availa CHR-224/413	ible using the followin CHR-232/433	g lobes: CHR-24	0/453	
903-2002°	180830-16 ^d	158660-16°			CHR-248/472 CHR-268/492	CHR-256/492	CHR-26		
903-2002°	180830-16 ^d	158660-16°							
903-2002°	180830-16 ^d	158660-16°							
903-2002°	180830-16 ^d	158660-16°							
903-2002 ^c	180830-16 ^d	158660-16°							
903-2002 ^c	180830-16 ^d	158660-16°							
903-2002 ^c	180830-16 ^d	158660-16°							
903-2002 ^c	180830-16 ^d	158660-16°							
903-2002°	180830-16 ^d	158660-16°							
903-2002 ^c	180830-16 ^d	158660-16°							

For Neon 2.0 - 2.4L. For SRT-4 and PT Cruiser 2.4L.

Includes valve springs and titanium retainers.

d Requires 158660-16 retainers.

e Titanium, for use with standard valve locks.

Chrysler Small Block V8 Tech Tips & Notes

1957-1958 392 Hemi V8

Although not usually considered to be a Chrysler Small Block, these early Chysler Hemi engines provided the basic architecture for the "A" and "LA" engines that followed. Although visually similar, the Dodge and DeSoto hemis (and the polyspherical variants) of the 1950's were unique engines that had little interchangeability with the Chrysler versions.

Our 53 prefix is for the 1951–1956 301–331–354 hemis, while the 54 prefix designates the 1957–1958 392 hemi. There is a lifter bore bank angle change between these two families, so be careful since these camshafts have the same basic dimensions. The cams can be physically interchanged, but performance would be poor, as valve timing would be incorrect from bank to bank. A 392 type timing chain set will also be required when installing these camshafts in the earlier 301–354 engines.

Retrofit hydraulic roller camshafts and drop in hydraulic roller lifters are offered, along with most valve train components. With the hydraulic roller applications, there may have to be some clearancing performed on the cylinder block and heads where the pushrods pass through, due to the taller lifters changing the pushrod angles, but modern camshaft technology can easily be applied to this half-century old powerplant.

Mechanical roller camshafts and drop in roller lifters for applications ranging from mild street to Nostalgia Top Fuel are also available, along with most valve train components. Whether you're using stock cast iron heads, or the latest billet aluminum pieces, we can supply the proper valve springs, retainers, and other parts to suit your needs.

1964-1987 273-340-360 (5.9L) & 1967-1986 318 "LA" V8

This engine family is commonly referred to as the Small Block Chrysler V8. Properly called the "LA" series, it is an evolution of the 1956-1966 "A" family, which included displacements of 277-301-303-318-326 cu.in. The A was noted for its Polyspherical combustion chamber/staggered valve cylinder heads (one rocker shaft per head, with the intake and exhaust rockers pointing in opposite directions), and mechanical lifters (except the 1959 Chrysler 326). The important part of this heritage is to help explain the unusual 59 degree lifter bore bank angle that carried over into the LA family. This was used in the A to provide the best compromise for lifter to pushrod angles for its inline lifter bore blocks. Also note there were 1964-1966 318 engines that were still the A version, and should not be confused with the 1967-1986 LA 318.

When upgrading to the LA (Lightweight A) family, Chrysler maintained the 59 degree lifter bore angle in the blocks, even though the valves were now inline, in a normally configured wedge chambered cylinder head. Shaft mounted 1.5:1 ratio rocker arms were employed. This resulted in an awkward appearing angle between the lifters and push-

rods. With the change in cylinder head configuration, a different valve layout was incorporated into the heads, however the basic camshaft dimensions were maintained. Therefore, while A and LA camshafts will physically interchange, half of the lobes will be in the wrong location, allowing only four cylinders to run properly. The 1964-1967 273 engines were equipped with mechanical lifter camshafts and adjustable rocker arms. Later engines had hydraulic lifters and non-adjustable rocker arms (with a couple of rare exceptions).

There were also left-hand rotation marine engines produced that required a unique camshaft. Make certain of the engine's rotation if you have a marine application.

Be aware of both OE production and factory replacement cylinder blocks that may incorporate very large chamfers on the tops of the lifter bores. This is not usually a problem when hydraulic and mechanical flat faced camshafts and lifters are used. In certain cases, if hydraulic and mechanical roller lifters are installed in these blocks, the oiling passages in the lifters may become exposed to the chamfer at full valve lift, causing a loss of oil pressure. Possible solutions would be sleeving the lifter bores, or having a camshaft custom ground having a reduced base circle diameter.

Crane Cams' 69 prefix has been assigned to the camshafts and components for this engine family, along with its factory produced variants. Principal among these are the R3 blocks that are available from Chrysler. These are offered in 59 degree and 48 degree lifter bank angle options (also, 45 and 47 degrees on the aluminum blocks), with the 59 degree R3 block not intended for roller lifter usage. There are also a number of choices of camshaft bearing journal sizes being used. These range from the standard stepped journals, plus: 50mm (1.968") – RB (first four journals) or 5RB (all five journals) suffix; 2.000" – BB suffix; 54mm (2.125") – 54J suffix; 60mm (2.362") – 60J suffix.

We offer cast hydraulic and mechanical lifter camshafts for the LA engines having the standard journal diameter, lifter bank angle, and firing order.

Steel billet retrofit hydraulic roller camshafts and components are available. The hydraulic roller lifters have a vertical locking bar, and are a drop-in configuration, with no machining required. These camshafts are produced from steel billet material, are heat treated, and then finish ground. They also incorporate a cast iron distributor drive gear and rear journal (IG suffix), allowing the use of a standard type distributor gear for long term reliability. Some early production and some later replacement and aftermarket cylinder heads may require modifications for pushrod clearance, due to their angle having changed resulting from the higher pushrod seats in the hydraulic roller lifters.

Steel billet mechanical roller camshafts are offered with Iron Gear versions for street performance and endurance racing, having standard diameter journals. Racing mechanical roller camshafts are available in standard firing order (1-8-4-3-6-5-7-2) and SFO (1-8-7-3-6-5-4-2) firing order. Mechanical roller camshafts are also available for the various camshaft journal diameters and lifter bore bank angles as previously mentioned.



1986-1991 318 (5.2L) & 1987-1991 360 (5.9L) "LA" V8

These engines are a continuation of the LA series, being factory upgraded with hydraulic roller camshafts and lifters. Cylinder head changes were also made, with the valve spring envelope being reduced, making it very difficult to fit performance valve springs. Still designated with our 69 prefix, this engine group is listed separately to properly define the emissions legalities of the camshafts.

Hydraulic roller camshafts are offered, along with many valve train components.

Dodge R5

This is an evolution of the LA engine, designed for rules specific oval track racing. These engines were never installed in any vehicles, or sold as a complete assembly. Normally paired with the P7 cylinder heads, these are built per application for each form of competition. This is known as our 184 prefix, with 8620 steel billet roller cams having 60mm journals available on special order.

1992-2002 5.2L & 5.9L Magnum V8

The final upgrade to the LA family, the Magnum engines received non-adjustable pedestal mounted 1.6:1 ratio rocker arms from the factory. The nose of the camshaft was also shortened as a result of vehicle packaging requirements, so there is no camshaft interchangeability with the earlier LA engines. Our 70 prefix indicates this version.

We offer hydraulic roller camshafts and many valve train components for the Magnum. Our **36655-16** Pushrod Guideplate and Rocker Arm Stud Conversion Kit can be used to install adjustable stud mounted rocker arms, with no cylinder head machining required.

2002-2010 5.7L & 6.1L HEMI V8

Chrysler's latest pushrod V8 capitalizes on the heritage of the legendary Chrysler Hemi powerplants of the 50's, 60's, and 70's. Loosely based around the LA engine's architecture, these are equipped with a hydraulic roller camshaft and .842" diameter hydraulic roller lifters. Crane Cams' 198 prefix denotes our products for these engines. Whenever upgrading to a performance camshaft, the cylinder deactivation system (MDS) lifters can not be used, and computer upgrades will be required. The 392 Crate engines are also included in this group.

We currently offer hydraulic roller camshafts, and other valve train components, with more products to be introduced.

COMPLETE CAM SPECIFICATIONS

	Application	Camshaft Series/ Grind Number	rpm Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
	Hydraulic Roller Cams	:hafts—Retr	ofit								
	Good low end and mid range and HP, good idle, daily and performance usage, auto trans w/2500+ converter, 2600-3400 cruise RPM, 8.75 to 10.5 compression ratio advised.	HR-224/339-10	2000- 6000	539521 ^a 549521 ^b	68532-16 ^c	224 224	286 286	110	7 37 47 (3)	.000 .000	.509 .509
	Good mid to upper RPM torque and HP, fair idle, daily and performance usage, also mild supercharged, auto trans w/2500+ converter, 3200-4000 cruise RPM, 9.5 to 11.0 compression ratio advised, or 8.5 to 10.0 w/supercharger	HR-230/352-2-14	2600- 6600	539531 ^a 549531 ^b	68532-16 ^c	230 240	292 302	114	6 44 59 1	.000 .000	
	Good upper RPM torque and HP, rough idle, performance usage, auto trans w/ 3000+ converter, 4000-4800 cruise RPM, 11.0 to 12.5 compression ratio advised.	HR-240/365-25-8	3200- 6800	539541° 549541° ••	68532-16 ^c	240 248	302 310	108	17 43 57 11	.000	
	Mechanical Roller Car	nshafts									
,	Good low end and mid range torque, good idle, daily and performance usage, 2600-3400 cruise RPM, 8.75 to 9.75 compression ratio advised.	SR-230/338-8	2200- 6200	538491 ^{a,e} 548491 ^{b,e}	66515-16 66542-16 ^d	230 230	280 280	108	12 38 48 2	.020 .020	.507 .507
	Good mid range RPM torque and HP, good idle, daily and performance usage, also mild supercharged, auto trans w/2000+ converter, 2800-3600 cruise RPM, 9.0 to 10.5 compression ratio advised, or 8.0 to 9.0 with supercharger.	SR-230/338-25-10	2200- 6200	538501 ^{a,e} 548501 ^{b,e}	66515-16 66542-16 ^d	230 238	280 288	110	10 40 54 4	.020 .020	
	Good mid to upper RPM torque and HP, fair idle, daily and performance usage, also mild supercharged, auto trans w/2500+ converter, 3200-4000 cruise RPM, 9.5 to 11.0 compression ratio advised, or 8.5 to 10.0 with supercharger.	SR-238/350-2S-12	2800- 6600	538511 ^{a,e} 548511 ^{b,e}	66515-16 66542-16 ^d	238 246	288 296	112	12 46 60 6	.020 .020	
	Good upper RPM torque and HP, rough idle, performance usage, also supercharged, auto trans w/3000+ converter, 3600-4400 cruise RPM, 10.0 to 11.5 compression ratio advised, or 8.5 to 10.5 with supercharger.	SR-246/362-12	3200- 7000	538521 ^{a,e} 548521 ^{b,e}	66515-16 66542-16 ^d	246 246	296 296	112	16 50 60 6	.020 .020	
	Competition only, nostalgia A/F.	R-278/458-10	6000- 8600	538701 ^{a,e} 548701 ^{b,e}	66542-16 ^d	278 278	310 310	110	33 65 73 25	.020 .022	.687 .687
,	Competition only, baseline nostalgia T/F.	R-284/456-10	6000- 9900	538661 ^{a,e} 548661 ^{b,e}	66542-16 ^d	284 284	324 324	110	35 69 75 29	.026 .026	.684 .684
,	Competition only, cacklefest exhibition.	R-285/410-8		538711 ^{a,e} 548711 ^{b,e}	66542-16 ^d	285 285	328 328	108	39.5 65.5 75.5 29.5	.026 .028	.615 .615

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: Although the 1951-1956 301-331-354 camshafts have the basic same dimensions as the 1957-1958 392 camshafts, and are physically interchangeable, the lifter bore bank angle is different between these two groups. You must use the correct camshaft for your particular block to achieve proper performance.

€

NOTE: All camshafts are the short nose (1.100"), internally threaded (7/16"-14) configuration, requiring the 57-58 timing set.



CRANE VAL	VE TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 32
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	N ROCKERS - C/ GOLD RACE
	99838-16 ^f	99957-16 ⁹ 99944-16 ^h	99822-16 ^{f,g} 99820-16 ^{f,h}	99098-1 ^{9,j} 99097-1 ^{h,j}		69975-1 ^k			
	99838-16 ^f	99957-16 ⁹ 99944-16 ^h	99822-16 ^{f,g} 99820-16 ^{f,h}	99098-1 ^{9,j} 99097-1 ^{h,j}		69975-1 ^k			
	99838-16 ^f	99957-16 ⁹ 99944-16 ^h	99822-16 ^{f,g} 99820-16 ^{f,h}	99098-1 ^{9,j} 99097-1 ^{h,j}		69975-1 ^k			
	99893-16 ^f	99954-16 ⁹	99822-16 ^{f,g}	99098-1 ^{9,j}		69975-1 ^k			
	77073 10	99953-16 ^h	99820-16 ^{f,h}	99097-1 ^{h,j}		0,2,7,5			
	99893-16 ^f	99954-16 ^g 99953-16 ^h	99822-16 ^{f,g} 99820-16 ^{f,h}	99098-1 ^{9,j} 99097-1 ^{h,j}		69975-1 ^k			
	99893-16 ^f	99954-16 ⁹ 99953-16 ^h	99822-16 ^{f,g} 99820-16 ^{f,h}	99098-1 ^{9,j} 99097-1 ^{h,j}		69975-1 ^k			
	99893-16 ^f	99954-16 ⁹ 99953-16 ^h	99822-16 ^{f,g} 99820-16 ^{f,h}	99098-1 ^{9,j} 99097-1 ^{h,j}		69975-1 ^k			
	96884-16 ^f	99675-16 ⁱ		99097-1 ^{h,j}					
	96884-16 ^f	99675-16 ⁱ		99097-1 ^{h,j}					
	70007 10								

a For 1951-1956 301-331-354 cu.in.

b For 1957-1958 392 cu.in.

c Vertical locking bar hydraulic roller lifters. Due to the increased height of these lifters, the cylinder heads will require clearancing for the changed pushrod angles.

d Ultra Pro series roller lifters.

e Requires either 69990-1 aluminum bronze, or 69970-1 coated steel distributor gears.

Must machine cylinder heads.

g For 3/8" valve stems.

h For 11/32" valve stems.

Titanium, for 11/32" single groove valve stems, must use 99097-1 valve stem locks (included with the retainers).

j Machined steel, heat treated, single groove.

k Performance steel billet gears and roller chain set.

					COM	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Hot Int.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf											
Brute low end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 7.75 to 8.75 compression ratio advised.	H-248-2	800- 4200	693971°	99278-16	192 204	248 260	112	(11) 23 39 (15)	.000 .000		
Great low end torque and HP, smooth idle, daily usage, off road, towing, economy, mild marine performance, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-260-2	1200- 4800	693901* 693902*a	99278-16	204 216	260 272	112	(5) 29 45 (9)		.427 .454	
Good low end and mid range torque and HP, good idle, daily usage, off road, towing, economy, mild marine performance, also mild turbocharged, 2400-2800 cruise RPM, 8.5 to 10.0 compression ratio advised.	Z-268-2	1200- 5000	693511* 693512*	99278-16	212 220	268 276	112	(1) 33 47 (7)		.459 .480	
Good low end to mid range torque, good idle, daily usage, off road, highway towing, fuel efficiency plus performance, 2600-3000 cruise RPM, 8.75 to 10.0 compression ratio advised.	Energizer 272 H10	1800- 5200	15005° 150052°a	99278-16	216 216	272 272	110	3 23 43 (7)		.454 .454	
Good low end and mid range torque and HP, good idle, daily usage and off road, towing, performance and fuel efficiency, marine performance, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	H-272-2	1800- 5400	693941* 693942*a	99278-16	216 228	272 284	112	1 35 51 (3)	.000 .000		
Good low end and mid range torque and HP, good idle, daily usage and off road, towing, performance and fuel efficiency, marine performance, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	Z-276-2	1800- 5600	693521* 693522*a	99278-16	220 228	276 284	110	5 35 49 (1)		.480 .501	
Excellent mid range torque, rough idle,moderate per- formance usage, limited oval track, mild bracket rac- ing, auto trans w/3000+ converter, serious off road, 9.5 to 11.0 compression ratio advised.	H-222/3200-6	2200- 5600	690141*	99278-16 99378-16*b	222 222	294 294	106	9 33 41 1	.000 .000	.480 .480	
Good mid range torque and HP, fair idle, daily perfor- mance usage, mild bracket racing, mild supercharged, small nitrous system, 3000-3400 cruise RPM, 9.5 to 10.75 compression ratio advised.	H-278-2	2200- 5800	693801" 693802" ^a	99278-16 99378-16*b	222 234	278 290	114	2 40 56 (2)	.000	.467 .494	

RPM range shown is for average usage. These cam profiles
will RPM higher, depending upon application.

NOTE: For maximum performance, and to provide the most accurate valve adjustment on hydraulic lifter camshafts, the use of our 69770-16 adjustable rocker arms and 69691-16 pushrods is highly recommended.

NOTE: Early 1986-91 318 (5.2L) and early 1987-91 360 (5.9L) engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller camshafts and lifters can be installed in these engines, providing the appropriate kit components are used.



CRANE VALV	/E TRAIN CO	MPONENTS						
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See p
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCKE Crane Classic/ GC Energizer R <i>a</i>
69308-1 ^c	99835-16 ^c	99948-16			69621-16°	69975-1* ^f	69770-16 ⁹ 69771-16 ^{*h}	69790 69791
69308-1 ^c	99835-16°	99948-16			69621-16°	69975-1*f	69770-16 ⁹ 69771-16 ^{*h}	69790 69791
69308-1 ^c	99835-16°	99948-16			69621-16°	69975-1*f	69770-16 ⁹ 69771-16 ^{*h}	69790 69791
69308-1 ^c	99835-16°	99948-16			69621-16°	69975-1*f	69770-16 ⁹ 69771-16 ^{*h}	69790 69791
69308-1 ^c	99835-16°	99948-16			69621-16°	69975-1*f	69770-16 ^g 69771-16 ^{*h}	69790 69791
69308-1 ^c	99835-16°	99948-16			69621-16°	69975-1*f	69770-16 ⁹ 69771-16 ^{*h}	69790 69791
	99838-16 ^d	99948-16	99822-16 ^d		69621-16°	69975-1*f	69770-16 ^g 69771-16 th	69790 69791
69308-1°	99835-16°	99948-16			69621-16°	69975-1*f	69770-16 ⁹ 69771-16*h	69790 69791

Section Continued



Cam and lifter kit, includes installation lubricants. Optional Hi Intensity hydraulic lifters, see page 292 for details. Contains standard diameter valve springs, no machining required.

Must machine cylinder heads.

Heavy wall, heat treated, for use with adjustable rocker arms.

Performance steel billet gears and roller chain set.

^{1.5} ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).
1.6 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).
1.5 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane

pushrods. 1.6 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane pushrods.

					СОМ	PLETE C	AM SPE	CIFICA	TIONS	
And to	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 294	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Clo @ .050' Cam Lif	' Hot t Int.	Lift Int.
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.
Hydraulic Roller Camsha Excellent low end torque and HP, smooth idle, daily usage, towing, economy, also mild turbocharged, 2200-3000 cruise RPM, 8.0 to 9.5 compression ratio advised.	HR-204/286-2-12 IG	800- 4800	699601*a	69532-16 ^b	204 214	260 270	112	(5) 44 29 (10)		.429 .452
Good low end torque and HP, good idle, daily usage, off road, performance and fuel efficiency, also mild turbocheaged, 2600-3400 cruise RPM, 8.75 to 10.5 compression ratio advised.	HR-214/325-25-12 IG	1400- 5400	699611*a	69532-16 ^b	214 222	276 284	112	0 34 48 (6)		.488 .509
Good low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3000-3800 cruise RPM, 9.5 to 10.75 compression ratio advised.	HR-222/339-25-12 IG	2000- 6000	699621*a	69532-16 ^b	222 230	284 292	112	4 38 52 (2)		.509 .528
Good mid range torque and HP, fair idle, moderate performance usage, bracket racing w/heavy car, auto trans w/2500+ converter, serious off road, 3200-4000 cruise RPM, 10.0 to 11.5 compression ratio advised.	HR-226/345-251-10 IG	2000- 6000	699651*a	69532-16 ^b	226 230	288 292	110	8 38 50 0		.518 .528
Good mid to upper RPM torque and HP, fair idle, performance usage, 3600-4400 cruise RPM, good w/manifold nitrous system, 10.0 to 11.5 compression ratio advised.	HR-230/352-25-12 IG	2600- 6600	699631*a	69532-16 ^b	230 238	292 300	112	8 42 56 10		.528 .548
Good mid range to upper RPM torque and HP, rough idle, performance usage, bracket racing, auto trans w/3500+ converter, 360+ cu.in., 4000-4800 cruise RPM, 10.5 to 12.0 compression ratio advised.	HR-238/365-2S-8 IG	2800- 6800	699661*a	69532-16 ^b	238 246	300 308	108	16 42 56 10		.548 .558
Good mid range to upper RPM torque and HP, rough idle, performance usage, mild bracket racing, auto trans w/3500+ converter, 4200-4800 cruise RPM, 10.5 to 12.0 compression ratio advised, also mild supercharged.	HR-238/365-25-14 IG	3000- 7000	699641*a	69532-16 ^b	238 246	300 308	114	10 48 62 4		.548 .558
Rough idle, performance usage, bracket racing, auto trans w/3500+ converter, 4000-4800 cruise RPM, 360+ cu.in., 11.0 to 12.5 compression ratio advised.	HR-242/372-2-8 IG	3200- 7000	699671*a	69532-16 ^b	242 252	304 314	108	18 44 59 13		.558 .558
Performance usage, bracket racing w/ heavy car, auto trans w/4000+ converter, 380+ cu.in., 11.5 to 13.0 compression ratio advised.	HR-246/372-25-8 IG	3400- 7000	699681*a	69532-16 ^b	246 254	308 316	108	20 46 60 14		.558 .558
Performance usage, good upper RPM HP, bracket racing, good w/manifold nitrous system, auto trans w/4000+ converter, 380+ cu.in., 13.0 minimum compression ratio advised, also mild supercharged.	HR-252/372-2S-10 IG	4000- 7200	699691*a	69532-16 ^b	252 262	314 324	110	21 51 66 16		.558 .558

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Due to the increased pushrod seat height of the Crane retrofit hydarulic roller lifters, some early cylinder heads, and some aftermarket cylinder heads, may have to be modi-

fied for pushrod clearance.

NOTE: For maximum performance, and to provide the most accurate valve adjustment on hydraulic roller camshafts, the use of our 69770-16 or 69790-1 adjustable rocker arms and 69628-16 pushrods is highly recommended. Otherwise, special length pushrods will be required. See page 305 for special pushrod ordering instructions.

NOTE: Early 1986-91 318 (5.2L) and early 1987-91 360 (5.9L) engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller camshafts and lifters can be installed in these engines, providing the appropriate kit components are used.



CRANE VALV	E TRAIN CO	MPONENTS						
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 320
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCKERS – CRANE CLASSIC/ GOLD ENERGIZER RACE
	99838-16'	99948-16	99822-16 ^c		69628-16 ^d	69975-1*e	69770-16 ^f 69771-16 ^{*g}	69790-1 ^h 69791-1 ^{*i}
	99838-16 ^c	99948-16	99822-16 ^c		69628-16 ^d	69975-1*e	69770-16 ^f 69771-16 ^{*g}	69790-1 ^h 69791-1 ^{*i}
	99838-16°	99948-16	99822-16 ^c		69628-16 ^d	69975-1*e	69770-16 ^f 69771-16 ^{*g}	69790-1 ^h 69791-1* ⁱ
	99838-16°	99948-16	99822-16 ^c		69628-16 ^d	69975-1*e	69770-16 ^f 69771-16 ^{*g}	69790-1 ^h 69791-1 ^{*i}
	99838-16°	99948-16	99822-16 ^c		69628-16 ^d	69975-1*e	69770-16 ^f 69771-16 ^{*g}	69790-1 ^h 69791-1° ⁱ
	96874-16°	99957-16	99822-16 ^c		69628-16 ^d	69975-1*e	69770-16 ^f 69771-16 ^{*g}	69790-1 ^h 69791-1* ⁱ
	96874-16°	99957-16	99822-16 ^c		69628-16 ^d	69975-1*e	69770-16 ^f 69771-16 ^{*g}	69790-1 ^h 69791-1 ^{*i}
	96874-16°	99957-16	99822-16 ^c		69628-16 ^d	69975-1*e	69770-16 ^f 69771-16 ^{*g}	69790-1 ^h 69791-1 ^{*i}
	96874-16°	99957-16	99822-16 ^c		69628-16 ^d	69975-1*e	69770-16 ^f 69771-16 ^{*g}	69790-1 ^h 69791-1 ^{*i}
	96874-16°	99957-16	99822-16 ^c		69628-16 ^d	69975-1*e	69770-16 ^f 69771-16 ^{*g}	69790-1 ^h 69791-1* ⁱ

- Camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required.
- b Vertical locking bar hydraulic roller lifters, no machining required. Special length pushrods are required, use 69628-16 with adjustable rocker arms.
- Must machine cylinder heads.
- **d** Heavy wall, heat treated, for use with adjustable rocker arms.
- e Performance steel billet gears and roller chain set.
- f 1.5 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).
- **g** 1.6 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).
- h 1.5 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane pushrods.
- 1.6 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane pushrods.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 293	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Gross Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
Mechanical Lifter Camsh		2600	101101*	0004044	220	200	44.4	10 10	000	400	
Good low end and mid range torque and HP, fair idle, moderate performance usage, bracket racing, 3400- 3800 cruise RPM, 10.0 to 11.5 compression ratio advised.	F-238/3200-2-14	2600- 6400	691191*	99260-16	238 248	300 310	114	10 48 63 5	.022 .022		
Good mid range torque, performance usage, limited oval track 1/4-3/8 mile, bracket racing w/heavy car, serious off road, auto trans w/2500+ converter, 10.5 to 12.0 compression ratio advised.	F-244/3454-2S-6	3200- 6800	690921*	99260-16	244 252	280 288	106	19 45 55 17	.026 .026		
Good mid range torque and HP, rough idle, performance usage, limited oval track, bracket racing, serious off road, auto trans w/2000+ converter, 10.5 to 12.0 compression ratio advised.	F-248/3602-2-8	3200- 7000	690911°	99260-16	248 258	284 294	108	21 47 62 16	.026 .026		
Performance usage, great mid range torque and HP, bracket racing, 340+ cu.in., auto trans w/2500+ converter, 11.0 to 12.5 compression ratio advised.	F-256/383-2S-8	3600- 7400	690931°	99260-16	256 260	312 316	108	25 51 63 17	.014 .016		
Good mid range and upper RPM torque and HP, rough idle, performance usage, bracket racing, 340+ cu.in., auto trans w/2500+ converter, 11.0 to 12.5 compression ratio advised.	F-258/3735-2-8	3600- 7200	691381°	99260-16	258 268	294 304	108	26 52 67 21	.026 .026		
Good upper RPM torque and HP, moderate competition only, bracket racing, 360+ cu.in., auto trans w/3000+ converter, good w/ plate nitrous system, aluminum cylinder heads recommended, 12.0 minimum compression ratio advised.	F-262/394-25-10	3800- 7600	691391°	99260-16	262 264	294 296	110	26 56 67 17	.018 .018		
Good upper RPM torque and HP,moderate competition only, bracket racing, 360+ cu.in., auto trans w/3000+ converter, 12.0 minimum compression ratio advised.	F-268/3868-2-8	4000- 7600	691561* 3	99260-16	268 278	304 314	108	31 57 72 26	.026 .026		
Competition only, good upper RPM torque and HP, auto trans w/3500+ converter, good with manifold nitrous system, 360+ cu.in., 12.5 minimum compres- sion ratio advised.	F-274/412-2S-8	4200- 8000	691571*	99260-16	274 288	306 324	108	34 60 75 33	.018 .026		
Competition only, good upper RPM HP, auto trans w/3500+ converter, 360+ cu.in., 12.5 minimum compression ratio advised.	F-278/4002-8	4400- 8000	691701*	99260-16	278 278	314 314	108	36 62 72 26	.026 .026	.600 .600	
Radical competition only, maximum performance applications, flat tappet restricted classes, aluminum cylinder heads advised, 13.5 minimum compression ratio advised.	F-288/4134-8	5000- 8400	691951*	99260-16	288 288	324 324	108	41 67 77 31		.620 .620	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: To effect valve adjustment, 318, 340 and 360 engines require the use of Crane Adjustable Rocker Arms and any

To effect valve adjustment, 318, 340 and 360 engines require the use of Crane Adjustable Rocker Arms and appropriate pushrods when using mechanical lifter cams.

NOTE: Early 1986-91 318 (5.2L) and early 1987-91 360 (5.9L) engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller camshafts and lifters can be installed in these engines, providing the appropriate kit components are used.



CRANE VALV	E TRAIN CO	OMPONENTS						
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 32
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCKERS Crane Classic/ Gold Energizer Race
	99838-16ª	99948-16	99822-16ª		69622-16 ^b	69975-1* ^c	69770-16 ^d 69771-16* ^e	69790-1 ¹ 69791-1
	99838-16ª	99948-16	99822-16ª		69622-16 ^b	69975-1*c	69770-16 ^d 69771-16 ^{*e}	69790-1 ¹
	99838-16ª	99948-16	99822-16ª		69622-16 ^b	69975-1*c	69770-16 ^d 69771-16 ^{*e}	69790-1 ¹
	99838-16ª	99948-16	99822-16ª		69622-16 ^b	69975-1*c	69770-16 ^d 69771-16 ^{*e}	69790-1 ¹
	99838-16ª	99948-16	99822-16ª		69622-16 ^b	69975-1°¢	69770-16 ^d 69771-16*e	69790-1 ¹
	99838-16ª	99948-16	99822-16ª		69622-16 ^b	69975-1° ^c	69770-16 ^d 69771-16*e	69790-1 ¹ 69791-1 ¹
	99838-16ª	99948-16	99822-16ª		69622-16 ^b	69975-1*c	69770-16 ^d 69771-16* ^e	69790-1 ¹ 69791-1 ¹
	99838-16ª	99948-16	99822-16ª		69622-16 ^b	69975-1*c	69770-16 ^d 69771-16*e	69790-1 ¹
	99838-16ª	99948-16	99822-16ª		69622-16 ^b	69975-1° ^c	69770-16 ^d 69771-16* ^e	69790-1 ¹
	99838-16ª	99948-16	99822-16ª		69622-16 ^b	69975-1*c	69770-16 ^d 69771-16*e	69790-1 ¹ 69791-1

Must machine cylinder heads.

Heavy wall, heat treated, for use with adjustable rocker arms.

Performance steel billet gears and roller chain set.

^{1.5} ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).

1.6 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).

f 1.5 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane

g 1.6 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane pushrods.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 296	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Lash Hot Int.	Gross Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
Mechanical Roller Camsh											
Good low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 10.5 to 11.5 compression ratio advised.	SR-238/350-2S-12 IG	2800- 6600	698521*a	69515-16 69542-16°	238 246	288 296	112	12 46 60 6		.525 .543	
Good mid to upper RPM torque & HP, fair idle, moderate performance usage, mild bracket racing, good w/plate nitrous system, auto trans w/3000+ converter, 3800-4200 cruise RPM, 10.5 to 12.0 compression ratio advised. Good w/Roots supercharger, 14 lbs. maximum boost w/8.0 maximum compression ratio advised.	SR-246/362-2S-12 IG	3200- 7000	698531*a	69515-16 69542-16 ^c	246 254	283 290	112	15 49 63 9	.020 .020		
Competition only, bracket racing, heavy car, good w/ manifold nitrous system, 360+ cu.in., auto trans w/race converter, aftermarket aluminum cylinder heads required, 12.0 to 13.0 compression ratio advised.	R-256/452-2S-10	3800- 7800	698271*b	69542-16 ^c	256 268	285 297	110	23 53 69 19	.020 .022	.746 .746	
Good mid range torque and HP, rough idle, performance usage, oval track, bracket racing, auto trans w/ race converter, 11.5 to 12.5 compression ratio advised.	R-260/420-25-8	3800- 7600	698801*b	69515-16 69542-16°	260 266	292 298	108	26 54 65 21		.630 .630	
Competition only, good mid to upper RPM HP, oval track, bracket racing, auto trans w/race converter, 12.5 minimum compression ratio advised.	R-268/420-251-8	4000- 7800	698821*b	69515-16 69542-16 ^c	268 276	300 308	108	30 58 70 26		.630 .630	
Competition only, good upper RPM HP, bracket racing, auto trans w/race converter, 12.5 minimum compression ratio advised.	R-272/420-2-8	4200- 8000	698831"b	69515-16 69542-16°	272 282	304 314	108	32 60 72 29		.630 .630	
Competition only, good upper RPM torque and HP, bracket racing, Super Pro, Super Gas, auto trans w/race converter, aftermarket aluminum cylinder heads required, 13.0 minimum compression ratio advised.	R-274/482-25-8	4200- 8200	698281*b	69542-16 ^c	274 278	318 334	108	30 64 72 26		.723 .735	
Competition only, good upper RPM HP, bracket racing, auto trans w/race converter, nitrous, 12.5 minimum compression ratio advised.	R-276/420-2-10	4400- 8200	698841*b	69515-16 69542-16 ^c	276 286	308 318	110	32 64 77 29	.020 .020		
Competition only, bracket racing, good upper RPM HP, Super Quick, Super Comp, etc.,manual trans or auto w/trans brake, aftermarket aluminum cylinder heads required, 13.0 minimum compression ratio advised.	R-280/452-2S-8	5000- 8600	698291*b	69542-16 ^c	280 288	309 317	108	37 63 77 31		.678 .678	
Competition only, Super Stock or Competition elim., manual trans or auto w/trans brake, 13.5 minimum compression ratio advised.	R-284/4765-2S-8	5200- 9000	698611" ^b	69542-16 ^c	284 292	318 326	108	39 65 79 33	.035 .030		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.
NOTE: 8620 steel billet roller camshafts for Chrysler R series

cylinder blocks with 50mm, 2.000", and 60mm diameter camshaft bearing journals, and 45, 47, or 48 degree lifter bore bank angles are available on special order. Lightweight, gun drilled rear drive camshafts are also an option. Appropriate oil conducting roller lifters are also available. Contact

Crane's Performance Consultants for details. **IMPORTANT NOTE:** Roller lifter camshafts are not intended for use **NOTE:** To effect valve adjustment, 318, 340 and 360 engines

in R blocks having 59 degree bank angle lifter bores. Contact Crane's Performance Consultants for details.

NOTE: Early 1986-91 318 (5.2L) and early 1987-91 360 (5.9L) engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller camshafts and lifters can be installed in these engines, providing

the appropriate kit components are used. require the use of Crane Adjustable Rocker Arms and appropriate pushrods when using roller lifter cams.



CRANE VALV	/E TRAIN CO	MPONENTS						
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 320
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCKERS – Crane Classic/ Gold Energizer race
	99893-16 ^d	99957-16	99822-16 ^d		69622-16 ^f	69975-1* ⁹	69770-16 ^h 69771-16 ^{*i}	69790-1 ^j 69791-1* ^k
	99893-16 ^d	99957-16	99822-16 ^d		69622-16 ^f	69975-1* ^g	69770-16 ^h 69771-16 ^{*i}	69790-1 ^j 69791-1 ^{*k}
	96883-16 ^d	99679-16°	99822-16 ^d		69622-16 ^f	69975-1*g	69770-16 ^h 69771-16 ^{*i}	69790-1 ^j 69791-1* ^k
	99885-16 ^d	99955-16	99822-16 ^d		69622-16 ^f	69975-1* ⁹	69770-16 ^h 69771-16 ^{*i}	69790-1 [;] 69791-1 ^{*k}
	99885-16 ^d	99955-16	99822-16 ^d		69622-16 ^f	69975-1*g	69770-16 ^h	69790-1 ^j
							69771-16* ⁱ	69791-1* ^k
	99885-16 ^d	99955-16	99822-16 ^d		69622-16 ^f	69975-1* ^g	69770-16 ^h 69771-16* ⁱ	69790-1 ^j 69791-1* ^k
	96883-16 ^d	99679-16°	99822-16 ^d		69622-16 ^f	69975-1* ^g	69770-16 ^h 69771-16 ^{*i}	69790-1 ^j 69791-1 ^{*k}
	99885-16 ^d	99955-16	99822-16 ^d		69622-16 ^f	69975-1* ^g	69770-16 ^h 69771-16 ^{°i}	69790-1 ^j 69791-1 ^{*k}
	96883-16 ^d	99679-16°	99822-16 ^d		69622-16 ^f	69975-1* ⁹	69770-16 ^h 69771-16 ^{*i}	69790-1 [;] 69791-1* ^k
	96883-16 ^d	99679-16°	99822-16 ^d		69622-16 ^f	69975-1* ⁹	69770-16 ^h 69771-16 ^{*i}	69790-1 [;] 69791-1" ^k

- **b** Requires **69990-1** aluminum-bronze distributor drive gear.
- c Ultra Pro Series roller lifters.
- d Must machine cylinder heads.
- e Titanium, must use 99098-1 single-groove valve stem locks, included with the retainers.
- f Heavy wall, heat treated, for use with adjustable rocker arms.
- g Performance steel billet gears and roller chain set.

- **h** 1.5 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).
- i 1.6 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).
- j 1.5 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane pushrods.
- k 1.6 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane pushrods.

Camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required.

					СОМ	PLETE C	AM SPE	CIFICATION	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Camsha	fts									
Brute low end torque, for 86-91 318 (5.2L) and 87-92 360 (5.9L) TBI equipped Dodge trucks and vans (except 91 Dakota), designed to improve low end torque and HP for street performance, towing and economy.	2010	800- 4200	694101°	70530-16 ^a	194 184	250 240	107	(6) 20 23 (19)	.000 .000	.407 .384
Excellent low end torque, for 86-91 318 (5.2L) and 87-92 360 (5.9L) TBI equipped Dodge trucks and vans (except 91 Dakota), designed to improve low end torque and HP for street performance, and towing (50 States Legal, C.A.R.B. E.O. D-225-23).	2020	1000- 4600	694111	70530-16 ^a	204 194	260 250	112	(5) 29 34 (20)	.000 .000	.429 .407
Good low end torque and HP, good idle, daily usage, tow- ing, also mild turbocharged, computer upgrades required, 2200-3000 cruise RPM, 8.0 to 9.5 compression ratio advised.	HR-204/286-2S-14	1000- 4800	699701°	70530-16ª	204 208	260 250	114	(7) 31 43 (15)	.000	.429 .438

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: The 1991 Dakota engines were fuel injected and used a camshaft core with a shorter nose. These would

have the same configuration as the 70-prefix camshafts listed below.

NOTE: For maximum performance, and to provide the most accurate valve adjustment on hydraulic roller camshafts, the

use of our **69770-16** or **69790-1** adjustable rocker arms and special length pushrods is highly recommended.

Chrysler-Dodge-Plymouth Magnum V-8 92-02 5.2-5.9 Litre

Hydraulic Rol	ler Camsha	fts										
Brute low end torque, for 92- improves low-end torque and mance, towing and economy and vans. (Compatible W/fac legal, 94 and earlier Chrysler eng. C.A.R.B. E.O. D-225-47)	d HP, for street perfor- w/multi-point F.I. trucks tory valve train.) (50 state	2020	800- 4600	704111	70530-16°	194 204	250 260	112	(10) 24 39 (15)	.000 .000	.434 .458	
Excellent low end torque, for 9 and midrange torque and HP, 1 towing w/stock or modified vans. (Compatible w/factory w 94 and earlier Chrysler trucks v E.O. D-225-47)	for street performance and ulti-point F.I. trucks and alve train.) (50 state legal,	2030	1200- 5200	704121	70530-16°	204 208	260 264	114	(7) 31 43 (15)	.000 .000	.458 .467	
Good low end and mid range t usage, performance and towir charged, computer upgrades r RPM, 8.5 to 9.75 compression	ng, off road, mild super- equired, 2200-3000 cruise	HR-208/292-251-10	1600- 5600	708501°	70530-16°	208 216	264 272	110	(1) 29 43 (7)	.000 .000	.467 .482	
Good mid range torque and HI mild supercharged, cylinder he upgrades required, 2600-3400 compression ratio advised.	ead and computer	HR-214/325-2S-14	1800- 5800	708511*	70530-16°	214 220	276 282	114	(2) 36 49 (9)	.000 .000	.520 .531	
Good mid to upper RPM torqu ate performance usage, cylind upgrades required, 3000-3800 compression ratio advised. goo max. boost w/8.0 max. compr	er head and computer cruise RPM, 9.5 to 11.0 od w/supercharger, 10 lbs.	HR-222/339-25-14	2200- 6200	708521*	70530-16°	222 226	284 288	114	2 40 52 (6)	.000 .000	.542 .552	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon applications.

NOTE: 1992-2002 5.2L and 5.9L Magnum engines no longer use shaft mount rocker arms, but instead have individually mounted non-adjustable 1.6 ratio pedestal rockers. For street applications, Crane offers a method to convert to stud mounted adjustable rocker arms without cylinder

head removal or machining. Install Pushrod guideplate and Rocker Arm Stud Conversion Kit, 36655-16, along with aluminum roller rocker arms (such as 11776-16, 11746-16, or 11759-16). Pushrods, 36621-16, are also required. Valve cover clearance will have to be checked.



See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCK Crane Classic/ G Energizer F
						69975-1*b	69770-16 ^c	6979
						69975-1*b	69770-16°	6979
						69975-1*b	69770-16°	6979

- a For use with standard Chrysler alignment bars.
- **b** Performance steel billet gears and roller chain set
- c 1.5 ratio rocker arms, adjustable, must use special Crane pushrods (shafts not included).
- **d** 1.5 ratio rocker arm kit with rocker shafts, adjustable, must use special Crane pushrods.

36621-16 ^f	69975-1* ^g	11776-16 ^h 11746-16 ⁱ	11759-16 ^j
36621-16 ^f	69975-1*g	11776-16 ^h 11746-16 ⁱ	11759-16
		11/40-10	
36621-16 ^f	69975-1* ^g	11776-16 ^h 11746-16 ⁱ	11759-16 ⁱ
36621-16 ^f	69975-1* ⁹	11776-16 ^h 11746-16 ⁱ	11759-16 ⁱ
36621-16 ^f	69975-1* ^g	11776-16 ^h 11746-16 ⁱ	11759-16 ⁱ

- e For use with standard Chrysler alignment bars.
- Heavy wall, heat treated, for use with 36655-16 Pushrod Guideplate and Rocker Arm Stud Conversion Kit
- **g** Performance steel billet gears and roller chain set.
- h Crane Classic extruded, 1.6 ratio, for use with 36655-16 Pushrod Guideplate and Rocker Arm Stud Conversion Kit. Requires 36621-16 pushrods.
- Energizer, 1.6 ratio, for use with 36655-16 Pushrod Guideplate and Rocker Arm Stud Conversion Kit. Requires 36621-16 pushrods.
- j 1.6 ratio, for use with 36655-16 Pushrod Guideplate and Rocker Arm Stud Conversion Kit. Requires 36621-16 pushrods.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Camsha	fts									
Excellent low end and mid range torque and HP, smooth idle, daily usage, off road, towing, economy, MDS compatible, 2200-2600 cruise RPM.	HR-208/297-25-16	1000- 5000	1989491*	a	208 214	268 274	116	(10.5) 38.5 44.5 (10.5)		.505 .505
Excellent low end and mid range torque and HP, smooth idle, daily usage, off road, towing, economy, valve spring upgrade required, 2200-2600 cruise RPM.	HR-210/3236-25-12	1200- 5200	1989501*	b	210 216	268 274	112	(2) 32 45 (9)	.000	.550 .550
Good mid range torque and HP, good idle, daily usage, also mild supercharged or nitrous, valve spring and com- puter upgrades required, 2400-2800 cruise RPM.	HR-216/3236-25-12	1800- 5800	1989511*	b	216 222	274 280	112	1 35 48 (6)		.550 .550
Good upper RPM HP, fair idle, radical street, valve spring and computer upgrades required, 2600-3000 cruise RPM.	HR-222/3236-25-14	2200- 6200	1989521*	b	222 228	280 286	114	(3) 45 48 0	.000	.550 .550

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.



					-			-	
CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM Crane Classic/ Energizer	ROCKERS — GOLD RACE
	99831-16°								
	99831-16°								
	99831-16°								
	99831-16°								

Re-use standard lifters. Must use non-MDS lifters.

c Compatible with standard retainers and valve stem locks.

Chrysler Big Block V8 Tech Tips & Notes

1958-1978 350-361-383-400-413-426-440 B & RB V8

The B and RB Big Block Chrysler engines vary primarily due to cylinder block deck height differences. Intake manifolds, distributor housings, and pushrod lengths are noticeable changes from one to the other. The B (Low Block) engines are 350-361-383-400- (1962) 413, while RB (High Block) engines are 413-426-400 cu.in. Characterized by inline lifter bores in the block, inline valves in the cylinder heads, 1.5:1 ratio shaft mounted rocker arms, and a front mounted distributor, these engines were used throughout Chrysler's product lines for over two decades. Be aware that there are reverse rotation marine, and also gear drive cam industrial versions of these engines, that require unique camshafts.

Early cylinder heads had removable rocker pedestals for the rocker shafts, as did the 1960's performance engines (Stage II, Stage III, Max Wedge, etc., which also featured adjustable rocker arms and mechanical lifter camshafts), while later heads have integral shaft stands.

From 1958 to 1969, all camshafts used a single bolt to retain the cam sprocket. These have been the Crane 64 prefix camshafts, with hydraulic and mechanical flat faced lifter grinds offered. In 1970, the 440 Six Pack engines were upgraded by having a three bolt configuration camshaft installed. These are our 68 prefix items, which include hydraulic, mechanical, retrofit hydraulic roller, and mechanical roller camshafts and components. The single bolt and three bolt camshafts can be interchanged among these engines, providing the appropriate timing set is used. **Due to their superior reliability, we will now be offering only the 68 prefix three bolt camshafts for their engines.**

The Chrysler Hemi 426 camshafts will also physically fit into the B engines, but due to their different lobe layout, only four cylinders would function properly.

Our offerings include retrofit 8620 steel billet hydraulic roller camshafts and steel billet roller lifters to provide an excellent torque and power band increase. The lifters are a drop in type (no block machining, or lifter bore sleeving required), having a vertical locking bar to prevent rotation. Special pushrods are required due to the increased height of the lifters.

Our steel billet mechanical roller camshafts are available in standard firing order (1-8-4-3-6-5-7-2) and SFO (1-8-7-3-6-5-4-2) firing orders. Roller camshafts for the Chrysler Mega blocks with 47 degree lifter bank angles, and other aftermarket blocks having 48 degree lifter bank angles are also available. Roller camshafts with 2.125" diameter journals can be custom ordered. Engines equipped with Koffel B1 cylinder heads will require grooving the fourth camshaft bearing journal for proper upper end lubrication, optional labor number **98088** accomplishes this. All of our roller lifters are designed to drop into the block, with no machining or lifter bore sleeving required.

Early raised cam Chrysler Mega blocks had very tall lifter bores and a 47 degree lifter bore bank angle, so part number **66554-16** roller lifters (with the pushrod seats and guidebars raised .400") can be used to avoid additional block machining. Special camshafts are also required for the change in lifter bank angle, so be certain of what you have before ordering.

Aftermarket cylinder heads may require different rocker arms, shafts, pushrods, valve springs, retainers, locks, etc, than standard. Make sure of exactly what you need before ordering additional components.

1966-1971 426 Hemi V8

The famed 426 Hemi is related to the RB V8. One primary change to the cylinder block includes additional head bolt bosses for the Hemi head's internal attaching bolts. These cylinder heads utilize the classic Chrysler double shaft system for the intake and exhaust rockers. Standard rocker ratios are 1.57:1 intake, and 1.52:1 exhaust. Lifter bores are inline, inclined at a 45 degree bank angle. These engines are indicated by our 66 prefix.

There were also 1964 –1965 426 Hemi 426 engines that had single bolt camshafts. We recommend using the later three bolt configuration camshafts and timing sets in these engines (no other modifications required) for increased reliability. The Chrysler B/RB camshafts will physically fit into the Hemi engines, but due to their different lobe layout, only four cylinders will function properly.

The currently available aftermarket cylinder blocks have either standard or raised camshaft locations. Most of the raised camshaft blocks have the lifter bores changed to a 48 degree lifter bank angle, for better pushrod geometry. Special camshafts are required to maintain proper cam timing for each side of the engine. Early raised cam Chrysler Mega blocks had very tall lifter bores and a 50 degree lifter bore bank angle, so part number **66554-16** roller lifters (with the pushrod seats and guidebars raised .400") can be used to avoid additional block machining. Special camshafts are also required for this unique change in lifter bank angle. Some replacement iron blocks may also have tall lifter bores. Check your lifter guidebar to block clearance before final engine assembly in the event that modifications are required.

The aftermarket blocks may also have relocated lifter bore spacing. While the standard lifter centerline spacing is 1.812", there are also popular "Spread .100" (1.900") and "Spread .200" (2.000") configurations. Be sure of your spacing when ordering roller lifters so that you don't exceed the travel capabilities of the guidebar.

We offer hydraulic, retrofit hydraulic roller, mechanical, and mechanical roller camshafts and components for these engines. When installing our hydraulic roller camshafts and retrofit lifters, machining will be required on the block and cylinder heads to provide clearance for the pushrods. This is due to the increased pushrod seat height on the hydraulic roller lifters, changing the angle of the pushrods. Our roller lifters are designed to drop into the block, with no machining or lifter bore sleeving required.



Street roller camshafts are also offered, with their superior torque and horsepower potential popular among the Hemi crowd.

Mechanical roller camshafts are available with standard stepped journal diameters, 2.125" - BB suffix journal diameters (with standard or SFO (1-8-7-3-6-5-4-2) firing orders for standard 45 degree, or 48 degree lifter bank angle blocks), and 60mm (2.362") - 60J suffix journal diameters (with standard or SFO firing orders). These larger journal camshafts have a stepped front journal, so that a standard timing set can be used. The larger journal camshafts are machined for 3/8" – 24 bolts to attach the timing set, requiring special shouldered bolts, and two 5/16" dowel pins are installed. For increased oil distribution to the valve train area, we can machine the oil groove in the fourth camshaft bearing journal to a larger size. This can be performed under labor number **98088**.

While the standard valve stem diameter for these engines is 5/16", aftermarket heads are commonly set up for 11/32" valve stems. Some heads for supercharged fuel applications may have 3/8" exhaust valve stems. Verify your valve stem diameter when ordering retainers and valve locks.

HEMI 99 500 V8

This engine was developed specifically for maximum performance drag racing applications, and never installed in any vehicles, nor sold as a complete assembly. Designated by our 159 prefix, we offer custom ground 8620 steel billet roller camshafts with 60mm (2.362") bearing journals, and the SFO (1-8-7-3-6-5-4-2) firing order.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Lifter Camshaf							- Сериний с			
Excellent low end torque, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised		1200- 4800	683901* 683902*a,b	99278-16 ^b	204 216	260 272	112	(5) 29 45 (9)	.000 .000	
Replacement for factory 335 HP 383 cu.in. camshaft.	BluePrinted 2843564 (3512907)	1400- 5000	680101	99278-16 ^b	214 226	272 292	115	(5) 39 51 (5)	.000	
Excellent low end and mid range torque and HP, good idle, daily usage, off road, towing, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	H-272-2	1600- 5400	683941* 683942*a,b	99278-16 ^b	216 228	272 284	112	1 35 51 (3)	.000 .000	.454 .480
Good mid range torque and HP, good idle, daily performance usage, mild bracket racing, 3000-3400 cruise RPM, 9.5 to 10.75 compression ratio advised.	H-222/3114-25-12	1800- 5600	680321*	99278-16 ^b 99378-16* ^c	222 234	278 290	112	4 38 54 0	.000	.467 .494
Good mid range torque and HP, good idle, daily performance usage, mild bracket racing, 3000-3400 cruise RPM, 9.5 to 10.75 compression ratio advised. Also mild supercharged.	H-278-2	1800- 5600	683801* 683802*a,b	99278-16 ^b 99378-16* ^c	222 234	278 290	114	2 40 56 (2)		.467 .494
Good mid range to upper RPM torque and HP, fair idle, moderate performance usage, 400+ cu.in., bracket racing, 3400-3800 cruise RPM, 9.5 to 11.0 compression ratio advised.	H-286	2200- 6000	684321"	99278-16 ^b 99378-16* ^c	226 226	286 286	112	6 40 50 (4)	.000 .000	
Excellent mid range torque and HP, rough idle, bracket racing w/heavy car, auto trans w/2500+ converter, 10.0 to 11.5 compression ratio advised.	H-228/3200-2S-8	2600- 6400	680591°	99278-16 ^b 99378-16* ^c	228 234	284 290	108	11 37 50 4	.000 .000	.480 .494
Good mid range to upper RPM torque and HP, rough idle, performance usage, mild bracket racing, auto trans w/3000+ converter, 3800-4200 cruise RPM, 10.0 to 11.5 compression ratio advised.	H-302-2	2800- 6600	684561"	99278-16 ^b 99378-16 ^{*c}	232 242	302 312	112	9 43 58 4	.000	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application. NOTE: These three-bolt camshafts can be used in engines

NOTE: These three-bolt camshafts can be used in engines originally equipped with single-bolt camshafts if the appropriate timing chain and gear assembly, 68975-1 or 68977-1 s used.

NOTE: Camshafts for Chrysler Mega Blocks with 47 degree lifter bore bank angles, and aftermarket blocks with 48 degree lifter bore bank angles are available on special order.

NOTE: For maximum performance, and to provide the most accurate valve adjustment on hydraulic lifter camshafts, the use of our 64770-16 adjustable rocker arms and 64640-16 (low block) or 64641-16 (high block) pushrods is highly recommended. Adjustable rocker arms and appropriate pushrods are required for use with mechanical lifter camshafts.

NOTE: Low Block Engines are 350-361-383-400 cu.in., while High Block Engines are 413-426-440 cu.in.



CRANE VALV	/E TRAIN CO	MPONENTS						
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 320
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCKERS – CRANE CLASSIC/ GOLD ENERGIZER RACE
64308-1 ^d	99839-16°	99957-16			64640-16 ⁹ 64641-16 ^h	68975-1 ⁱ 68977-1 ^j	64770-16 ^k 64771-16* ^l	64790-1™ 64791-1*¹
64308-1 ^d	99839-16°	99957-16			64640-16 ⁹ 64641-16 ^h	68975-1 ⁱ 68977-1 ^j	64770-16 ^k 64771-16 ^{*l}	64790-1 ^m 64791-1 ^{*n}
64308-1 ^d	99839-16°	99957-16			64640-16 ⁹ 64641-16 ^h	68975-1 ⁱ 68977-1 ^j	64770-16 ^k 64771-16* ^l	64790-1 ^m 64791-1 ^{*n}
64308-1 ^d	99839-16°	99957-16			64640-16 ^g 64641-16 ^h	68975-1 ⁱ 68977-1 ^j	64770-16 ^k 64771-16 ^{*l}	64790-1 ^m 64791-1* ⁿ
64308-1 ^d	99839-16°	99957-16			64640-16 ⁹ 64641-16 ^h	68975-1 ⁱ 68977-1 ^j	64770-16 ^k 64771-16 ^{*l}	64790-1 ^m 64791-1 ^{*n}
64308-1 ^d	99839-16°	99957-16			64640-16 ⁹ 64641-16 ^h	68975-1 ⁱ 68977-1 ^j	64770-16 ^k 64771-16* ^l	64790-1 ^m 64791-1 ^{*n}
	99839-16°	99954-16	99822-16 ^b		64640-16 ^g 64641-16 ^h	68975-1 ⁱ 68977-1 ^j	64770-16 ^k 64771-16 ^{*l}	64790-1 ⁻ⁿ 64791-1 ^{*n}
	99839-16 ^e	99954-16	99822-16 ^b		64640-16 ^g 64641-16 ^h	68975-1 ⁱ 68977-1 ^j	64770-16 ^k 64771-16 ^{*l}	64790-1 ^m 64791-1 ^{*n}

Section Continued



- Cam and Lifter Kit, includes installation lubricants.
- For 68-78 engines.
- For 68-78 engines, optional Hi Intensity hydraulic lifters, see page 292 for details.
- Contains standard diameter valve springs, no machining required. Standard diameter valve springs, no machining required.
- Must machine cylinder heads.
- Heavy wall, heat treated, for Low Block engines with adjustable rocker arms.
- Heavy wall, heat treated, for High Block engines with adjustable rocker arms. Performance steel billet gears and roller chain set.

- Pro Series steel billet gears and roller chain set with thrust bearing.
- 1.5 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).
- 1.6 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).
- 1.5 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane
- 1.6 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane

					COM	PLETE C	AM SPE	CIFICA	TIONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe	Open/Clo @ .050 Cam Lif	' Hot t Int.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf		IVANGE	LITISSIONS COde	LITTERS	IIIL/ LAII.	IIIt/ EXII.	Separation	IIIt/ EXI	LAII.	LAII.	
Good mid range to upper RPM torque and HP, rough idle, performance usage, mild bracket racing, auto trans w/3000+ converter, 3800-4200 cruise RPM, modern upgrade from factory Six-Pack camshaft, 10.0 to 11.5 compression ratio advised.		3000- 6800	680601°	99278-16 99378-16 ^{°a}	236 244	292 300	112	11 4: 59 :		.522 .543	
Strong mid range torque, rough idle, bracket racing, seri- ous off road, auto trans w/3000+ converter, 10.5 to 12.0 compression ratio advised.	H-238/3347-6	3000- 6800	680651*	99278-16 99378-16*a	238 238	294 294	106	17 4 ² 49 9			
Good upper RPM torque and HP, Pro Street with 440+ cu.in., rough idle, performance usage, bracket racing, auto trans w/3500+ converter, 4200-4600 cruise RPM, 10.5 to 12.0 compression ratio advised.	H-312-2	3200- 7000	684571°	99278-16 99378-16*ª	242 252	312 322	112	14 48 63 9		.528 .552	
Moderate competition only, rough idle, good upper RPM torque and HP, bracket racing, auto trans w/3500+ converter, 10.5 to 12.0 compression ratio advised.	H-242/3520-2-8	3600- 7200	680701°	99278-16 99378-16 [°]	242 252	314 324	108	18 44 59 13			
Good upper RPM torque and HP, Pro Street with 440+ cu.in., rough idle, performance usage, bracket racing, auto trans w/3500+ converter, aftermarket aluminum cylinder heads advised, 4200-4600 cruise RPM, 11.0 to 12.5 compression ratio advised.	H-244/362-25-12	3800- 7200	680711*	99278-16 99378-16*a	244 252	300 308	112	15 49 63 9			
Performance usage, good upper RPM and HP, Pro Street with 440+ cu.in., rough idle, bracket racing, auto trans w/3800+ converter, aftermarket aluminum cylinder heads advised, 11.5 to 13.0 compression ratio advised.	H-248/369-25-12	4000- 7200	680721°	99278-16 99378-16 [°]	248 256	304 312	112	17 5° 65 1°			
Moderate competition only, good upper RPM HP, bracket racing, 440+ cu.in., auto trans w/4000+ converter, 12.0 miniumum compression ratio advised.	H-252/3680-2-8	4000- 7200	680761*	99278-16 99378-16*ª	252 262	324 334	108	23 49 64 18			

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application. NOTE: These three-bolt camshafts can be used in engines originally equipped with single-bolt camshafts if the appropriate timing chain and gear assembly, 68975-1 or 68977-1 is used.

NOTE: Camshafts for Chrysler Mega Blocks with 47 degree lifter bore bank angles, and aftermarket blocks with 48 degree lifter bore bank angles are available on special order. For maximum performance, and to provide the most

accurate valve adjustment on hydraulic lifter camshafts, the use of our **64770-16** adjustable rocker arms and **64640-16** (low block) or 64641-16 (high block) pushrods is highly

recommended. Adjustable rocker arms and appropriate pushrods are required for use with mechanical lifter

NOTE: Low Block Engines are 350-361-383-400 cu.in., while High Block Engines are 413-426-440 cu.in.



CRANE VALV	E TRAIN CO	MPONENTS						
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 2
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCKERS Crane Classic/ Goli Energizer Raci
	99890-16 ^b	99970-16	99822-16 ^b		64640-16° 64641-16ª	68975-1* ^e 68977-1* ^f	64770-16 ⁹ 64771-16 ^{*h}	64790-1 64791-1
	99890-16 ^b	99970-16	99822-16 ^b		64640-16° 64641-16 ^d	68975-1*e 68977-1*f	64770-16 ⁹ 64771-16 ^{*h}	64790-1 64791-1
	99890-16 ^b	99970-16	99822-16 ^b		64640-16° 64641-16 ^d	68975-1*e 68977-1*f	64770-16 ⁹ 64771-16 ^{*h}	64790-1 64791-1
	99890-16 ^b	99970-16	99822-16 ^b		64640-16° 64641-16 ^d	68975-1*e 68977-1*f	64770-16 ⁹ 64771-16 ^{*h}	64790-1 64791-1
	99890-16 ^b	99970-16	99822-16 ^b		64640-16° 64641-16ª	68975-1°° 68977-1° ^f	64770-16 ⁹ 64771-16 ^{*h}	64790-1 64791-1
	99890-16 ^b	99970-16	99822-16 ^b		64640-16 ^c 64641-16 ^d	68975-1*e 68977-1*f	64770-16 ⁹ 64771-16 ^{*h}	64790-1 64791-1
	99890-16 ^b	99970-16	99822-16 ^b		64640-16° 64641-16 ^d	68975-1*e 68977-1*f	64770-16 ⁹ 64771-16 ^{*h}	64790-1 64791-1

Optional Hi Intensity hydraulic lifters, see page 292 for details.

Must machine cylinder heads.

Heavy wall, heat treated, for Low Block engines with adjustable rocker arms.

Heavy wall, heat treated, for High Block engines with adjustable rocker arms.

Performance steel billet gears and roller chain set.

Pro Series steel billet gears and roller chain set with thrust bearing.

1.5 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).

^{1.6} ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included). 1.5 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane

^{1.6} ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane pushrods.

			COMPLETE CAM SPECIFICATIONS							
Andinator	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 294	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Gross Lift Int.
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.
Hydraulic Roller Camsha Brute low end torque, smooth idle, daily usage, towing, economy, also mild turbocharged, 2200-3000 cruise RPM, 8.0 to 9.5 compression ratio advised.	HR-204/286-2-12	800- 5200	689501" ^a	68532-16 ^b	204 214	260 270	112	(5) 29 44 (10)	.000	
Excellent low end and mid range torque and HP, good idle, daily usage, off road, performance and fuel efficiency, 2600-3400 cruise RPM, 8.75 to 10.5 compression ratio advised.	HR-214/325-2S-12	1400- 5600	689511*a	68532-16 ^b	214 222	276 284	112	0 34 48 (6)		.488 .509
Good low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3000-3800 cruise RPM, 9.5 to 10.75 compression ratio advised.	HR-222/339-25-12	1800- 6000	689521*a	68532-16 ^b	222 230	284 292	112	4 38 52 (2)	.000 .000	.509 .528
Good mid range torque and HP, fair idle, performance usage, 3600-4400 cruise RPM, excellent for 440 Six-Pack, mild supercharged, 10.0 to 11.5 compression ratio advised.	HR-230/352-2S-12	2200- 6400	689531*a	68532-16 ^b	230 236	292 298	112	8 42 55 1		.528 .539
Good mid to upper RPM torque and HP, fair idle, performance usage, 3800-4600 cruise RPM, mild supercharged, 10.5 to 12.0 compression ratio advised.	HR-234/359-2S-12	2600- 6600	689551*a	68532-16 ^b	234 242	296 304	112	10 44 58 4		.539 .558
Performance usage, good mid range torque and HP, rough idle, bracket racing w/heavy car, 440+ cu.in., auto trans w/3000+ converter, 4000-4800 cruise RPM, 10.5 to 12.0 compression ratio advised.	HR-240/365-2S-10	2800- 6600	689561*a	68532-16 ^b	240 248	302 310	110	15 45 59 9	.000	.548 .558
Good mid range and upper RPM torque and HP, rough idle, performance usage, bracket racing, 440+ cu.in., auto trans w/3200+ converter, 4000-4800 cruise RPM, good w/mild supercharged or plate nitrous system, 11.5 to 13.0 compression ratio advised.	HR-240/365-2S-14	3000- 6800	689541*a	68532-16 ^b	240 248	302 310	114	11 49 63 5	.000 .000	.548 .558
Good upper RPM torque and HP, performance usage, bracket racing, 470+ cu.in., auto trans w/3500+ converter, good w/manifold nitrous system, 12.0 to 13.5 compression ratio advised. Good w/supercharger, 20 lbs. maximum boost w/8.0 maximum compression ratio advised.	HR-248/372-2S-14	3200- 7000	689571*a	68532-16 ^b	248 256	310 318	114	15 53 67 9		.558 .558
Performance usage, good upper RPM torque and HP, bracket racing, 490+ cu.in., aftermarket aluminum cylinder heads advised, auto trans w/3500+ converter, good w/ large manifold nitrous system, 12.5 minimum compression ratio advised. Good w/supercharger, 22 lbs. max. boost w/8.5 max. compression ratio advised.	HR-254/400-25-14	3400- 7000	689701*a	68532-16 ^b	254 262	324 332	114	17.5 56.5 69.5 12.5		.600 .600

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: These three-bolt camshafts can be used in engines originally equipped with single-bolt camshafts if the appropriate timing chain and gear assembly, 68975-1 or 68977-1 is used.

NOTE: Camshafts for Chrysler Mega Blocks with 47 degree lifter bore bank angles, and aftermarket blocks with 48 degree lifter bore bank angles are available on special order. NOTE: For maximum performance, and to provide the most accurate valve adjustment on hydraulic roller camshafts, the use of our 64770-16 adjustable rocker arms and 64628-16 (low block) or 64629-16 (high block) pushrods is highly recommended. Otherwise, special length pushrods will be required. See page 305 for special pushrod ordering instructions.

NOTE: Low Block Engines are 350-361-383-400 cu.in., while High Block Engines are 413-426-440 cu.in.

NOTE: For engines equipped with B-1 cylinder heads, the fourth cam bearing journal must be grooved for proper oiling. Labor operation 98088 is an available option for this service.



CRANE VALV	/E TRAIN CO	MPONENTS						
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 3
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCKERS Crane Classic/ Goli Energizer Raci
	99893-16 ^c 99832-16 ^{cd}	99969-16 99976-16°	99822-16 ^c		64628-16 ^f 64629-16 ^g	68975-1*h 68977-1*i	64770-16 ^j 64771-16° ^k	64790-1 64791-1
	99893-16 ^c 99832-16 ^{cd}	99969-16 99976-16°	99822-16 ^c		64628-16 ^f 64629-16 ^g	68975-1*h 68977-1*i	64770-16 ^j 64771-16 ^{*k}	64790-1 64791-1
	99890-16 ^c 99832-16 ^{c,d}	99970-16 99976-16°	99822-16°		64628-16 ^f 64629-16 ^g	68975-1*h 68977-1*i	64770-16 ^j 64771-16° ^k	64790-1 64791-1
	99890-16 ^c 99832-16 ^{c,d}	99970-16 99976-16°	99822-16°		64628-16 ^f 64629-16 ^g	68975-1*h 68977-1*i	64770-16 ^j 64771-16 ^{*k}	64790-1 64791-1
	99890-16 ^c 99832-16 ^{cd}	99970-16 99976-16°	99822-16°		64628-16 ^f 64629-16 ^g	68975-1*h 68977-1*i	64770-16 ^j 64771-16 ^{*k}	64790-1 64791-1
	99890-16 ^c 99832-16 ^{cd}	99970-16 99976-16°	99822-16°		64628-16 ^f 64629-16 ^g	68975-1*h 68977-1*i	64770-16 ^j 64771-16 ^{*k}	64790-1 64791-1
	99890-16 ^c 99832-16 ^{cd}	99970-16 99976-16°	99822-16 ^c		64628-16 ^f 64629-16 ^g	68975-1* ^h 68977-1* ⁱ	64770-16 ^j 64771-16* ^k	64790-1 64791-1
	99890-16 ^c 99832-16 ^{c,d}	99970-16 99976-16 ^e	99822-16°		64628-16 ^f 64629-16 ^g	68975-1* ¹ 68977-1* ¹	64770-16 ^j 64771-16* ^k	64790-1 64791-1
	99890-16 ^c 99832-16 ^{c,d}	99970-16 99976-16°	99822-16°		64628-16 ^f 64629-16 ^g	68975-1*h 68977-1*i	64770-16 ^j 64771-16* ^k	64790-1 64791-1

Requires cam button spacer and 66990-1 aluminum-bronze distributor drive gear.

Vertical locking bar hydraulic roller lifters, no machining required. Special length pushrods are required, use 64628-16 (Low Block) or 64629-16 (High Block) with adjustable rocker arms.

Must machine cylinder heads.

Ovate wire beehive spring, requires **99976-16** retainers. Steel, for **99832-16** beehive springs.

Heavy wall, heat treated, for Low Block engines with adjustable rocker arms. Heavy wall, heat treated, for High Block engines with adjustable rocker arms. Performance steel billet gears and roller chain set.

Pro Series steel billet gears and roller chain set with thrust bearing.

1.5 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).

1.6 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).

1.5 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane

m 1.6 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane pushrods.

			COMPLETE CAM SPECIFICATIONS							
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 296	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Gross Lift Int.
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.
Mechanical Lifter Camsh		2000	C04204*	00250.46	220	204	112	12 46	020	520
Good low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2000+ converter, 10.0 to 11.5 compression ratio advised.	F-238/3467-2-12	2800- 6600	681201*	99259-16	238 248	284 294	112	12 46 61 7	.028 .022	
Good mid range torque and HP, rough idle, moderate performance usage, good mid-range HP, bracket racing, auto trans w/2500+ converter, serious off road, 10.0 to 11.5 compression ratio advised.	F-248/3334-2-12	3200- 7000	681241*	99259-16	248 258	310 320	112	17 51 66 12	.022 .022	.500 .520
Good mid range torque and HP, rough idle, performance usage, bracket racing, auto trans w/3000+ converter, 10.5 to 12.0 compression ratio advised.	F-248/3600-2-8	3400- 7000	680931°	99259-16	248 258	284 294	108	21 47 62 16	.028 .030	
Good mid range and upper RPM torque and HP, rough idle, performance usage, bracket racing, auto trans w/3000+ converter, 4000-4400 cruise RPM, 11.0 to 12.5 compression ratio advised.	F-250/376-2S-12	3600- 7200	680941°	99259-16	250 254	282 286	112	18 52 64 10	.020 .018	
Replacement for factory 425 HP 426 cu.in. camshaft.	BluePrinted 2402293	3600- 7200	680201*	99259-16	256 256	304 304	112.5	20.5 55.5 65.5 10.5	.028 .032	
Good mid range and upper RPM torque and HP, rough idle, performance usage, bracket racing, auto trans w/3500+ converter, 11.0 to 12.5 compression ratio advised.	F-258/3468-8	4000- 7400	681321°	99259-16	258 258	320 320	108	26 52 62 16	.022 .022	
Moderate competition only, good mid and upper RPM HP, bracket racing, auto trans w/3500+ converter, 11.5 to 13.0 compression ratio advised.	F-268/3868-2-8	4600- 7800	681561°	99259-16	268 278	304 314	108	31 57 72 26	.026 .026	
Competition only, good upper RPM HP, bracket racing, 1-4 bbl., manual trans or auto trans w/4000+ converter, 383+ cu.in., 12.0 minimum compression ratio advised.	F-274/3933-8	4800- 8000	681681°	99259-16	274 274	314 314	108	34 60 70 24	.028 .028	
Competition only, good upper RPM HP, bracket racing, manual trans or auto trans w/4000+ converter, 440+ cu.in., 12.0 minimum compression ratio advised.	F-278/4002-8	5000- 8200	681701°	99259-16	278 278	314 314	108	34 64 70 28	.026 .026	
Competition only, good upper RPM HP, bracket racing, aftermarket aluminum cylinder heads advised, manual trans or auto trans w/race converter, 470+ cu.in., 13.0 minimum compression ratio advised.	F-280/430-10	5000- 8400	681721*	99259-16	280 280	320 320	110	33 67 73 27	.018 .018	
Radical competition only, maximum performance applications, flat tappet restricted classes, 1-4 bbl., manual trans or auto trans w/race converter, 13.0 minimum minimum compression ratio advised.	F-288/4134-6	5200- 8400	681941*	99259-16	288 288	324 324	106	42 66 74 34	.026 .026	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: These three-bolt camshafts can be used in engines originally equipped with single-bolt camshafts if the appropriate timing chain and gear assembly, 68975-1 or 68977-1 is used.

NOTE: Camshafts for Chrysler Mega Blocks with 47 degree lifter bore bank angles, and aftermarket blocks with 48 degree lifter bore bank angles are available on special order.

NOTE: To provide for valve adjustment on mechanical lifter camshafts, the use of our 64770-16 or 64790-1 adjustable rocker arms and 64621-16 (low block) or 64622-16 (high

block) pushrods is highly recommended.

NOTE: Adjustable rocker arms and appropriate pushrods are required for use with mechanical lifter camshafts.

NOTE: Low Block Engines are 350-361-383-400 cu.in., while High Block Engines are 413-426-440 cu.in.



	CRANE VALV	/E TRAIN CC	MPONENTS						
_	See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 320
	VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCKERS — Crane Classic/ Gold Energizer Race
		99890-16ª	99970-16	99822-16ª		64621-16 ^b 64622-16 ^c	68975-1* ^d 68977-1* ^e	64770-16 ^f 64771-16 ^{*g}	64790-1 ^h 64791-1 ^{*i}
		99890-16ª	99970-16	99822-16ª		64621-16 ^b 64622-16 ^c	68975-1*d 68977-1*e	64770-16 ^f 64771-16 ^{*g}	64790-1 ^h 64791-1 ^{*i}
		99890-16ª	99970-16	99822-16ª		64621-16 ^b 64622-16 ^c	68975-1° ^d 68977-1° ^e	64770-16 ^f 64771-16 ^{*g}	64790-1 ^h 64791-1* ⁱ
		99890-16ª	99970-16	99822-16ª		64621-16 ^b 64622-16 ^c	68975-1*d 68977-1*e	64770-16 ^f 64771-16 ^{*g}	64790-1 ^h 64791-1 ^{*i}
		99893-16ª	99954-16	99822-16ª		64621-16 ^b 64622-16 ^c	64975-1 ⁱ 68977-1*e	64770-16 ^f 64771-16 ^{*g}	64790-1 ^h 64791-1 ^{*i}
		99890-16ª	99970-16	99822-16ª		64621-16 ^b 64622-16 ^c	68975-1*d 68977-1*e	64770-16 ^f 64771-16 ^{*g}	64790-1 ^h 64791-1° ⁱ
		99890-16ª	99970-16	99822-16ª		64621-16 ^b 64622-16 ^c	68975-1*d 68977-1*e	64770-16 ^f 64771-16 ^{*g}	64790-1 ^h 64791-1° ⁱ
		99890-16ª	99970-16	99822-16ª		64621-16 ^b 64622-16 ^c	68975-1*d 68977-1*e	64770-16 ^f 64771-16 ^{*g}	64790-1 ^h 64791-1°i
		99890-16ª	99970-16	99822-16ª		64621-16 ^b 64622-16 ^c	68975-1*d 68977-1*e	64770-16 ^f 64771-16 ^{*g}	64790-1 ^h 64791-1* ⁱ
		99890-16ª	99970-16	99822-16ª		64621-16 ^b 64622-16 ^c	68975-1*d 68977-1*e	64770-16 ^f 64771-16 ^{*g}	64790-1 ^h 64791-1 ^{*i}
		99890-16ª	99970-16	99822-16ª		64621-16 ^b 64622-16 ^c	68975-1*d 68977-1*e	64770-16 ^f 64771-16 ^{*g}	64790-1 ^h 64791-1* ⁱ

Must machine cylinder heads.
Heavy wall, heat treated, for Low Block engines with adjustable rocker arms.
Heavy wall, heat treated, for High Block engines with adjustable rocker arms.
Performance steel billet gears and roller chain set.
Pro Series steel billet gears and roller chain set with thrust bearing.
1.5 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).

^{1.6} ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included). 1.5 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane pushrods.

^{1.6} ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane pushrods.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Mechanical Roller Camsh	afts										
Excellent mid range torque and HP, fair idle, moderate performance usage, off road, mild bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 10.5 to 11.5 compression ratio advised.	SR-246/362-2S-12	3200- 7200	688521*a	66515-16 66542-16 ^b	246 254	296 304	112	16 50 64 10	.020 .020	.543 .561	
Good mid range to upper RPM torque and HP, rough idle, moderate performance usage, mild bracket racing, auto trans w/3500+ converter, 4000-4400 cruise RPM, good w/plate nitrous system, 11.0 to 12.0 compression ratio advised.	SR-254/374-2S-12	3400- 7200	688531*a	66515-16 66542-16 ^b	254 258	304 308	112	20 54 66 12	.020 .020		
Good mid range and upper RPM torque and HP, rough idle, performance usage, oval track, bracket racing, auto trans w/3500+ converter, 11.5 to 13.0 compression ratio advised.	R-260/420-2S-8	3800- 7600	688801*a	66542-16 ^b	260 268	292 300	108	26 54 66 22	.020 .020	.630 .630	
Good upper RPM torque and HP, moderate competition only, bracket racing, auto trans w/race converter, 12.0 minimum compression ratio advised.	R-268/420-2-8	4000- 7800	688811*a	66542-16 ^b	268 278	300 310	108	30 58 71 27	.020 .020		
Competition only, good upper RPM HP, bracket racing, auto trans w/race converter, 12.5 minimum compression ratio advised.	R-272/420-2-10	4200- 8000	688821*a	66542-16 ^b	272 282	304 314	108	30 62 75 27		.630 .630	
Competition only, good mid to upper RPM torque and HP, 440+ cu.in., bracket racing, auto trans w/race converter, good with plate or manifold nitrous system, aluminum aftermarket cylinder heads advised, 12.5 minimum compression ratio advised.	R-274/454-2S-12	4400- 8200	688651" ^a	66542-16 ^b	274 278	306 310	112	29 65 75 23	.020 .022		
Competition only, good upper RPM HP, 440+ cu.in., bracket racing, auto trans w/race converter, 12.5 mini- mum compression ratio advised.	R-276/420-2-10	4400- 8400	688831" ^a	66542-16 ^b	276 286	308 318	110	32 64 77 29	.020 .020	.630 .630	
Competition only, single 4-barrel, Super Stock 383-400 cu.in., auto trans w/race converter, 11.5 minimum compression ratio advised.	R-280/4468-8	4600- 8200	688981*a	66542-16 ^b	280 280	312 312	108	37 63 73 27	.028 .030		
Competition only, Super Street, Super Gas, Pro E.T., auto trans w/race converter, aftermarket aluminum cylinder heads advised, 13.0 minimum compression ratio advised.	R-280/450-254-10	4600- 8400	688681*a	66542-16 ^b	280 288	320 328	114	33 67 77 31		.675 .638	
Competition only, good upper RPM HP, 470+ cu.in., bracket racing, auto trans w/race converter, 13.0 minimum compression ratio advised.	R-282/420-2-10	4800- 8600	688841*a	66542-16 ^b	282 292	314 324	110	35 67 80 32	.020 .020		
Competition only, Super Stock drags 426 cu.in., 11.5 minimum compression ratio advised.	R-284/456-6	5000- 8200	688561*a	66542-16 ^b	284 284	324 324	106	38 66 70 34	.026 .026	.684 .684	
Radical competition only, maximum performance appli- cations, Top Dragster, Top Sportsman, Quick 16, etc., 560+ cu.in., aftermarket aluminum cylinder heads required, good w/large manifold nitrous system.	R-286/500-2S3-14	5000- 8400	688671*a	66542-16 ^b	286 306	320 338	114	32 74 92 34	.026 .022	.750 .750	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: These three-bolt camshafts can be used in engines

NOTE: These three-bolt camshafts can be used in engines originally equipped with single-bolt camshafts if the appropriate timing chain and gear assembly, 68975-1 or 68977-1 is used.

NOTE: Camshafts for Chrysler Mega Blocks with 47 degree lifter bore bank angles, and aftermarket blocks with 48 degree lifter bore bank angles are available on special order. NOTE: Adjustable rocker arms and appropriate pushrods are required for use with roller lifter camshafts. To provide for valve adjustment on roller lifter camshafts, the use of our 64770-16 or 64790-1 adjustable rocker arms and 64621-16 (low block) or 64622-16 (high block) pushrods is highly recommended.

NOTE: Low Block Engines are 350-361-383-400 cu.in., while High Block Engines are 413-426-440 cu.in.

NOTE: For engines equipped with B-1 cylinder heads, the fourth cam bearing journal must be grooved for proper oiling. Labor operation **98088** is an available option for this service.



CRANE VALV	/E TRAIN CO	MPONENTS						
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 3
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCKERS CRANE CLASSIC/ GOLE ENERGIZER RACE
	96879-16 ^c 99832-16 ^{cd}	99970-16 99976-16 ^f	99822-16 ^c	99098-1 ^j	64621-16 ^m 64622-16 ⁿ	68975-1*° 68977-1* ^p	64770-16 ^q 64771-16* ^r	64790-1 64791-1
	96879-16 ^c 99832-16 ^{p,c}	99970-16 99976-16 ^q	99822-16 ^c	99098-1 ^j	64621-16 ^m 64622-16 ⁿ	68975-1*° 68977-1* ^p	64770-16 ^q 64771-16 ^{*r}	64790-1 64791-1
	99885-16 ^c	99955-16	99822-16°	99098-1 ^j	64621-16 ^m 64622-16 ⁿ	68975-1*° 68977-1*°	64770-16 ^q 64771-16 ^{*r}	64790-1 64791-1
	99885-16°	99955-16	99822-16°	99098-1 ^j	64621-16 ^m 64622-16 ⁿ	68975-1*° 68977-1*°	64770-16 ^q 64771-16 ^{*r}	64790-1 64791-1
	99885-16°	99955-16	99822-16 ^c	99098-1 ^j	64621-16 ^m 64622-16 ⁿ	68975-1*° 68977-1* ^p	64770-16 ^q 64771-16 ^{*r}	64790-1 64791-1
	99885-16°	99955-16	99822-16 ^c	99098-1 ^j	64621-16 ^m 64622-16 ⁿ	68975-1*° 68977-1*°	64770-16 ^q 64771-16* ^r	64790-1 64791-1
	99885-16°	99955-16	99822-16 ^c	99098-1 ^j	64621-16 ^m 64622-16 ⁿ	68975-1*° 68977-1*°	64770-16 ^q 64771-16 ^{*r}	64790-1 64791-1
	99885-16°	99955-16 99681-16 ⁹	99822-16°	99098-1 ^j	64621-16 ^m 64622-16 ⁿ	68975-1*° 68977-1* ^p	64770-16 ^q 64771-16 ^{*r}	64790-1 64791-1
	99885-16'	99955-16 99681-16 ⁹	99822-16°	99098-1 ^j	64621-16 ^m 64622-16 ⁿ	68975-1*° 68977-1*°	64770-16 ^q 64771-16 ^{*r}	64790-1 64791-1
	99885-16°	99955-16 99681-16 ⁹	99822-16°	99098-1 ^j	64621-16 ^m 64622-16 ⁿ	68975-1*° 68977-1*°	64770-16 ^q 64771-16 ^{*r}	64790-1 64791-1
	99885-16°	99955-16 99681-16 ⁹	99822-16°	99098-1 ^j	64621-16 ^m 64622-16 ⁿ	68975-1°° 68977-1°°	64770-16 ^q 64771-16* ^r	64790-1 64791-1
	96886-16 ^c 961246-16 ^{c,e}	99634-16 ^h 99962-16 ⁱ	99828-16°	99081-1 ^k 99082-1 ^l	64621-16 ^m 64622-16 ⁿ	68975-1*° 68977-1*°	64770-16 ^q 64771-16*r	64790-1 64791-1

- Requires cam button spacer and 66990-1 aluminum-bronze distributor drive gear.
- Ultra Pro Series roller lifters.
- Must machine cylinder heads.

 Ovate wire beehive spring, requires 99976-16 retainers.

- Ovate wire beenive spring, requires 99976-16 retainers.

 Triple, for 2.050" assembly height, requires 99662-16 retainers.

 Steel, for 99832-16 beehive springs.

 Titanium, Posi Stop, must use 99098-1 single groove valve stem locks, included with the retainers.

 Titanium, standard 10 degree configuration.

 Titanium, for 961246-16 valve springs.

 Machined steel Heat treated, single groove.

- Machined steel, heat treated, 10 degree for 11/32" single groove valve stems.
- Machined steel, heat treated, 10 degree for 3/8" single groove valve stems. Heavy wall, heat treated, for Low-Block engines with adjustable rocker arms. Heavy wall, heat treated, for High-Block engines with adjustable rocker arms.

- Heavy wall, heat treated, for High-Block engines with adjustable rocker arms.

 Performance steel billet gears and roller chain set.

 1.5 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).

 1.6 ratio iron rocker arms, adjustable, must use appropriate Crane pushrods (shafts not included).

 1.5 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane pushrods.

 1.6 ratio aluminum rocker arm kit with rocker shafts, adjustable, must use appropriate Crane pushrods.

Chrysler-Dodge-Plymouth V-8 "Hemi 426" 66-71

						COMPLETE CAM SPECIFICATIONS					
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 293	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
Hydraulic Lifter Camshaf Excellent low end torque, good idle, daily usage, 2600-3000 cruise RPM, 8.5 to 10.25 compression ratio advised.	H-212/304-2-12	1600- 5200	660091*	99278-16	212 222	284 294	112	(1) 33 48 (6)		.477 .486	
			€								
Great mid range torque and HP, street Hemi and Crate Motor upgrade, fair idle, mild bracket racing, auto trans w/2500+ converter, 3800-4200 cruise RPM, 10.0 to 11.5 compression ratio advised.	H-232/3360-2-12	2600- 6000	660611*	99278-16	232 242	304 314	112	9 43 58 4	.000	.528 .535	
Good mid range torque and HP, street Hemi and Crate Motor upgrade, fair idle, mild bracket racing, good w/472+ cu.in., auto trans w/3000+ converter, 3800- 4200 cruise RPM, 10.5 to 12.0 compression ratio advised.	H-236/348-2S-12	2800- 6200	660621*	99278-16	236 244	292 300	112	11 45 59 5	.000 .000	.546 .550	
Rough idle, performance usage, good upper RPM HP, bracket racing, auto trans w/3500+ converter, 4000- 4400 cruise RPM, 11.0 to 12.5 compression ratio advised. Also good w/ supercharger, 18 lbs. maximum boost w/8.5 maximum compression ratio advised.	H-244/362-25-14	3200- 6600	660631°	99278-16	244 252	300 308	114	13 51 65 7	.000	.568 .572	
Hydraulic Roller Camsha	fts — Retrofi	t									
Great mid range torque and HP, fair idle, mild bracket racing, auto trans w/2500+ converter, 3000-3400 cruise RPM, 9.5 to 11.0 compression ratio advised.	HR-226/345-251-12	2200- 6200	669521*a	68532-16 ^b	226 230	288 292	112	6 40 52 (2)	.000 .000	.542 .535	
Good mid range torque and HP, street Hemi and Crate Motor upgrade, fair idle, mild bracket racing, auto trans w/3000+ converter, 3400-3800 cruise RPM, 10.0 to 11.5 compression ratio advised.	HR-236/359-2S-12	2600- 6600	669531*a	68532-16 ^b	236 240	298 302	112	6 40 52 (2)	.000 .000		
Crate Motor upgrade, rough idle, performance usage, good upper RPM torque and HP, bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.5 to 12.0 compression ratio advised, supercharged and/or nitrous.	HR-244/372-2S-14	3000- 6800	669541*a	68532-16 ^b	244 248	306 310	114	13 51 63 5		.584 .565	
Performance usage, good upper RPM torque and HP, bracket racing, auto trans w/3500+ converter, good w/472+ cu.in., good w/large nitrous system, 11.5 minumum compression ratio advised. Also supercharged, 22 lbs. maximum boost w/8.5 maximum compression ratio.	HR-254/400-2S-14	3400- 7000	669571*a	68532-16 ^b	254 258	324 328	114	17.5 56.5 68 10	.000	.628 .608	
Performance usage, good upper RPM HP, bracket racing, auto trans w/race converter, good w/496+ cu.in., good w/large nitrous system, 12.5 minumum compression ratio advised. Also supercharged, 28 lbs. maximum boost w/8.5 maximum compression ratio.	HR-262/400-25-14	3600- 7000	669561*a	68532-16 ^b	262 266	332 336	114	21.5 60.5 72 14		.628 .608	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Due to the increased pushrod seat height of the Crane retrofit hydraulic roller lifters, the cylinder heads, and possibly the cylinder block, will have to be modified for pushrod clearance.

NOTE: Recently produced iron cylinder blocks may have taller than standard lifter bores. This may cause roller lifter guidebar interference, preventing the lifters from contacting the base circle of the camshaft. This will require clearancing, usually by grinding the block. This should be checked prior to final engine assembly.

NOTE: Camshafts for Chrysler Mega Blocks with 50 degree lifter bore bank angles, and aftermarket blocks with 48 degree lifter bore bank angles are available on special order.



Custom Grind Cams Also Available - Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALV	/E TRAIN CC	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM Crane Classic, Energizer	
	99893-16	99954-16 ^d	99824-16°	99093-1°	66621-16 ^f	68975-1* ⁹ 68977-1* ^h			
	99893-16	99954-16 ^d	99824-16 ^c	99093-1°	66621-16 ^f	68975-1* ⁹ 68977-1* ^h			
	99893-16	99954-16 ^d	99824-16°	99093-1°	66621-16 ^f	68975-1* ⁹ 68977-1* ^h			
	99893-16	99954-16 ^d	99824-16 ^c	99093-1°	66621-16 ^f	68975-1* ^g 68977-1* ^h			
	99896-16 ^c	99970-16 ^d	99824-16 ^c	99093-1°	66628-16 ^f	68975-1* ⁹ 68977-1* ^h			
	99896-16 ^c	99970-16 ^d	99824-16°	99093-1°	66628-16 ^f	68975-1* ⁹ 68977-1* ^h			
	99896-16°	99970-16 ^d	99824-16 ^c	99093-1°	66628-16 ^f	68975-1° ⁹ 68977-1° ^h			
	99896-16°	99970-16 ^d	99824-16 ^c	99093-1°	66628-16 ^f	68975-1* ⁹ 68977-1* ^h			
	99896-16°	99970-16 ^d	99824-16 ^c	99093-1°	66628-16 ^f	68975-1* ⁹ 68977-1* ^h			

Requires cam button spacer and 66990-1 aluminum-bronze distributor drive gear.

Vertical locking bar hydraulic roller lifters, machining possibly required (see IMPORTANT NOTE on opposite page). Special length pushrods are required, use 66628-16.

Must machine cylinder heads.

Requires Crane Multi-Fit valve locks.

Machined steel, heat treated, Multi-Fit.

f Heavy wall, heat treated.
 g Performance steel billet gears and roller chain set.
 h Pro Series steel billet gears and roller chain set with thrust bearing.

Chrysler-Dodge-Plymouth V-8 "Hemi 426" 66-71

Also: Brad Anderson aluminum, Johnson/Rodeck TFX-92, Keith Black aluminum, Milodon VII litre, and JP-1

						PLETE C	AM SPE	CIFIC	CATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh	Degrees Lobe Separation	Open/ @ .0 Cam Int/	50" Lift	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Mechanical Lifter Camsh		IMINGE	Liffissions code	LII ILKS	IIIt/ LAII.	IIIt/ EXII.	Jeparation	IIIt/	LAII	LAII.	LAII.
Good low and mid range torque, street Hemi, fair idle, moderate performance usage, bracket racing, auto trans w/3000+ converter, 3600-4000 cruise RPM, 10.0 to 11.5 compression ratio advised.		2800- 6400	661201*	99259-16	238 248	300 310	112	12 61	46 7	.022 .022	
Good mid range torque and HP, Crate Motor upgrade, rough idle, moderate performance usage, bracket racing, auto trans w/3500+ converter, 10.5 to 12.0 compression ratio advised. Also mild supercharged and/or nitrous.	F-248/3600-2-12	3600- 7000	660941*	99259-16	248 258	294 304	112	17 66	52 12	.028 .030	.565 .568
Rough idle, moderate performance usage, bracket racing, auto trans w/4000+ converter, 11.5 to 13.0 compression ratio advised. Also mild supercharged and/or nitrous.	F-260/391-25-10	4000- 7200	661381*	99259-16	260 264	292 296	110		55 17	.018 .018	.614 .603
Mechanical Roller Camsh											
Good low end and mid range torque and HP, Crate Motor upgrade, good idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3200- 3600 cruise RPM, 10.0 to 11.5 compression ratio advised. Also mild supercharged and/or nitrous.	SR-238/350-2S-12	3000- 7000	668511*a	66515-16 66542-16 ^b	238 246	288 296	112	42 60	46 6	.020 .020	
Good mid range torque and HP, Crate Motor upgrade, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 10.5 to 11.5 compression ratio advised. Also mild supercharged and/or nitrous.	SR-246/362-2S-12	3200- 7200	668521*a	66515-16 66542-16 ^b	246 254	296 304	112	16 64	50 10		.568 .568
Good mid range and upper RPM torque and HP, rough idle, mild bracket racing, auto trans w/3000+ converter, 11.0 to 12.5 compression ratio advised. Also mild supercharged and/or nitrous.	SR-254/374-2S-12	3600- 7600	668531*a	66515-16 66542-16 ^b	254 262	304 312	112	20 68	54 14		.587 .565
Performance usage, Pro Street, mild bracket racing, auto trans w/race converter, 12.0 to 13.5 compression ratio advised. Also mild supercharged and/or nitrous.	SR-262/400-2S-12	3800- 7600	668541*a	66515-16 66542-16 ^b	262 266	300 304	112	24 70	58 16		.628 .608
Performance usage, bracket racing, auto trans w/race converter, good w/large nitrous system, 12.0 to 13.5 compression ratio advised. Also supercharged w/22 lbs. maximum boost w/8.5 maximum compression ratio.	R-262/452-25-12	4000- 7800	668301*a	66515-16 66542-16 ^b	262 276	291 312	112		58 23	.020 .020	.710 .699
Competition only, bracket racing w/heavy car, single 4 bbl, auto trans w/race converter, 12.0 to 13.5 compression ratio advised.	R-274/4334-8	4400- 8000	668281*a	66515-16 66542-16 ^b	274 274	314 314	108	32 68	62 26		.680 .659

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: Recently produced iron cylinder blocks may have taller

NOTE: Recently produced iron cylinder blocks may have taller than standard lifter bores, causing roller lifter guidebar interference, preventing the lifters from contacting the base circle of the camshaft. This will require clearancing, usually by grinding the block. You must check for this prior to final engine assembly.

NOTE: Camshafts for Chrysler Mega Blocks with 50 degree lifter bore bank angles, and aftermarket blocks with 48 degree lifter bore bank angles are available on special order.

NOTE: Roller camshafts for the Keith Black 48°, Brad Anderson,

lifter bore bank angles are available on special order.

Roller camshafts for the Keith Black 48°, Brad Anderson, and Johnson/Rodeck TFX-92 engines, with either standard, 2.125″ or 60mm cam bearing journals, are available on special order. Contact Crane's Performance Consultants for details

NOTE: Roller camshafts for the 2.125"1-4 journal diameter configuration and those having 60mm journals are available with the 4/7 firing order swap (1-8-7-3-6-5-4-2).

NOTE: Custom ground tool steel roller camshafts are available for the 2.125" 1–4 journal diameter, and the 60mm journal diameter configuration blocks.



Custom Grind Cams Also Available – Call 866-388-5120 or go to cranecams.com for ordering information

	CRANE VALV	E TRAIN CO	OMPONENTS							
_	See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 31
	VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM Crane Classic Energizer	ROCKERS - / GOLD RACE
		99893-16	99954-16 ^d	99824-16°	99093-1°	65689-16 ^f	68975-1* ^g 68977-1* ^h			
		99893-16	99954-16 ^d	99824-16°	99093-1°	65689-16 ^f	68975-1* ⁹ 68977-1* ^h			
		99893-16	99954-16 ^d	99824-16 ^c	99093-1°	65689-16 ^f	68975-1* ⁹ 68977-1* ^h			
		96878-16	99970-16 ^d	99824-16 ^c	99085-1°	65689-16 ^f	68975-1* ^g			
		700/0-10	33370-10	99024-10	77003-1	03003-10	68977-1°h			
		96878-16°	99970-16 ^d	99824-16 ^c	99085-1°	65689-16 ^f	68975-1* ⁹ 68977-1* ^h			
		96878-16°	99970-16 ^d	99824-16°	99085-1°	65689-16 ^f	68975-1* ⁹ 68977-1* ^h			
		96878-16°	99970-16 ^d	99824-16°	99085-1°	65689-16 ^f	68975-1° ^g 68977-1° ^h			
		96886-16°	99970-16 ^d	99824-16	99085-1°	65689-16 ^f	68975-1* ⁹ 68977-1* ^h			
		96886-16°	99970-16 ^d	99824-16°	99085-1°	65689-16 ^f	68975-1* ⁹ 68977-1* ^h			

Section Continued



- Requires cam button spacer and 66990-1 aluminum-bronze distributor drive gear.
- Ultra Pro Series roller lifters.
- Must machine cylinder heads.
- Requires Crane Multi-Fit valve locks. Machined steel, heat treated, Multi-Fit.
- Heavy wall, heat treated.
- Performance steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set with thrust bearing.

Chrysler-Dodge-Plymouth V-8 "Hemi 426" 66-71

Also: Brad Anderson aluminum, Johnson/Rodeck TFX-92, Keith Black aluminum, Milodon VII litre, and JP-1

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 296	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Gross Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
Mechanical Roller Camsh Competition only, NHRA A/FD.		1000	660031*ahc	CCE 47 1C0	276	205	112	⊃F 71	020	0.40	
Competition only, NARA A/TU.	R-276/5401-2S-13XBB 48I	6800	668821*a,b,c	66547-16°	276 282	305 311	113	25 71 74 28	.020 .022	.848 .821	
Competition only, serious race Super Stock w/2-4's, SFO (1-8-7-3-6-5-4-2) firing order.	R-276/555-2S-13XBBA SF0	5500- 8500	668351*a,b,d	66542-16 ^f	276 294	306 324	113	26 70 82 32		.871 .798	
Competition only, drag racing single 4-barrel Super Stock, manual or auto trans w/race converter, 12.0 minimum compression ratio advised.	320-324-12R	4400- 8400	668951°a	66542-16 ^f	284 286	320 324	112	32 72 77 29	.028 .030		
Competition only, Nostalgia F/C.	R-292/480-10XBB 48D	5000- 8500	668311*a,b,c	66547-16°	292 292	332 332	110	36 76 76 36		.754 .730	
Competition only, Nostalgia A/GS.	R-292/500-254-14XBBA 48I	9500- 9500	668321*a,b,c	66542-16 ^f 95542-16 ^g	292 296	332 336	114	35 77 85 31	.026 .026	.785 .760	
Competition only, maximum performance, baseline high RPM normally aspirated applications, 12.5 minimum compression ratio advised.	R-296/4778-8	4600- 8600	669091*a	66542-16 ^f	296 296	328 328	108	42 74 78 38	.024 .026	.750 .726	
Competition only, supercharged alcohol dragster up to 480 cu.in.	R-296/4778-2S-14 R-296/4778-2S-14XBBA 48I	6000-) 10000	669101*a 669161*a,b,c	66542-16 ^f 95542-16 ^g	296 300	328 322	114	39 77 89 31	.024 .026		
Competition only, supercharged alcohol funny car over 480 cu.in.	R-296/500-16 R-296/500-16 48D R-296/500-16 XBBA 48D	6000- 9600	669121*a 669131*a,c 669171*a,b,c	66542-16 ^f 95542-16 ^g	296 296	336 336	116	35 81 87 29		.785 .760	
Competition only, supercharged alcohol funny car over 480 cu.in., Pro Mod, with rigid valve train, SFO (1-8-7-3-6-5-4-2) firing order.	R-296/5001-16XBBA 48D SF0	9 6000-9600	668331*a,b,c,d	66542-16 ^f 95542-16 ^g	296 296	330 330	116	36 80 88 28	.020 .022	.785 .760	
Competition only, baseline supercharged Fuel Dragster or Funny Car, and Blown Fuel Hydro.	R-298/4778-14XBB 48D	5000- 8600	669181*a,b,c	66549-16 ^h	298 298	330 330	114	37 81 85 33	.026 .026	.750 .726	
Competition only, Top Fuel Dragster and Funny Car.	R-302/500-25R-14XBB 48I	5000- 8600	668341*a,b,c	66549-16 ^h	302 298	342 338	114	37 85 83 35	.026 .026	.785 .760	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application. NOTE: Recently produced iron cylinder blocks may have taller

than standard lifter bores, causing roller lifter guidebar interference, preventing the lifters from contacting the base circle of the camshaft. This will require clearancing, usually by grinding the block. you must check for this prior to final

engine assembly.

NOTE: Camshafts for Chrysler Mega Blocks with 50 degree lifter bore bank angles, and aftermarket blocks with 48 degree lifter bore bank angles are available on special order.

NOTE: Camshafts for the Keith Black 48°, Brad Anderson, and Johnson/Rodeck TFX-92 engines, with either standard, 2.125" or 60mm cam bearing journals, are available on special order.

Contact Crane's Performance Consultants for details.

NOTE: Camshafts for the 2.125" 1-4 journal diameter configuration

and those having 60mm journals are available with the 4/7 firing order swap (1-8-7-3-6-5-4-2).

NOTE: Custom ground tool steel roller camshafts are available for the 2.125" 1–4 journal diameter, and the 60mm journal diameter configuration blocks.



Custom Grind Cams Also Available - Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM CRANE CLASSIC/ ENERGIZER	
	2424244	22.121.14							
	96848-16 [†] 961356-16 ^t	99681-16 ^k 99663-16 ^v	99826-16 ⁿ	99097-110					
	96849-16 ⁱ 961355-16 ^u	99656-16 ¹ 99663-16 ^v	99825-16°	99093-1 ^{5,p}					
	96848-16 ⁱ 961356-16 ^t	99656-16 ¹ 99663-16 ^v	99825-16°	99093-1 ^{s,p}	66624-16				
	96849-16 ⁱ 961356-16 ^t	99681-16 ^k 99663-16 ^v	99826-16 ⁿ	99097-1 ^{7,0}					
	96849-16 ^j 961355-16 ^u	99681-16 ^k 99663-16 ^v	99826-16 ⁿ	99097-110					
	96848-16 ⁱ 961355-16 ^u	99656-16 ¹ 99663-16 ^v	99825-16°	99093-1 ^{s,p}	66624-16				
	96848-16 ⁱ 96849-16 ^j 961355-16 ^u	99681-16 ^k 99663-16 ^v	99826-16 ⁿ	99097-1 ^{5,0}					
	96848-16 ⁱ 96849-16 ^j 961355-16 ^u	99681-16 ^k 99663-16 ^v	99826-16 ⁿ	99097-1 ^{7,0}					
	96848-16 ⁱ 96849-16 ^j 961355-16 ^u	99681-16 ^k 99663-16 ^v	99826-16 ⁿ	99097-11,0					
	96849-16 ⁱ 961355-16 ^u	99681-16 ^k 99678-16 ^m 99663-16 ^v	99826-16 ⁿ 99828-16 ^p	99097-1 ^{1,0} 99098-1 ^{1,0}					
	96849-16 ^j 961355-16 ^u	99681-16 ^k 99678-16 ^m 99663-16 ^v	99826-16 ⁿ 99828-16 ^p	99097-1 ^{1,0} 99098-1 ^{1,0}					

- Requires cam button spacer and 66990-1 aluminum-bronze distributor drive gear.
- 9310 steel camshaft with 2.125" cam bearing journals.
- For 48° lifter bank angle blocks.
- Camshaft has SFO firing order 1-8-7-3-6-5-4-2.
- Ultra Pro Series 1.000" diameter roller lifters for standard to .200" spread lifter bore blocks, requires cylinder block machining.
- Ultra Pro Series roller lifters.
- Ultra Pro Series roller lifters for .100 to .200" spread lifter bore blocks.

 Ultra Pro Series 1-1/16" diameter roller lifters for standard to .200" spread lifter bore blocks, requires

 s cylinder block machining.

- For 2.100" assembly height, cylinder head machining may be required.
 For 2.200" assembly height, cylinder head machining may be required.
 Titanium, for 11/32" valve stems, must use **99097-1** valve stem locks (included with the retainers) and 99421-16 lash caps.
- I Requires Crane Multi-Fit valve locks.
- m Titanium, for 3/8" valve stems, must use 99098-1 valve stem locks (included with the retainers) and 99422-16 lash caps.
- Must machine cylinder heads.
- For 11/32" valve stems.
- For 5/16" valve stems.
- For 3/8" valve stems.
- Machined steel, heat treated. Machined steel, heat treated, Multi-Fit.
- Small diameter, low mass, Pacaloy wire for 2.100" assembly height. Requires **99963-16** titanium
- **u** Small diameter, low mass, Pacaloy wire for 2.175" assembly height. Requires **99963-16** titanium
- v Titanium, for **961356-16** and **961355-16** springs, requires Crane Multi Fit valve locks.

					СОМ	PLETE C	AM SPE	CIFICA	ΓΙΟΝS		
Application	Camshaft Series/ Grind Number	RPM Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 286 FOLLOWERS	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration	Degrees Lobe Separation	Open/Clo @ .050′ Valve Lif Int/Exh	Hot	Gross Lift Int. Exh.	
Hydraulic Follower Cams		NAINGE	ETHISSIONS Code	FOLLOWERS	IIIL/EXII.	IIII/EXII.	эерагаиоп	IIIL/EXII	EXII.	EXII.	
Excellent low end torque, smooth idle, upgrade for stock applications, economy, 1800-2400 cruise RPM, standard compression ratio advised.	H-260-2	1400- 4600	190021*	19800-8	212 220	260 268	112	(1) 33 47 (7)		.415 .425	
Good low end torque, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, 8.75 to 10.0 compression ratio advised.	H-270	1400- 4600	194611*	19800-8	218 218	270 270	113	1 37 47 (9)		.415 .415	
Good low and mid-range torque, good idle, daily usage and off road, performance and fuel efficiency, turbocharged performance, 2600-3000 cruise RPM, 9.5 to 11.0 compression ratio advised.	H-272-2	1800- 5200	194621*	19800-8	226 234	272 280	110	8 38 52 2	.000 .000	.420 .420	
Fair idle, moderate performance usage, mini stock short oval, good mid-range HP, 3000-3400 cruise RPM, 10.0 to 11.5 compression ratio advised.	H-278-2	2400- 5600	190071*	19800-8	234 242	278 286	110	12 42 56 6	.000 .000	.460 .480	
	1 6										
Mechanical Follower Cam Moderate competition, good mid and upper RPM torque & HP, mini stock short oval, 10.0 to 11.5 com- pression ratio advised.	1Shafts FOR-272-2-10	2500- 6000	192211°a	19800-8	232 242	272 282	110	11 41 66 6		.435 .460	
Moderate competition only, good mid and upper RPM torque & HP, mini stock short oval, 10.5 to 12.0 compression ratio advised.	FOR-300-6	3200- 7000	192251"a	19800-8	264 264	300 300	106	30 54 62 22		.510 .510	
Moderate competition only, good mid and upper RPM HP, mini stock long oval, 11.0 to 12.5 compres- sion ratio advised.	FOR-300-8	3400- 7200	192221*a	19800-8	264 264	300 300	108	29 55 65 19		.510 .510	
Competition only, radical turbocharged, drag racing, high RPM road course, prepared cylinder head recom- mended.	FOR-310-2R-8	4200- 8200	192261*a	19800-8	274 264	310 300	108	34 60 64 19		.535 .510	
Competition only, good mid and upper RPM HP, mini stock, long oval track or road course, 12.0 minimum compression ratio advised.	FOR-310-8	4000- 7600	192241*a	19800-8	274 274	310 310	108	34 60 70 24		.535 .535	
Radical competition only, high RPM maximum perfor- mance applications, high boost and RPM turbo- charged, 13.0 minimum compression ratio advised.	FOR-320-10	4600- 8400	192231*a	19800-8	284 284	320 320	110	37 67 77 27		.560 .560	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Certain special order camshafts are not warranted against lobe wear.

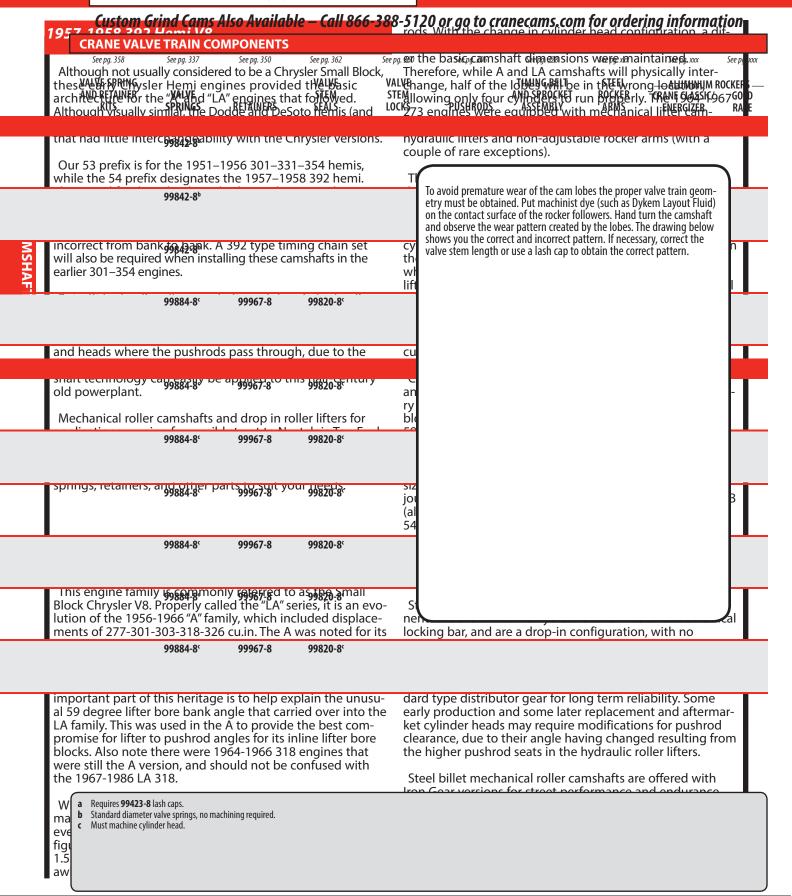
NOTE: Although 1988 and later 2.3L and 2.5L engines are equipped with a composite steel camshaft and roller followers, conventional camshafts and followers can be fitted to them. **NOTE:** To install mechanical type camshafts in the Ford 2300 c.c. engine, a methaod of effecting valve adjustment must be

provided. Remove the hydraulic adjuster bodies from the cylinder head, then mill the top of the adjuster boss down .200". Machine 8 press-in sleeves from steel, approximately 1.700" long to replace the hydraulic adjusters. Drill and tap the center of each sleeve to 14mm x 1.25. The sleeves should then be pressed into the head, and secured by pinning or with a locking compound. The 71-74 Ford 2000 c.c. OHC engine's adjusters and locking nuts can then be used to provide valve adjustment. The rocker stabilizer springs from the 71-74 Ford 2000 c.c. OHC engine should also be used to maintain follower to valve stem contact.

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.

Tips & Notes





1986-1991 318 (5.2L) & 1987-1991 360 (5.9L) "LA" V8

These engines are a continuation of the LA series, being factory upgraded with hydraulic roller camshafts and lifters. Cylinder head changes were also made, with the valve spring envelope being reduced, making it very difficult to fit performance valve springs. Still designated with our 69 prefix, this engine group is listed separately to properly define the emissions legalities of the camshafts.

Hydraulic roller camshafts are offered, along with many valve train components.

Dodge R5

This is an evolution of the LA engine, designed for rules specific oval track racing. These engines were never installed in any vehicles, or sold as a complete assembly. Normally paired with the P7 cylinder heads, these are built per application for each form of competition. This is known as our 184 prefix, with 8620 steel billet roller cams having 60mm journals available on special order.

1992-2002 5.2L & 5.9L Magnum V8

The final upgrade to the LA family, the Magnum engines received non-adjustable pedestal mounted 1.6:1 ratio rocker arms from the factory. The nose of the camshaft was also shortened as a result of vehicle packaging requirements, so there is no camshaft interchangeability with the earlier LA engines. Our 70 prefix indicates this version.

We offer hydraulic roller camshafts and many valve train components for the Magnum. Our **36655-16** Pushrod Guideplate and Rocker Arm Stud Conversion Kit can be used to install adjustable stud mounted rocker arms, with no cylinder head machining required.

2002-2010 5.7L & 6.1L HEMI V8

Chrysler's latest pushrod V8 capitalizes on the heritage of the legendary Chrysler Hemi powerplants of the 50's, 60's, and 70's. Loosely based around the LA engine's architecture, these are equipped with a hydraulic roller camshaft and .842" diameter hydraulic roller lifters. Crane Cams' 198 prefix denotes our products for these engines. Whenever upgrading to a performance camshaft, the cylinder deactivation system (MDS) lifters can not be used, and computer upgrades will be required. The 392 Crate engines are also included in this group.

We currently offer hydraulic roller camshafts, and other valve train components, with more products to be introduced.



Custom Grind Cams Also Available – Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING BELT AND SPROCKET ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC/ ENERGIZER	ROCKERS — GOLD RACE

			To avoid premature wear of the cam lobes the proper valve train geometry must be obtained. Put machinist dye (such as Dykem Layout Fluid) on the contact surface of the rocker followers. Hand turn the camshaft and observe the wear pattern created by the lobes. The drawing below shows you the correct and incorrect pattern. If necessary, correct the valve stem length or use a lash cap to obtain the correct pattern.
99884-8°	99967-8	99820-8	correct
99884-8	99967-8	99820-8	incorrect
99884-8 ^b	99967-8	99820-8 ^b	Valve too short, need longer valve or lash cap.
99884-8 ⁶	99967-8	99820-8 ^b	← incorrect →
99884-8 ^b	99967-8	99820-8 ^b	Valve too long, correct valve length
99884-8 ^b	99967-8	99820-8 ^b	or remove lash cap
99884-8 ^b	99967-8	99820-8 ^b	

a Requires 99423-8 lash caps.b Must machine cylinder head.

					СОМ	PLETE C	AM SPE	CIFIC	CATI	ONS	
Application	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 286	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	'@ .0 Valve)50" e Lift	Lash Hot Int.	Gross Lift Int.
Application	Grind Number	RANGE	Emissions Code	FOLLOWERS	Int/Exh.	int/Exn.	Separation	Int/	EXN	Exh.	Exh.
Hydraulic Roller Followel Excellent low end torque, smooth idle, daily usage, upgrade for stock applications, performance and fuel efficiency, 2200-3000 cruise RPM, 8.5 to 19.75 com- pression ratio advised.	RFOR-214/420-12	1000- 4200	199541*		214 214	252 252	112	0 44 (34 (10)	.000 .000	.420 .420
Good low end torque, good idle, daily usage, off road, performance and fuel efficiency, turbocharged performance, 2600-3200 cruise RPM, 8.75 to 10.5 compression ratio advised.	RFOR-226/420-25-12	1400- 4600	199501*		226 234	274 282	112	6 54	40 0	.000	
Good mid range torque, fair idle, moderate performance usage, good mid-range HP, autocross, medium oval track, bracket racing, auto w/2500+ converter, 3200-3600 cruise RPM, 9.5 to 10.75 compression ratio advised.	RFOR-234/450-8	2000- 5600	199511*		234 234	282 282	108	14 50	40 4		.450 .450
Rough idle, performance usage, good mid-range torque and HP, oval track, bracket racing, auto w/3000+ converter, 10.0 to 11.5 compression ratio advised.	RFOR-242/480-8	2800- 6600	199521*		242 242	290 290	108	18 54	44 8		.480 .480
Rough idle, performance usage, good upper RPM HP, oval track, bracket racing, auto w/3500+ converter, 10.5 to 12.0 compression ratio advised.	RFOR-250/510-10	3200- 7000	199531°		250 250	298 298	110	20 60	50 10	.000 .000	.510 .510
Mechanical Roller Follow	er Camshafts	;									
Moderate competition only, good mid range RPM torque and HP, short oval track, bracket racing, auto w/3200+ converter, 10.5 to 12.0 compression ratio advised.	RFOR-252/560-6	3200- 7000	198091*		252 252	284 284	106	24 56	48 16	.010 .012	
Moderate competition only, good mid and upper RPM torque and HP, long oval track, bracket racing, auto w/4000+ converter, 11.5 minimum compression ratio advised.	RFOR-260/584-8	3600- 7400	198101*		260 260	292 292	108	27 63	53 17	.010 .012	.584 .584
Competition only, good mid and upper RPM torque and HP, oval track, road course, bracket racing, auto w/race converter, 12.0 minimum compression ratio advised.	RFOR-268/608-6	4000- 7800	198131°		268 268	300 300	106	32 64	56 24	.010 .012	.608 .608
Competition only, high RPM maximum performance applications, bracket racing, auto w/race converter,	RFOR-276/632-8	4600- 8400	198161*		276 276	308 308	108	35 71	61 25	.010 .012	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: Hydraulic Roller Camshafts are designed to be used with a Ford stock length valve. Failure to do this will

give incorrect gross lift, incorrect rocker geometry, and cause premature wear and loss of power.

IMPORTANT NOTE: Mechanical roller cams must use a valve that is 4.900" overall length, such as a small block Chevrolet valve. There should be .300" from tip of valve to top of keeper groove. This valve combined with Crane springs, retainers and locks will enable you to obtain proper valve spring assembly height and give you a .090" cushion from coil bind.



Custom Grind Cams Also Available – Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 3
VALVE SPRING AND RETAINER KITS	VALVE Springs	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING BELT AND SPROCKET ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	99884-8ª	99967-8	99820-8ª			Cam Base C	ircle	.5	00"R
	99884-8ª	99967-8	99820-8ª			_	+	\	
	99884-8ª	99967-8	99820-8ª		.425"				
	99884-8ª	99967-8	99820-8ª		1 2.07	5"	Stock S	Spring Seat	
	99884-8ª	99967-8	99820-8ª		cam, the v	at the correct valve to	ust be checkéo	d. If the spring sea	roller ats are
					obtained. method o material,	mension of 2.075" to If the spring seats h f measuring must be by drilling an 11/32"	ave been mac e used. Make a perpendicula	hined, then an al I gauge from a bl r through hole. Ir	ock of Isert
	99838-8ª	99936-8	99820-8ª	99096-1 ^b	(.500" rad	over the valve stem ius) base circle of the e of the gauge to the	e cam lobe. Th	ie dimension fron	
	99838-8ª	99936-8	99820-8ª	99096-1 ^b					
	77030"0	77730-0	7702U-0	77070° I	c.c. en	: To install Mechanic gine, a method of ei ed. Remove the hyd	fecting valve	adjustment must	be
	99838-8ª	99936-8	99820-8ª	99096-1 ^b	inder l Machi long to ter of	head, then mill the t ne 8 press-in sleves o replace the hydrau each sleeve to 14mn	op of the adju from steel, ap lic adjusters. [1 x 1.25. The s	ster boss down .2 proximately 1.700 Drill and tap the c leeves should the	200". 0" en- en be
	99838-8ª	99936-8	99820-8ª	99096-1 ^b	presse ing co ers an ment.	d into the head, and mpound. The 71-74 d locking nuts can th The rocker stabilizer IC engine should als	secured by pi Ford 2000 c.c. nen be used to springs from	inning or with a l OHC engine's adj provide valve ad the 71-74 Ford 20	ock- ust- iust-

Must machine cylinder head. Machined steel, heat treated. Required to obtain correct assembly height.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 286	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Cold Int. Exh.	Gross Lift Int. Exh.	
Mechanical Lifter Camsh	afts										
Good low and mid range power, manual or auto trans OK, advise low restriction air intake and header with free-flowing exhaust	F-210/374-2SR-10	1000- 6500	223-0010*		210 206	232 228	110	(1) 31 37 (11)	.008 .010	.374 .366	
Moderate performace usage, good mid range to upper RPM power, manual trans, advise upgraded air intake system, header with free-flowing exhaust.	F-214/382-2SR-9	2000- 7000	223-0012*		214 210	236 232	109	1 33 38 (8)	.008 .010	.382 .374	
Performance usage, upper RPM power, manual trans, good intake and exhaust with ported head recommended, good with nitrous or supercharger, 10.5 to 12.0 compression ratio advised.	F-218/390-2SR-10	3000- 8000	223-0014*		218 214	240 236	110	2 36 41 (7)	.008 .010	.390 .382	

Ford Duratec 4 Cylinder 02-05 1.8-2.0-2.3 Litre DOHC 4V **Mechanical Lifter Camshafts** Good low end and mid range power, smooth idle, per- F-212/354-2SR-10 224-0010*a 1000-212 232 110 (4) .010 .374 36 formance upgrade, auto or manual trans, upgraded air 6000 204 224 32 (8) .012 .354 intake and cat-back exhaust advised, will work with ❸ standard valve springs. 224-0012*a Good mid range power, fair idle, performance usage in F-226/410-2SR-10 248 110 1500-226 3 43 .008 .410 5-speed cars and 2WD trucks, advise upgraded air 38 (2) 6500 216 238 .010 .385 intake system, intake manifold, and header with free flowing exhaust. ❸ Performance usage, requires stand-alone fuel man-F-236/435-2SR-10 2500-224-0014*a 236 258 110 8 48 .008 .435 agement, high flow intake and exhaust systems, port-7500 248 43 3 226 .010 .410 ed head, good for turbo or supercharger, also nitrous, 10.5 to 12.0 compression ratio advised. ❸ Competition only, drag racing, high RPM road race, F-246/460-2SR-10 3500-224-0016*a 246 268 110 13 53 .008 .460 serious off road, needs stand alone fuel management, 8000 236 258 48 8 .010 .435 high flow intake and exhaust, ported head, good with

3

224-0018*a

❸

256

246

278

268

110

18

53 13

.008 .485

.010 .460

4500-

9000

F-256/485-2SR-10

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

turbo or supercharger with spread lobe separation,

Competition only, high RPM drag racing, requires seri-

ous head, intake and exhaust systems, fuel manage-

ment, good with high RPM turbo, supercharger,

nitrous, 13.0 minimum compression ratio advised.

12.0 minimum compression ratio advised.



Custo	om Grind Cams	: Also Availab	le – Call 86	6-388-5120	or go to cr	anecams.com	for orde	ring informa	ition
CRANE	VALVE TRAIN C	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRI AND RETAIN KITS		RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC/ ENERGIZER	
			F-226 The m circle (be cleated or with .460"	/410 F-236/435 aximum performance (1.418"), that will wor aranced for lobe cleara (1.318"), that will wor h .050" longer valves. ift grinds. You must s	F-246/460 racing camshafts for t k with standard lengtl nce. Otherwise, the n k with either stock len Lobe to cylinder head specify the base circle o	er. Popular profiles includ hese engines are product n valves, but will require ose of the lobe will conta gth valves plus a .050" th clearance should still be of diameter when ordering. ir unique cam phaser and	ed in two versions the cylinder head ct the head. Re ick lash cap (Ferre checked, particula These camshafts	casting to duced base ea C10011), rily with the s will not	
903-2007									
903-2007	1				railable on special ord F-246/460 F-256	er. Popular profiles includ / 485	e:		
903-2007	1								
903-2007	1								

Valve spring and retainer kit **903-2007** required Includes valve springs and titanium retainers

903-2007

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	rpm Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Lifter Camshaf	fts						<u> </u>			
Brute low end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 7.75 to 8.75 compression ratio advised.	H-192/2667-25-12	800- 4200	500511*	99280-12	192 204	248 260	112	(11) 23 39 (15)	.000 .000	.429 .458
Good low end torque, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-260-2	1200- 4600	503901°	99280-12	204 216	260 272	112	(5) 29 45 (9)	.000	.458 .487
Good low and mid range torque, good idle, daily usage and off road, towing, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	H-272-2	1800- 5400	503941*	99280-12	216 228	272 284	112	1 35 51 (3)		.487 .515
Good low and mid range torque, fair idle, moderate performance usage, limited 1/4 - 3/8 mile oval track, serious off road, mild bracket racing, auto with 2500+ converter, 8.75 to 10.5 compression ratio advised.	H-224/309-2-6	2200- 5600	500211*	99280-12	224 234	288 298	106	10 34 47 7	.000	.497 .523
Good mid to upper RPM torque and HP, performance usage, 3/8 - 1/2 mile oval track, radical off road, bracket racing, 11.0 to 12.25 compression ratio advised.	H-238/3347-8	3200- 6400	500641*	99280-12	238 238	294 294	108	16 42 52 6	.000 .000	
Mechanical Lifter Camsh	afts									
Good mid range torque and HP, fair idle, moderate performance usage, off road, mild bracket racing, auto trans with 2000+ converter, 3400-3800 cruise RPM, 10.0 to 11.5 compression ratio advised.	F-238/3200-2-10	2600- 6000	501181°	99257-12ª	238 248	304 314	110	14 44 59 9	.022 .022	
Good upper to upper RPM torque and HP, 3/8 - 1/2 mile oval track, serious off road, bracket racing, auto with 2500+ converter, 11.5 minimum compression ratio advised.	F-246/359-2S-6	3000- 6200	501211*	99257-12ª	246 250	282 286	106	21 45 55 15	.012 .012	
Good upper RPM HP, performance usage, 3/8 - 1/2 mile oval track, bracket racing, auto with 3000+ converter, 12.0 minimum compression ratio advised.	F-256/3634-25-8	3600- 6800	501311*	99257-12ª	256 264	292 300	108	23 53 63 21		.585 .604

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: Roller camshaft kit components are available on special order.



Custom Grind Cams Also Available – Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC/ ENERGIZER	ROCKERS — GOLD RACE
	99838-12	99944-12	99820-12 ^b	99097-1 ^c	50621-12 ^d				
	99838-12	99944-12	99820-12 ^b	99097-1	50621-12 ^d				
	99838-12	99944-12	99820-12 ^b	99097-1	50621-12 ^d				
	99838-12	99944-12	99820-12 ^b	99097-1	50621-12 ^d				
	99838-12	99944-12	99820-12 ^b	99097-1	50621-12 ^d				
	99893-12	99953-12	99820-12 ^b	99097-1	50621-12 ^d				
	99893-12	99953-12	99820-12 ^b	99097-1	50621-12 ^d				
	99893-12	99953-12	99820-12 ^b	99097-1°	50621-12 ^d				

Requires appropriate Crane pushrods. Must machine cylinder head. Machined steel, heat treated.

Heavy wall, heat treated.

Ford Small Block V8 Tech Tips & Notes

1962-1987 221-255 (4.2L) – 260-289-302 (5.0L) cu.in. V8 and 1988-1995 302 (5.0L) cu.in. V8 trucks (except 1982-1995 302 (5.0L) H.O.)

Ford's modern line of small block V8 engines was introduced in 1962, with the 221 and 260 cu.in. versions. This engine family (properly referred to as the Windsor, even if it isn't the 351 cu.in. variety) has inline lifter bores in the block, and cylinder heads with inline valves equipped with 1.6:1 ratio rocker arms. The firing order is 1-5-4-2-6-3-7-8.

These engines are designated by Crane's 36 prefix. We offer hydraulic, hydraulic roller (retrofit and OE style), mechanical, and mechanical roller camshafts for them. A wide-ranging line of valve train components is also available.

The 1962 and 1963 cylinder heads have 5/16" diameter valve stems (different valve spring retainers, valve locks, and valve stem seals required), while the 1964 and later engines have 11/32" valve stems.

From 1962 to 1965, the rocker arm studs were a straight 3/8" diameter adjustable configuration. In 1966, bottleneck 3/8 – 5/16" rocker arm studs were installed, resulting in a non-adjustable configuration. The exception would be the HiPo 289 engines, offered through 1967, which had mechanical lifter camshafts, and retained the adjustable style straight 3/8" studs. Our 99768-16 positive locking nuts will permit valve adjustment on the bottleneck stud applications. In 1977, a net lash pedestal mount rocker arm system was installed, continuing with the remainder of production through 1995. These pedestal mount rocker cylinder heads can be easily converted to an adjustable configuration for hydraulic and hydraulic roller street applications by using our Pushrod Guideplate Conversion Kits. Part number 36655-16 provides for 3/8" stud mounted adjustable rocker arms, and 36656-16 is for 7/16" stud mounted rocker arms. No machining is necessary, and your standard pushrods can be maintained, thanks to the composite bushing inserts in the pushrod guideplates. For mechanical and mechanical roller applications, we advise the heads be machined for screw-in rocker arm studs and pushrod guide-

The production and aftermarket cylinder heads for the Windsor and Cleveland families all have the same valve layout, with the exception of the Gurney-Weslake pieces. If you are fortunate to have a set of these, we can custom produce a roller camshaft having the proper lobe layout.

Most 1985-1987 302, all 1988-97 302 passenger car, and all 1996-2000 302 truck engines are equipped with hydraulic roller camshafts and lifters. The firing order of 1-5-4-2-6-3-7-8 is maintained for these applications. Conventional hydraulic, mechanical, and roller lifter camshafts can be installed in these engines if the appropriate kit components are used.

The 1985-95 302 H.O. engines, although closely related, have a different firing order, and are discussed later on this page.

1969-1970 Boss 302 V8

Specifically developed for the Trans Am road racing series, the Boss 302 had canted valve "Cleveland" style cylinder heads installed on the 302 block. Since these heads have large ports and valves, and are intended for constant high RPM usage, a street driven application should have a relatively mild camshaft installed to enhance the torque and drivability. Rocker arm studs are a straight 7/16" diameter, with adjustable 1.73:1 ratio rocker arms required for the factory installed mechanical lifter camshaft. Although the valves are staggered, the same length pushrods are used for the intake and exhaust.

Due to the Boss heads' different valve spring requirements, and the increased rocker ratio, this engine is designated by Crane's 27 prefix (even though the camshaft is physically the same as the 36 prefix). We offer hydraulic, retrofit hydraulic roller, mechanical, and mechanical roller camshafts for them. An extensive line of valve train components is also available.

1985-1995 5.0L (302) H.O. V8

Although closely related to the standard 302, the 1985-95 5.0L H.O. are equipped with hydraulic roller lifters, with camshafts having a firing order of 1-3-7-2-6-5-4-8 (the same as the 351 Windsor). Our 44 prefix designates these engines. The camshafts are dimensionally the same as the 36 prefix, with the different firing order constituting the primary change. Camshafts can be interchanged, providing the necessary changes are performed for the proper firing order.

We offer hydraulic, hydraulic roller, mechanical, and mechanical roller camshafts. A wide-ranging line of valve train components is also available.

The standard pedestal mount rocker cylinder heads can be easily converted to an adjustable configuration for hydraulic and hydraulic roller street applications by using our Pushrod Guideplate Conversion Kits. Part number **36655-16** provides for 3/8" stud mounted adjustable rocker arms, and **36656-16** is for 7/16" stud mounted rocker arms. No machining is necessary, and your standard pushrods can be maintained, thanks to the composite bushing inserts in the pushrod guideplates. For mechanical and mechanical roller applications, we advise the heads be machined for screw-in rocker arm studs and pushrod guideplates.

1993-1995 SVT Cobra 5.0 Mustangs were factory equipped with aluminum needle bearing roller tip 1.7:1 pedestal mount rocker arms. These are our **44746-16**, designed for basic bolt-on installation, but make sure to check for adequate spring travel due to the increased valve lifts when installing on other engines.



1969-1993 351 (5.8L) cu.in. Windsor and 1982-1984 302 (5.0L) cu.in. H.O., also 1994-1997 351W, and 302 SVO/351 SVO V8

Another derivative in the Windsor family, the 351 engine blocks incorporate 1.3" taller deck heights to accommodate the increased displacement. Lifter bores are still inline, as are the valves in the cylinder heads, and the 1.6:1 rocker arm ratio is retained. Most notably, the firing order was changed to 1-3-7-2-6-5-4-8. Our 44 prefix designates these engines. The camshafts are dimensionally the same as the 36 prefix, with the different firing order being the primary change. Camshafts can be interchanged, providing the necessary changes are performed for the proper firing order. Additionally, the 1982-1984 302 H.O. engines also were equipped with hydraulic lifter camshafts having this revised firing order.

We offer hydraulic, hydraulic roller (retrofit and OE style), mechanical, and mechanical roller camshafts and a wideranging line of valve train components for these engines.

From 1969 to 1976, bottleneck 3/8 – 5/16" rocker arm studs were installed in the cylinder heads, resulting in a nonadjustable configuration. Our 99768-16 positive locking nuts will permit valve adjustment for these applications. In 1977, a net lash pedestal mount rocker arm system was installed, continuing for the remainder of production through 1997. These pedestal mount rocker cylinder heads can be easily converted to an adjustable configuration for hydraulic and hydraulic roller street applications by using our Pushrod Guideplate Conversion Kits. Part number 36655-16 provides for 3/8" stud mounted adjustable rocker arms, and **36656-16** is for 7/16" stud mounted rocker arms. No machining is necessary, and your standard pushrods can be maintained, thanks to the composite bushing inserts in the pushrod guideplates. For mechanical and mechanical roller applications, we advise the heads be machined for screw-in rocker arm studs and pushrod guideplates.

1970-1982 351C-Boss 351-351M-400 cu.in. V8

The Ford 335 engine family (commonly called the "Cleveland") shared cylinder bore spacing dimensions, and the head bolt pattern with the Windsor engines, but few other parts are interchangeable. The inline lifter bores were retained, but they are at a different bank angle from the Windsor. Cam bearing sizes are also different, as are the distributor gear dimensions. The valves in the cylinder heads are canted (staggered), but the same length pushrods are used for the intake and exhaust valves. The rocker arm ratio is 1.73:1.

These engines are designated by Crane's 52 prefix. We offer hydraulic, retrofit hydraulic roller, mechanical, and mechanical roller camshafts for them. A wide-ranging line of valve train components is also available.

The pedestal mount rocker cylinder heads can be easily converted to an adjustable configuration for hydraulic and hydraulic roller street applications by using our Pushrod Guideplate Conversion Kits. Part number **52655-16** provides for adjustable configuration 7/16" stud mounted rocker arms. No machining is necessary, and your standard pushrods can be maintained, thanks to the composite bushing inserts in the pushrod guideplates. For mechanical and mechanical roller applications, we advise the heads be machined for screw-in rocker arm studs and pushrod guideplates.

The 1971 Boss 351 and 1972 351C H.O. featured cylinder heads with straight 7/16" rocker arm studs and pushrod guideplates, required for the mechanical lifter camshafts that were standard equipment.

The Fontana Clevor block also uses our 52 prefix camshafts, not the 36 or 44 prefix Windsor style items.

There can be a possible misapplication of components when choosing the proper retainers and valve stem locks for these engines. Although the valve stems are all 11/32" diameter, the configuration of the valve locks were changed. Note the following explanation to insure that the proper components are being used:

1970-1977 351C-351M-400 - Intake and exhaust valves use multiple groove valve stem locks, having a large outside diameter, requiring the use of 3/8" type valve spring retainers

1971 Boss 351 / 1972 351C H.O. - Intake and exhaust valves use standard single groove valve stem locks, requiring the use of 11/32" valve spring retainers.

1978 351M-400 - The intake valves use multiple groove valve stem locks, having a large outside diameter, requiring the use of 3/8" type valve spring retainers. The exhaust valves use standard single groove valve stem locks, requiring the use of 11/32" valve spring retainers.

1979-1982 351M-400 - Intake and exhaust valves use standard single groove valve stem locks, requiring the use of 11/32" valve spring retainers.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 293	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Gross Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
Hydraulic Lifter Camshaf								(2)			
Improves low-end and mid-range torque and HP in speed density fuel injected (SFI) truck (non-roller tappet) applications. Fine for auto or manual trans. Calif. legal 91-93 Federally certified trucks with MFM5.8TSHZCO, NFM5.8TSHZC1, OR PFM5.8TSHZD4 engine families. (50 state legal, C.A.R.B. E.O. D-225-24)	2021	800- 4200	364112ª	99280-16	190 198	252 260	109	(9) 19 33 (15)	.000 .000	.416 .432	
Excellent low end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 8.0 to 9.5 compression ratio advised.	Energizer 260 H10	1200- 4600	13003* 130032*b	99280-16	204 204	260 260	110	(3) 27 37 13	.000		
Great low end torque and HP, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised. (50 state legal, pre-computer, C.A.R.B. E.O. D-225-32)	H-260-2	1200- 4800	363901 363902°	99280-16	204 216	260 272	112	(5) 29 45 (9)	.000		
Great low end torque and HP, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	Z-256-2	1200- 5000	363501° 363502°°	99280-16	206 212	256 262	112	(4) 30 43 (11)	.000 .000		
Good low end torque, smooth idle, daily usage, fuel economy, light towing, off road, 2200-2700 cruise RPM, 8.5 to 10.0 compression ratio advised.	Energizer 266 H10	1400- 4800	13004* 130042*b	99280-16	210 210	266 266	110	0 30 40 (10)	.000 .000		
Excellent low end and mid range torque and HP, good idle, daily usage, off road, towing, economy, 2400-2800 cruise RPM, 8.5 to 10.0 compression ratio advised.	Н-266-2	1400- 5200	363931* 363932*c	99280-16	210 218	266 274	114	(4) 34 48 (10)	.000		
Good low end and mid range torque, good idle, daily usage, off road, fuel efficiency plus performance, 2600-3000 cruise RPM, 8.75 to 10.0 compression ratio advised.	Energizer 272 H10	1600- 5200	13005* 130052*b	99280-16	216 216	272 272	110	3 33 43 (7)	.000 .000	.484 .484	
Good low end and mid range torque and HP, good idle, daily usage and off road, towing, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised, w/centrifugal or small Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised. Also good w/plate nitrous system. (50 state legal, pre-computer, C.A.R.B. E.O. D-225-24)	H-272-2	1800- 5400	363941 363942 ^c	99280-16	216 228	272 284	112	1 35 51 (3)	.000		
Good low end and mid range torque and HP, good idle, daily usage and off road, towing, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised, w/centrifugal or small Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised. Also good w/plate nitrous system.	Z-268-2	1800- 5600	363511* 363512*¢	99280-16	218 224	268 274	112	2 36 49 (5)	.000 .000		

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller camshafts and lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: Specify if heads with 5/16" valve stems are used. These valve springs and retainers cannot be used with short valve stem

NOTE: Ford 221 thru 302 camshafts can be used in 351 Windsor engines if the engine is changed to 221 thru 302

firing order (1-5-4-2-6-3-7-8). Ford 351W firing order is

NOTE: To provide the most accurate valve adjustment on hydraulic lifter camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. For engines equipped with pedestal mounted rocker arms and hydraulic lifters, excessive lifter preload can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details.

IMPORTANT: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 255 and 302 cu.in. engines with pedestal mounted rockers to have adjustable rocker arms

without cylinder head removal or machining. Refer to page

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or **44984-1** timing chain and gear assemblies, a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: Left hand rotation hydraulic camshafts are available on special order. Contact Crane's Performance Consultants for details.

NOTE: These camshafts also fit the 1969-70 Ford-Mercury Boss 302 V-8 engines. Some kit components will differ. Contact Crane's Performance Consultants for details.



Custom Grind Cams Also Available — Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
36308-1 ^d	96803-16 ^d	99946-16		99097-1°	36621-16 ^f 36622-16 ^g	44975-1*h	36800-16 ⁱ 36801-16 ^j	36774-16 ^k 11746-16 ^l 44746-16 ^m	36750-16° 36759-16° 36758-16°
36308-1 ^d	96803-16 ^d	99946-16		99097-1°	36621-16 ^f 36622-16 ^g	44975-1*h	36800-16 ⁱ 36801-16 ^j	36774-16 ^k 11746-16 ^l 44746-16 ^m	36750-16° 36759-16° 36758-16°
36308-1 ^d	96803-16 ^d	99946-16		99097-1°	36621-16 ^f 36622-16 ^g	44975-1*h	36800-16 ⁱ 36801-16 ^j	36774-16 ^k 11746-16 ^l 44746-16 ^m	36750-16° 36759-16° 36758-16°
36308-1 ^d	96803-16 ^d	99946-16		99097-1°	36621-16 ^f 36622-16 ^g	44975-1*h	36800-16 ⁱ 36801-16 ^j	36774-16 ^k 11746-16 ^l 44746-16 ^m	36750-16 ⁿ 36759-16 ^o 36758-16 ^p
36308-1 ^d	96803-16 ^d	99946-16		99097-1°	36621-16 ^f 36622-16 ^g	44975-1*h	36800-16 ⁱ 36801-16 ^j	36774-16 ^k 11746-16 ^l 44746-16 ^m	36750-16° 36759-16° 36758-16°
36308-1 ^d	96803-16 ^d	99946-16		99097-1°	36621-16 ^f 36622-16 ^g	44975-1*h	36800-16 ⁱ 36801-16 ^j	36774-16 ^k 11746-16 ^l 44746-16 ^m	36750-16° 36759-16° 36758-16°
36308-1 ^d	96803-16 ^d	99946-16		99097-1°	36621-16 ^f 36622-16 ^g	44975-1*h	36800-16 ⁱ 36801-16 ^j	36774-16 ^k 11746-16 ^l 44746-16 ^m	36750-16° 36759-16° 36758-16°
36308-1 ^d	96803-16 ^d	99946-16		99097-1°	36621-16 ^f 36622-16 ^g	44975-1*h	36800-16 ⁱ 36801-16 ^j	36774-16 ^k 11746-16 ^l 44746-16 ^m	36750-16° 36759-16° 36758-16°
36308-1 ^d	96803-16 ^d	99946-16		99097-1°	36621-16 ^f 36622-16 ^g	44975-1*h	36800-16 ⁱ 36801-16 ^j	36774-16 ^k 11746-16 ^l 44746-16 ^m	36750-16 ⁿ 36759-16 ^o 36758-16 ^p

Section Continued



- Cam and Lifter Kit, includes installation lubricants and Rocker Arm Pedestal Shim Kit.
- Cam and Lifter Kit, includes assembly lubricant.
- Cam and Lifter Kit, includes installation lubricants, and rocker arm adjusting nuts.
- Contains standard diameter valve springs, no machining required.
- Machined steel, heat treated.
- For 63-68 engines, heavy wall, heat treated for use with or without guideplates. For 69-95 engines, heavy wall, heat treated for use with or without guideplates.

- For 73-00 engines, performance steel billet gears and roller chain set.

 1.6 ratio, cast, non-rail type for 3/8" studs, must machine 1966-00 cylinder heads and install

 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- 1.6 ratio, cast, rail type for 3/8" studs, non-adjustable with 5/16" top bottleneck studs, adjustable with straight 3/8" studs and locking nuts.
- **k** Crane Classic extruded, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install **99156-16** rocker arm studs and **36650-1** pushrod guideplates, or use **36655-16** Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- I Energizer, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install **99156-16** rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.

 m Energizer, 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required,
- includes Rocker Arm Pedestal Shim Kit.
- 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.

					COM	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Lifter Camshaf			21110010110 4044		,		- Серинино.	, 2		
Good mid range torque, fair idle, daily usage, mild brack- et racing, auto trans w/2500+ converter, 2700-3200 cruise RPM, 9.5 to 10.75 compression ratio advised.	Energizer 278 H10	2200- 5600	13009° 130092°a	99280-16 99380-16*d	222 222	278 278	110	6 36 46 (4)	.000 .000	
Moderate competition, rough idle, good mid-range torque and HP, limited oval track, mild bracket racing, serious off road, auto trans w/2500+ converter, 9.5 to 11.0 compression ratio advised.	H-222/3114-251-6	2200- 5400	360331*	99280-16 99380-16*d	222 228	278 284	106	9 33 44 4	.000	
Good mid range torque and HP, good idle, daily performance usage, mild bracket racing, 3000-3400 cruise RPM, 9.5 to 10.75 compression ratio advised, also mild supercharged, nitrous.	H-278-2	2200- 5800	363801° 363802″ ^b	99280-16 99380-16* ^d	222 234	278 290	114	2 40 56 (2)	.000 .000	
Good mid range torque and HP, good idle, daily perfor- mance usage, mild bracket racing, 3000-3400 cruise RPM, 9.5 to 10.75 compression ratio advised, also mild supercharged, nitrous.	Z-274-2	2200- 6000	363521* 363522*b	99280-16 99380-16*d	224 230	274 280	110	3 41 54 (4)	.000	
Good mid range to upper RPM torque, fair idle, moderate performance usage, oval track, Street Stock, Enduro, Hobby, 1/4-3/8 mile, bracket racing, Street, Heavy, Pro E.T., Super E.T., auto trans w/3000+ converter, 3200-3600 cruise RPM, 9.5 to 11.0 compression ratio advised.	H-288	2400- 6000	364381° 364382°°	99280-16 99380-16* ^d	226 226	288 288	108	10 36 46 0	.000 .000	
Good mid range to upper RPM torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 9.5 to 11.5 compression ratio advised, also w/plate or manifold nitrous system, or w/centirfugal or Roots supercharger, 10 lbs. max. boost w/8.5 maximum compression ratio.	H-286-2	2600- 6200	364551* 364552*b	99280-16 99380-16* ^d	226 236	286 296	110	8 38 53 3	.000 .000	.502 .520
Good mid range to upper RPM torque, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 9.5 to 11.0 compression ratio advised.	Energizer 284 H12	2800- 6200	13006° 130062°a	99280-16 99380-16*d	228 228	284 284	112	7 41 53 (3)	.000 .000	
Good upper RPM torque and HP, rough idle, performance usage, bracket racing: Pro E.T., Super E.T., auto trans w/ race converter, oval track: Street Stock, Enduro, Hobby, 3/8-1/2 mile, 3800-4200 cruise RPM, 10.0 to 11.5 compression ratio advised. Good w/Roots supercharger, 15 lbs. maximum boost w/8.0 max. compression ratio advised, or w/manifold nitrous system.	H-296-2	3200- 6800	364561* 364562*c	99280-16 99380-16* ^d	236 240	296 300	110	13 43 55 5	.000 .000	.520 .526

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kit available. See page

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller camshafts and lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: Specify if heads with 5/16" valve stems are used. These valve springs and retainers cannot be used with short valve stem heads.

NOTE: Ford 221 thru 302 camshafts can be used in 351 Windsor engines if the engine is changed to 221 thru 302 firing order (1-5-4-2-6-3-7-8). Ford 351W firing order is 1-3-7-2-6-5-4-8.

NOTE: To provide the most accurate valve adjustment on hydraulic lifter camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. For engines equipped with pedestal mounted rocker arms and hydraulic lifters, excessive lifter preload can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for

IMPORTANT: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 255 and 302 cu.in. engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to page 325 for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may

cause idling and performance problems when installing aftermarket camshafts. We recommend using our **44975-1** or **44984-1** timing chain and gear assemblies, a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: Left hand rotation hydraulic camshafts are available on special order. Contact Crane's Performance Consultants for

NOTE: These camshafts also fit the 1969-70 Ford-Mercury Boss 302 V-8 engines. Some kit components will differ. Contact Crane's Performance Consultants for details.



Custom Grind Cams Also Available – Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
36308-1°	96803-16°	99946-16		99097-1 ^h	36621-16 ^j 36622-16 ^k	44975-1* ¹	36800-16° 36801-16°	36774-16 ^p 11746-16 ^q 44746-16 ^r	36750-16 ^s 36759-16 ^t 36758-16 ^u
36308-1°	96803-16°	99946-16		99097-1 ^h	36621-16 ^j 36622-16 ^k	44975-1* ¹ 44984-1* ^m	36800-16° 36801-16°	36774-16 ^p 11746-16 ^q 44746-16 ^r	36750-16 ^s 36759-16 ^t 36758-16 ^u
36308-1°	96803-16°	99946-16		99097-1 ^h	36621-16 ^j 36622-16 ^k	44975-1* ¹	36800-16 ⁿ 36801-16 ^o	36774-16 ^p 11746-16 ^q 44746-16 ^r	36750-16 ^s 36759-16 ^t 36758-16 ^u
36308-1°	96803-16°	99946-16		99097-1 ^h	36621-16 ^j 36622-16 ^k	44975-1* ¹	36800-16 ⁿ 36801-16 ^o	36774-16 ^p 11746-16 ^q 44746-16 ^r	36750-16 ^s 36759-16 ^t 36758-16 ^u
36308-1°	96803-16°	99946-16		99097-1 ^h	36621-16 ⁱ 36622-16 ^k	44975-1*1	36800-16 ⁿ 36801-16 ^o	36774-16 ^p 11746-16 ^q 44746-16 ^r	36750-16 ^s 36759-16 ^t 36758-16 ^u
	96874-16 ^f	99946-16 99969-16 ^g	99820-16 ⁹	99097-1 ^h 99094-1 ⁱ	36621-16 ^j 36622-16 ^k	44975-1" ¹ 44984-1" ^m	36800-16° 36801-16°	36774-16 ^p 11746-16 ^q 44746-16 ^r	36750-16 ^s 36759-16 ^t 36758-16 ^u
36308-1°	96803-16°	99946-16		99097-1 ^h	36621-16 ^j 36622-16 ^k	44975-1" ¹	36800-16° 36801-16°	36774-16 ^p 11746-16 ^q 44746-16 ^r	36750-16° 36759-16° 36758-16"
	96874-16 ^f	99946-16 99969-16 ^g	99820-16 ⁹	99097-1 ^h 99094-1 ⁱ	36621-16 ^j 36622-16 ^k	44975-1" ¹ 44984-1" ^m	36800-16 ⁿ 36801-16 ^o	36774-16 ^p 11746-16 ^q 44746-16 ^r	36750-16 ^s 36759-16 ^t 36758-16 ^u

- Cam and Lifter Kit, includes assembly lubricant.
- **b** Cam and lifter kit, includes installation lubricants, and rocker arm adjusting nuts.
- c Cam, lifter, and valve spring kit, includes installation lubricants.
- **d** Optional Hi Intensity hydraulic lifters, see page 292 for details.
- e Contains standard diameter valve springs, no machining required.
- **f** Must machine cylinder heads.
- g Requires Crane Multi Fit valve locks.h Machined steel, heat treated.
- Machined steel, heat treated.
 Machined steel, heat treated, Multi Fit.
- **j** For 63-68 engines, heavy wall, heat treated for use with or without guideplates.
- k For 69-95 engines, heavy wall, heat treated for use with or without guideplates.
- For 73-00 engines, performance steel billet gears and roller chain set.
- m For 73-00 engines, Pro Series steel billet gears and roller chain set.
- n 1.6 ratio, cast, non-rail type for 3/8" studs, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- on 1977-00 pedestal mount cylinder heads for street applications.

 1.6 ratio, cast, rail type for 3/8" studs, non-adjustable with 5/16" top bottleneck studs, adjustable with straight 3/8" studs and locking nuts.

- p Crane Classic extruded, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- q Energizer, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- Energizer, 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- s 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- t 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
••			ETHISSIONS Code	LIFIERS	IIII/EXII.	IIIL/EXII.	Separation	IIIL/EXII	EXII.	EXII.
Hydraulic Roller Camshar Brute low end torque, smooth idle, daily usage, towing, performance and fuel efficiency, normally used in engines originally equipped with hydraulic roller cam- shafts.	2020	800- 4600	364211*a	36530-16°	198 208	260 270	112	(13) 31 36 (8)	.000	.445 .470
Excellent low end and mid range torque and HP, good idle, daily usage, performance and fuel efficiency, off road, towing, 2400-3200 cruise RPM, 8.75 to 10.0 comp. ratio advised.	HR-216/325-25-12	1800- 5600	369541*b,c	36532-16 ^f	216 224	278 286	112	1 35 49 (5)	.000	
Good mid range to upper RPM torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3000-3400 cruise RPM, 9.0 to 10.75 comp. ratio advised.	HR-224/339-2S-12	2400- 6400	369601*b,c	36532-16 ^f	224 232	286 294	112	5 39 53 (1)	.000 .000	.542 .563
Mechanical Lifter Camsh	afts									
Replacement for factory 289 Hi-Po	BluePrinted C30Z-6250-C	2200- 6000	360901*	99257-16	227 227	266 266	114	3.5 43.5 51.5 (4.5)	.020 .024	
Good low end & mid range torque & HP, fair idle, moderate performance usage, bracket racing, auto trans w/3000+ converter, 3400-3800 cruise RPM, 10.5 to 11.5 compress. ratio advised, also mild supercharged, nitrous.	F-278-2	2800- 6600	363841"	99257-16	238 248	278 288	114	10 48 63 5	.022 .022	
Radical street, performance usage, oval track: Late Model, Sportsman, 3/8-1/2 mile, bracket racing: Pro, Pro E.T., Super E.T., auto trans w/race converter; 11.0 to 12.5 compression ratio advised.	F-280-2	3200- 7000	364681* 364682*d	99257-16	244 252	280 288	108	16 48 56 16	.026 .026	
Performance usage, good mid-range HP, bracket racing, auto trans w/4000+ converter, 11.0 to 12.5 compression ratio advised.	F-310-2	3600- 7400	364761*	99257-16	248 258	310 320	108	21 47 62 16	.022 .022	
Performance usage, good mid and upper range HP, oval track, bracket racing, auto trans w/race converter, 11.5 minimum compression ratio advised.	F-260/3694-6	4400- 7800	361421°	99257-16	260 260	296 296	106	27 53 54 21	.000	
Moderate competition only, good upper RPM HP, bracket racing, auto trans w/race converter, 12.5 minim um compression ratio advised.	F-268/394-252-8	4800- 8200	361591°	99257-16	268 272	304 302	108	29 59 67 25	.018 .012	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller camshafts and lifters can be easily installed in these engines, providing the appropriate kit components are used.

springs and retainers cannot be used with short valve stem

NOTE: Ford 221 thru 302 camshafts can be used in 351 Windsor engines if the engine is changed to 221 thru 302 firing order (1-5-4-2-6-3-7-8). Ford 351W firing order is 1-3-7-2-6-5-4-8.

NOTE: To provide the most accurate valve adjustment on hydraulic roller camshafts, and in order to effect valve adjustment when using mechanical lifter camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. For engines equipped with pedestal mounted rocker arms and hydraulic roller lifters, excessive lifter preload can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details.

NOTE: Specify if heads with 5/16" valve stems are used. These valve IMPORTANT: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 255 and 302 cu.in. engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to page 325 for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and gear assemblies, a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: Left hand rotation mechanical camshafts are available on special order. Contact Crane's Performance Consultants for

NOTE: These camshafts also fit the 1969-70 Ford-Mercury Boss 302 V-8 engines. Some kit components will differ. Contact Crane's Performance Consultants for details.



Custom Grind Cams Also Available – Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
36308-1 ⁹	96803-16 ⁹	99946-16		99097-1 ^j	36631-16 ¹ 36625-16 ^m	44975-1* ^r 44984-1* ^s	36800-16 ^t 36801-16 ^u	36774-16° 11746-16° 44746-16°	36750-16 ^y 36759-16 ^z 36758-16 ^{aa}
	96874-16 ^h	99944-16 99969-16 ⁱ	99820-16 ^h	99097-1 ^j 99094-1 ^k	95610-16 ^q 95614-16 ^q	44975-1*r 44984-1*s	36800-16 ^t 36801-16 ^u	36774-16 ^v 11746-16 ^w 44746-16 ^x	36750-16 ^y 36759-16 ^z 36758-16 ^{aa}
	96874-16 ^h	99944-16 99969-16 ⁱ	99820-16 ^h	99097-1 ^j 99094-1 ^k	95610-16 ^q 95614-16 ^q	44975-1* ^r 44984-1* ^s	36800-16 ^t 36801-16 ^u	36774-16 ^v 11746-16 ^w 44746-16 ^x	36750-16 ^y 36759-16 ^z 36758-16 ^{aa}
	96803-16g	99946-16		99097-1 ^j	36622-16 ^p 95618-16 ^q	44975-1* ^r 44984-1* ^s	36800-16 ^t	36774-16 ^v	36750-16 ^y 86757-16 ^{bb}
	99893-16 ^h	99953-16 99969-16 ⁱ	99820-16 ^h	99097-1 ^j 99094-1 ^k	36622-16 ^p 95618-16 ^q	44975-1*r 44984-1*s	36800-16 ^t	36774-16 ^v	36750-16 ^y 86757-16 ^{bb}
	96877-16 ^h	99943-16 99969-16 ⁱ	99820-16 ^h	99097-1 ^j 99094-1 ^k	36622-16 ^p 95618-16 ^q	44975-1°r 44984-1°s		36774-16 ^v	36750-16 ^y 86757-16 ^{bb}
	96877-16 ^h	99943-16 99969-16 ⁱ	99820-16 ^h	99097-1 ^j 99094-1 ^k	36622-16 ^p 95618-16 ^q	44975-1*r 44984-1*s		36774-16 ^v	36750-16 ^y 86757-16 ^{bb}
	96877-16 ^h	99943-16 99969-16 ⁱ	99820-16 ^h	99097-1 ^j 99094-1 ^k	36622-16 ^p 95618-16 ^q	44975-1* ^r 44984-1* ^s		36774-16 ^v	36750-16 ^y 86757-16 ^{bb}
	330 96877-16 ^h	99943-16 99969-16 ⁱ	99820-16 ^h	99097-1 ^j 99094-1 ^k	36622-16 ^p 95618-16 ^q	44975-1* ^r 44984-1* ^s		36774-16°	36750-16 ^y 86757-16 ^{bb}

- a For 1986-89 (non-H.O.) engines originally equipped with hydraulic roller camshafts.
- **b** Camshaft has standard base circle diameter, for use with **36532-16** or **36560-16** hydraulic roller lifters.
- c Requires 36970-1 (.467" l.D.), 36971-1 (.500" l.D.), or 44970-1 (.531" l.D. SVO) steel, or 36990-1 (.467" l.D.), 36989-1 (.500" l.D.), or 44990-1 (.531" l.D. SVO), aluminum-bronze distributor drive gear.
- **d** Cam, lifter, valve spring, and retainer kit, includes installation lubricants.
- e For use with standard Ford alignment bars.
- **f** Vertical locking bar hydraulic roller lifters, no machining required. Cylinder head removal will be required.
- g Contains standard diameter valve springs, no machining required.
- h Must machine cylinder heads.
- i Requires Crane Multi Fit valve locks.
- j Machined steel, heat treated.
- k Machined steel, heat treated, Multi Fit.
- For engines with non-adjustable pedestal rocker arms and stock base circle camshafts, heavy wall, heat treated.
- **m** For engines with non-adjustable pedestal mount rocker arms, heavy wall, heat treated.
- For engines with adjustable rocker arms with Crane's Pushrod Guideplate Conversion Kit (36655-16), heavy wall, heat treated.
- For engines with non-adjustable bottleneck studs or pedestal mount rocker arms, heavy wall, heat treated.
- p For use with or without pushrod guideplate cylinder heads, heavy wall, heat treated.
- **q** Pro Series one-piece.
- For 73-00 engines, performance steel billet gears and roller chain set.
- For 73-00 engines, Pro Series steel billet gears and roller chain set.

- t 1.6 ratio, cast, non-rail type for 3/8" studs, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- u 1.6 ratio, cast, rail type for 3/8" studs, non-adjustable with 5/16" top bottleneck studs, adjustable with straight 3/8" studs and locking nuts.
- v Crane Classic extruded, 1.6 ratio 3/8ⁿ stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- w Energizer, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- Energizer, 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- y 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- z 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- aa 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- bb 1.6 ratio, 7/16" stud, must machine 1966-00 cylinder heads and install 99157-16 rocker arm studs and 36650-1 pushrod guideplates.

					СОМ	PLETE C	AM SPE	CIFIC	ATIC	ONS		
Application	Camshaft Series/ Grind Number	rpm Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/C @ .05 Cam l Int/E	0″ Lift	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Mechanical Roller Camsh	afts											
Good low end and mid range torque and HP, fair idle, moderate performance usage, off road, bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 10.5 to 11.5 compression ratio advised.	SR-238/350-2S-12	2800- 6600	368511*a,b	44518-16 44570-16 ^d	238 246	288 296	112	12 60	46 6		.560 .579	
Fair idle, moderate performance usage, good mid-range torque and HP, bracket racing, good w/manifold nitrous system, auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.5 to 12.0 compression ratio advised. Good w/Roots supercharger, 16 lbs. max. boost w/8.0 max. compression ratio advised.	SR-246/362-2S-10	3400- 7000	368601*a,b	44518-16 44570-16 ^d	246 254	296 304	110		48 12		.579 .598	
Good mid range torque and HP, radical street, rough idle, performance usage, oval track, bracket racing, auto trans w/race converter, 11.0 to 12.5 compression ratio advised.	R-252/420-2S-8	3600- 7400	448801*a,b,c	44518-16 44570-16 ^d	252 258	284 290	108		50 17		.672 .672	
Good mid range to upper RPM torque and HP, 302+ cu. in., rough idle, performance usage, oval track, bracket racing, auto trans w/race converter, 11.5 minimum compression ratio advised.	R-258/420-25-8	3800- 7600	448831*a,b,c	44518-16 44570-16 ^d	258 262	290 294	108		53 19		.672 .672	
Performance usage, good mid to upper RPM HP, 302+ cu.in., long oval track, bracket racing, auto trans w/race converter, 12.0 minimum compression ratio advised.	R-262/420-253-8	4200- 7800	448841*a,b,c	44518-16 44570-16 ^d	262 268	294 300	108		55 22		.672 .672	
Competition only, good upper RPM HP, 302+ cu.in., bracket racing, Heavy, Street, etc., auto trans w/race con- verter, aftermarket aluminum cylinder heads advised, 12.5 minimum compression ratio advised.	R-268/420-251-8	4800- 8200	448851*a,b,c	44518-16 44570-16 ^d	268 272	300 304	108		58 24		.672 .672	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller camshafts and lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: Specify if heads with 5/16" valve stems are used. These valve springs and retainers cannot be used with short valve stem heads.

NOTE: Ford 221 thru 302 camshafts can be used in 351 Windsor engines if the engine is changed to 221 thru 302 firing order (1-5-4-2-6-3-7-8). Ford 351W firing order is 1-3-7-2-6-5-4-8. NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft spromay cause idling and performance problems when aftermarket camshafts. We recommend using our 4

NOTE: To effect valve adjustment when using roller lifter camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped).

IMPORTANT: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 255 and 302 cu.in. engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to page 325 for details. E: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and gear assemblies, a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: These camshafts also fit the 1969-70 Ford-Mercury Boss 302 V-8 engines. Some kit components will differ. Contact Crane's Performance Consultants for details.



Custom Grind Cams Also Available - Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALV	E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	99893-16	99953-16	99820-16°	99097-1 ^f	36622-16 ⁹ 95618-16 ^h	44975-1* ⁱ 44984-1* ^j		36774-16 ^k	36750-16 ¹ 86757-16 ⁿ
	99893-16	99953-16	99820-16°	99097-1 ^f	36622-16 ⁹ 95618-16 ^h	44975-1* ⁱ 44984-1* ^j		36774-16 ^k	36750-16 ¹ 86757-16 ⁿ
	99885-16°	99956-16	99820-16°	99097-1 ^f	36622-16 ^g 95618-16 ^h	44975-1°i 44984-1°i		36774-16 ^k	36750-16 ¹ 86757-16 ⁿ
	99885-16°	99956-16	99820-16°	99097-1 ^f	36622-16 ⁹ 95618-16 ^h	44975-1*i 44984-1*j		36774-16 ^k	36750-16 ¹ 86757-16 ¹
	99885-16°	99956-16	99820-16°	99097-1 ^f	36622-16 ⁹ 95618-16 ^h	44975-1*i 44984-1*j		36774-16 ^k	36750-16 ¹ 86757-16 ¹¹
	99885-16°	99956-16	99820-16°	99097-1 ^f	36622-16 ⁹ 95618-16 ^h	44975-1*i 44984-1*j		36774-16 ^k	36750-16 ¹ 86757-16 ⁿ

- Requires **36970-1** (.467" l.D.), **36971-1** (.500" l.D.), or **44970-1** (.531" l.D. SVO) steel, or **36990-1** (.467" l.D.), **36989-1** (.500" l.D.), or **44990-1** (.531" l.D. SVO), aluminum-bronze distributor drive
- Requires 7/16-20 x 1-1/4" grade 8 cam gear bolt and hardened washer. Camshaft has 351W firing order: 1-3-7-2-6-5-4-8
- Ultra Pro Series roller lifters.
- Must machine cylinder heads.
- Machined steel, heat treated.
- For use with or without pushrod guideplate cylinder heads, heavy wall, heat treated.
- For 73-00 engines, performance steel billet gears and roller chain set.
- For 73-00 engines, Pro Series steel billet gears and roller chain set.

- k Crane Classic extruded, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- 1 1.6 ratio, 3/8" stud, must machine 1966-00 cylinder heads and install **99156-16** rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- m 1.6 ratio, 7/16" stud, must machine 1966-00 cylinder heads and install 99157-16 rocker arm studs and 36650-1 pushrod guideplates.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Roller Camsha		NAINGE	ETHISSIOTIS CODE	LIFIENS	IIIL/EXII.	IIII/EXII.	зерагация	IIIL/EXII	EXII.	EXII.	
Good low to mid-range torque and HP, for speed density (or mass airflow) style F.I., good idle, daily usage works w/auto or 4/5 speed manual and stock rear end gears, 2200-2600 cruise RPM, (50 state legal 85-93, C.A.R.B. E.O. D-225-46). Good w/centrifugal or small Roots supercharger, with speed density (of mass airflow) style F.I., 8 lbs. maximum boost w/stock 9.2 compression ratio advised, and good w/SEFI-type nitrous system, with speed density (or mass airflow) style F.I., stock 9.2 compression ratio advised.	2020	1000- 5000	444211 444212 ^a	36530-16 ^b 36532-16 ^c	208 216	262 270	112	(3) 31 45 (9)		.530 .530	
Good mid-range torque and HP, good idle, daily usage, designed for use with 1.7 ratio rockers and mass airflow style F.I. engines with aftermarket intake, heads, exhaust, 5-speed or auto w/mild stall converter, 2400-2800 cruise RPM, (50 state legal 85-93, C.A.R.B. E.O. D-225-46). Good w/centrifugal or small Roots supercharger, with mass airflow style F.I., 10 lbs. maximum boost w/8.5 maximum compression ratio advised, and good w/SEFI-type nitrous system, with mass airflow style F.I., stock 9.2 compression ratio advised.	2031	1400- 5400	444225 444226°	36530-16 ⁶ 36532-16 ^c	214 220	276 282	112	0 34 47 (7)		.513 ^d .529 ^d	
Delivers mid-range torque and HP, good idle, daily usage, requires mass airflow style F.I. for best idle control, works w/4/5 speed manual or auto, may require higher stall converter, use with 3.08 or numerically higher rear gesta, 2400-2800 cruise RPM, (50 state legal 85-93, C.A.R.B. E.O. D-225-46) Basic RPM 2000-5500. Good w/centrifugal or small Roots supercharger, with mass airflow style F.I., 10 lbs maximum boost w/8.5 maximum compression ratio advised, and good w/SEFI-type nitrous system, with mass airflow style F.I., stock 9.2 compression ratio advised.	2030	1400- 5400	444221 444222°	36530-16 ⁶ 36532-16 ^c	216 220	270 278	112	1 35 47 (7)	.000 .000	.533 .544	
Good low end torque and HP, good idle, daily usage, performance and fuel efficiency, off road, towing, 2400-3000 cruise RPM, 8.75 to 10.0 compression ratio advised.	HR-216/325-25-12	1400- 5400	449541*	36530-16 ^b 36532-16 ^c	216 224	278 286	112	1 35 49 (5)	.000	.520 .542	
Good mid-range and strong top-end power, E303 replacement, requires modified mass airflow, aftermarket intake, performance cylinder heads and headers, must use 5-speed and 3.55 or numerically higher rear gears, 2600-3000 cruise RPM, (50 state legal 85-93, C.A.R.B. E.O. D-225-46. Good w/centrifugal or Roots supercharger, 15 lbs. maximum boost w/8.0 maximum compression ratio advised, and good w/SEFI-type nitrous system, with mass airflow style F.I., stock 9.2 comp. ratio advised.	2040	1800- 5800	444231	36530-16 ⁶ 36532-16 ^c	220 220	282 282	110	0 40 40 0	.000 .000	.498 .498	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller lifters can be easily installed in these engines, providing the appropriate kit components are used. **NOTE:** To provide the most accurate valve adjustment on hydraulic roller camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On 16 positive locking nuts will permit valve adjustment. For engines equipped with pedestal mounted rocker arms and hydraulic lifters, excessive lifter preload can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details.

NOTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 302 cu.in. and 351W engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to page 325 for details.

NOTE: Special length pushrods can be ordered to provide proper hydraulic lifter preload. See page 305 for ordering instructions and page 374 for checking your hydraulic lifter preload. engines equipped with bottleneck type studs, using 99768- NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming. Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.



Custom Grind Cams Also Available — Call 866-388-5120 or go to cranecams.com for ordering information

	CRANE VALV	E TRAIN CO	MPONENTS							
_	See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
	VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUI Crane Classi Energizer	
	44308-1°	99841-16	99942-16		h	36631-16 ^k 36625-16 ^l 95608-16 ^{l,m}	44975-1* ⁿ 44984-1* ^o		44774-16 ^p 36774-16 ^q 44746-16 ^r	36759-16 36758-16 36750-16
	44308-1°	99841-16	99942-16		h	36631-16 ^k 36625-16 ^l 95608-16 ^{l,m}	44975-1* ⁿ 44984-1*°		44774-16 ^p 36774-16 ^q 44746-16 ^r	36759-16 36758-16 36750-16
	44308-1°	99841-16	99942-16		h	36631-16 ^k 36625-16 ^l 95608-16 ^{l,m}	44975-1*° 44984-1*°		44774-16 ^p 36774-16 ^q 44746-16 ^r	36759-16 36758-16 36750-16
		96870-16 ^f	99943-16 99969-16 ⁹	99820-16 ^f	99097-1 ⁱ 99087-1 ^j	36631-16 ^k 36625-16 ^l 95608-16 ^{l,m}	44975-1** 44984-1*°		44774-16 ^p 36774-16 ^q 44746-16 ^r	36759-16 36758-16 36750-16
	44308-1°	99841-16 96870-16 ^f	99942-16 99943-16 99969-16 ⁹	99820-16 ^f	99097-1 ⁱ 99087-1 ^j	36631-16 ^k 36625-16 ^l 95608-16 ^{l,m}	44975-1* ⁿ 44984-1*°		44774-16 ^p 36774-16 ^q 44746-16 ^r	36759-16 36758-16 36750-16





- Cam and spring kit, includes 44308-1 kit, containing valve springs, valve spring retainers, and valve m Pro Series one-piece. stem locks.
- For use with standard Ford alignment bars.
- Vertical locking bar hydraulic roller lifters, no machining required. Cylinder head removal required for installation in 302 and 302 H.O. applications.
- Gross valve lift with 1.7 ratio rocker arms.
- Includes standard diameter valve springs (99841-16), valve spring retainers (99942-16), and valve stem locks (99094 and 99097). No machining required.
- Must machine cylinder heads.
- Requires Crane Multi Fit valve stem locks.
- Included in 44308-1 valve spring and retainer kit.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- For engines with non-adjustable pedestal mount rocker arms, heavy wall, heat treated. For 302 H.O. engines with adjustable rocker arms with Pushrod Guideplate Conversion Kit (36655-16), heavy wall, heat treated. See page 325 for details.

- Performance steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set.
- Crane Classic extruded, 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required.
- Crane Classic extruded, 1.6 ratio, 3/8" stud, must machine cylinder heads and install **99156-16** rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on pedestal mount cylinder heads for street applications.
- Energizer 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- s 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- u 1.6 ratio, 3/8" stud, must machine cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on pedestal mount cylinder heads for street applications.

						СОМ	PLETE C	AM SPE	CIFICATION	ONS		
		Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 294	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Lash Hot Int.	Gross Lift Int.	
ı	Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
	Hydraulic Roller Camsha	fts										
	Good mid-range torque and HP, fair idle, moderate per- formance usage, for use with 1.7 ratio rocker arms, bracket racing, auto trans w/2500+ converter. Good w/ centrifugal or Roots supercharger, 20 lbs. maximum boost w/8.0 maximum compression ratio advised, and/ or nitrous, 2500-3600 cruise RPM, 8.75 to 10.5 compres- sion ratio advised.	HR-220/311-2S-14	2000- 6000	449591*	36530-16° 36532-16 ^b	220 226	282 288	114	1 39 52 (6)		.529° .544°	
	Good mid range torque and HP, fair idle, moderate per- formance usage, 2600-3200 cruise RPM, good w/plate nitrous system, auto trans w/2500+ converter, 9.0 to 10.5 compression ratio advised. Also good w/supercharg- er, 20 lbs. maximum boost w/ 8.5 maximum compres- sion ratio advised.	HR-220/332-252-14	2000- 6200	449631*	36530-16 ^a 36532-16 ^b	220 228	282 290	114	1 39 53 (5)		.531 .552	
•	Good mid range and upper RPM torque and HP, fair idle, performance usage, B303 upgrade, X303 replacement, bracket racing, auto trans with 2500+ converter, 3000-3400 cruise RPM, 9.5 to 10.75 compression ratio advised.	HR-224/339-12	2200- 6000	449661*	36530-16ª 36532-16 ^b	224 224	286 286	112	5 39 49 (5)	.000 .000	.542 .542	
,	Good mid range to upper RPM torque and HP, fair idle, moderate performance usage, good for use with 1.7 rocker arms, mild bracket racing, auto trans with 2500+converter, 3000-3400 cruise RPM, 9.0 to 10.75 compression ratio advised. Good w/centrifugal or Roots supercharger, 18 lbs. maximum boost w/8.0 maximum comperssion ratio advised, and good with SEFI-type or manifold nitrous system.	HR-224/339-2S2-12	1400- 5400	449671°	36530-16 ^a 36532-16 ^b	224 232	286 294	112	5 39 53 (1)		.576° .559°	
,	Good mid range to upper RPM torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans with 2500+ converter, 3000-3400 cruise RPM, 9.0 to 10.75 compression ratio advised. Good w/centrifugal or Roots supercharger, 18 lbs. maximum boost w/8.0 maximum comperssion ratio advised, and good with SEFI-type or manifold nitrous system.	HR-224/339-2S-12	2400- 6400	449601°	36530-16 ^a 36532-16 ^b	224 232	286 294	112	5 39 53 (1)	.000 .000	.542 .563	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: To provide the most accurate valve adjustment on hydraulic roller camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On

engines equipped with bottleneck type studs, using **99768-16** positive locking nuts will permit valve adjustment. For engines equipped with pedestal mounted rocker arms and hydraulic lifters, excessive lifter preload can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (**99170-1**). Refer to page 324 for details.

(99170-1). Refer to page 324 for details.

NOTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud
Conversion Kit (36655-16) for street applications, enabling
the 1977-00 302 cu.in. and 351W engines with pedestal
mounted rockers to have adjustable rocker arms without
cylinder head removal or machining. Refer to page 325 for
details.

IOTE: Special length pushrods can be ordered to provide proper hydraulic lifter preload. See page 305 for ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming.

Contact Crane's Performance consultants for details.

retainers may be required to prevent excessive shimming.
Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket.
This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.



Custom Grind Cams Also Available - Call 866-388-5120 or go to cranecams.com for ordering information

	CRANE VALV	/E TRAIN CO	MPONENTS							
_	See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
	VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
		96870-16 ^d	99943-16 99969-16°	99820-16 ^d	99097-1 ^f 99087-1 ^g	36631-16 ^h 36625-16 ⁱ 95608-16 ^{i,j}	44975-1* ^k 44984-1* ⁱ		44774-16 ^m 36774-16 ⁿ 44746-16°	36759-16 36758-16 36750-16
		96870-16 ^d	99943-16	99820-16 ^d	99097-1 ^f	36631-16 ^h	44975-1*k		44774-16 ^m	36759-16
			99969-16°		99087-19	36625-16 ⁱ 95608-16 ^{i,j}	44984-1* ¹		36774-16 ⁿ 44746-16°	36758-16 36750-16
		96870-16 ^d	99943-16 99969-16°	99820-16 ^d	99097-1 ^f 99087-1 ^g	36631-16 ^h 36625-16 ⁱ 95608-16 ^{i,j}	44975-1*k 44984-1* ¹		44774-16 ^m 36774-16 ⁿ 44746-16°	36759-10 36758-10 36750-10
		96870-16 ^d	99943-16 99969-16°	99820-16 ^d	99097-1 ^f 99087-1 ^g	36631-16 ^h 36625-16 ⁱ 95608-16 ^{i,j}	44975-1* ^k 44984-1* ^l		44774-16 ^m 36774-16 ⁿ 44746-16°	36759-16 36758-16 36750-16
		96870-16 ^d	99943-16 99969-16°	99820-16 ^d	99097-1 ^f 99087-1 ^g	36631-16 ^h 36625-16 ⁱ 95608-16 ^{i,j}	44975-1* ^k 44984-1* ^I		44774-16 ^m 36774-16 ⁿ 44746-16°	36759-1 36758-1 36750-1

Section Continued



- For use with standard Ford alignment bars.
- Vertical locking bar hydraulic roller lifters, no machining required. Cylinder head removal required for installation in 302 and 302 H.O. applications.
- Gross valve lift with 1.7 ratio rocker arms. Must machine cylinder heads.
- Requires Crane Multi Fit valve stem locks. Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- For engines with non-adjustable pedestal mount rocker arms, heavy wall, heat treated. For 302 H.O. engines with adjustable rocker arms with Pushrod Guideplate Conversion Kit
- (36655-16), heavy wall, heat treated. See page 325 for details. Pro Series one-piece.
- Performance steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set.

- $\boldsymbol{m} \quad \text{Crane Classic extruded, 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required.}$
- n Crane Classic extruded, 1.6 ratio, 3/8" stud, must machine cylinder heads and install **99156-16** rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on pedestal
- mount cylinder heads for street applications.

 Energizer 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes
- Rocker Arm Pedestal Shim Kit.

 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.6 ratio, 3/8" stud, must machine cylinder heads and install **99156-16** rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on pedestal mount cylinder heads for street applications.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Camsha	fts									
Good mid range to upper RPM torque and HP, fair idle, normally used with 1.7 rocker arms, moderate performance usage, F303 upgrade, bracket racing, auto trans with 3000 converter, 3200-3600 cruise RPM, good with 347 + cu.in., 8.5 to 11.0 compression ratio advised. Good w/centrifugal or Roots supercharger, 22 lbs. maximum boost w/8.0 maximum compression ratio advised, also good with manifold nitrous system.	HR-226/320-25-14	2600- 6600	449651*	36530-16 ^a 36532-16 ^b	226 232	288 294	114	4 42 55 (3)	.000 .000	
Good mid to upper RPM torque and HP, fair idle, performance usage, Z303 upgrade, bracket racing, auto trans with 3000+ converter, 3400-3800 cruise RPM, good with 347+ cu.in., with modified intake and cylinder heads, 10.0 to 11.5 compression ratio advised. Good w/centrifugal or Roots supercharger, 24 lbs. maximum boost with 8.5 maximum compression ratio advised, also good with manifold nitrous system.	HR-228/345-251-14	2600- 6600	449681*	36530-16 ^a 36532-16 ^b	228 232	290 249	114	5 43 55 (3)	.000 .000	.552 .563
Good upper RPM torque and HP, fair idle performance usage, bracket racing, auto w/3000+ converter, 3600-4000 cruise RPM, suitable for upper RPM with 347+ cu. in. with upgraded intake system and cylinder heads, 10.25 to 12.0 compression ratio advised. Good w/large centrifugal or Roots supercharger, 24 lbs. maximum boost with 9.0 maximum compression ratio, also good with large manifold nitrous system.	HR-228/345-25-14	2600- 6600	449691*	36530-16 ^a 36532-16 ^b	228 236	290 298	114	5 93 57 (1)		.552 .574
Good upper RPM torque and HP, fair idle, performance usage, bracket racing, auto w/3000+ converter, 3400-4000 cruise RPM, 10.0 to 11.5 compression ratio advised, best with 347+ cu.in Good WRoots supercharger, 20 lbs. maximum boost w/8.0 maximum compression ratio advised, also good with SEFI-type or manifold nitrous system.	HR-232/352-25-12	2800- 6800	449761°	36530-16 ^a 36532-16 ^b	232 244	294 306	112	9 43 59 5	.000 .000	.563 .595
Good mid to upper RPM torque and HP, rough idle, per- formance usage, bracket racing, auto trans w/3000+ converter, 3600-4000 cruise RPM, 10.5 to 12.0 compres- sion ratio advised, best with 331+ cu.in.	HR-236/359-25-10	2800- 6800	449641*	36530-16 ^a 36532-16 ^b	236 244	298 306	110	13 43 57 7		.574 .595

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kit available. See page

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: To provide the most accurate valve adjustment on hydraulic roller camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. For engines equipped with pedestal mounted rocker arms

and hydraulic lifters, excessive lifter preload can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details.

NOTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 302 cu.in. and 351W engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to page 325 for details.

NOTE: Special length pushrods can be ordered to provide proper hydraulic lifter preload. See page 305 for ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming. Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.



Custom Grind Cams Also Available - Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	96870-16 ^d	99943-16 99969-16°	99820-16 ⁴	99097-1 ^f 99087-1 ^g	36631-16 ^h 36625-16 ⁱ 95608-16 ^{i,j}	44975-1* ^k 44984-1* ⁱ		44774-16 ^m 36774-16 ⁿ 44746-16°	36759-16 ^p 36758-16 ^q 36750-16 ^r
	96870-16 ^d	99943-16 99969-16°	99820-16 ^d	99097-1 ^f 99087-1 ^g	36631-16 ^h 36625-16 ⁱ 95608-16 ^{i,j}	44975-1* ^k 44984-1* ^l		44774-16 ^m 36774-16 ⁿ 44746-16°	36759-16 ^p 36758-16 ^q 36750-16 ^r
	96870-16 ^d	99943-16 99969-16°	99820-16 ^d	99097-1 ^f 99087-1 ^g	36631-16 ^h 36625-16 ⁱ 95608-16 ^{i,j}	44975-1* ^k 44984-1* ^l		44774-16 ^m 36774-16 ⁿ 44746-16°	36759-16 ^p 36758-16 ^q 36750-16 ^r
	96870-16 ^d	99943-16 99969-16°	99820-16 ^d	99097-1 ^f 99087-1 ^g	36631-16 ^h 36625-16 ⁱ 95608-16 ^{i,j}	44975-1* ^k 44984-1* ⁱ		44774-16 ^m 36774-16 ⁿ 44746-16°	36759-16 ^p 36758-16 ^q 36750-16 ^r
	96870-16 ^d	99943-16	99820-16 ^d	99097-1 ^f	36631-16 ^h	44975-1*k		44774-16 ^m	36759-16 ^p
	333.2.3	99969-16°	37020 13	99087-19	36625-16 ⁱ 95608-16 ^{i,j}	44984-1* ¹		36774-16 ⁿ 44746-16 ^o	36758-16 ^q 36750-16 ^r

Section Continued



- For use with standard Ford alignment bars.
- Vertical locking bar hydraulic roller lifters, no machining required. Cylinder head removal required for installation in 302 and 302 H.O. applications.
- Gross valve lift with 1.7 ratio rocker arms.
- Must machine cylinder heads.
- Requires Crane Multi Fit valve stem locks.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- For engines with non-adjustable pedestal mount rocker arms, heavy wall, heat treated. For 302 H.O. engines with adjustable rocker arms with Pushrod Guideplate Conversion Kit (36655-16), heavy wall, heat treated. See page 325 for details.

- Pro Series one-piece.

 Performance steel billet gears and roller chain set.
 Pro Series steel billet gears and roller chain set.
 Crane Classic extruded, 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining
- n Crane Classic extruded, 1.6 ratio, 3/8" stud, must machine cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on pedestal mount cylinder heads for street applications.
- o Energizer 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.6 ratio, 3/8" stud, must machine cylinder heads and install **99156-16** rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on pedestal mount cylinder heads for street applications.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	rpm Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Camsha	fts									
Rough idle, performance usage, good upper RPM torque and HP, bracket racing, auto trans w/3500+ converter, also supercharged and/or nitrous, 10.0 to 11.5 compres- sion ratio advised.		3000- 7000	449811°	36530-16ª 36532-16 ^b	236 244	298 306	114	9 47 61 3	.000 .000	.574 .595
Moderate performance usage, rough idle, bracket racing, auto trans w/3500+ converter, good w/manifold nitrous system, 10.5 to 12.0 compression ratio advised. Also good w/centrifugal or Roots supercharger, 28 lbs. maximum boost w/8.5 maximum compression ratio.	HR-240/365-251-14	3200- 7000	449711*	36530-16 ^a 36532-16 ^b	240 244	302 306	114	11 49 61 3	.000 .000	.584 .595
Good high RPM HP, rough idle, competition usage, bracket racing, auto w/race converter, 347+ cu.in., 11.5 minimum compression ratio advised.	HR-244/372-25-10	3400- 7000	449581°	36530-16 ^a 36532-16 ^b	244 256	306 318	110	17 47 63 13	.000 .000	.595 .595
Good high RPM HP, rough idle, competition usage, bracket racing, auto w/race converter, 347+ cu.in., 12.0 minimum compression ratio advised. Also good for mild supercharged or mild nitrous.	HR-244/372-2S-12	3600- 7000	449571°	36530-16 ^a 36532-16 ^b	244 256	306 318	112	15 49 65 11	.000	.595 .595
Performance usage, for 347+ cu.in., NMRA, good w/ large plate nitrous, aftermarket aluminum cylinder heads advised, auto trans w/race converter, 13.0 minimum compression ratio advised. Also good w/centrifugal or Roots supercharger, 34 lbs. maximum boost w/8.5 maxi- mum compression ratio.	HR-252/400-25-14	3800- 7200	449741°	36532-16 ^b	252 260	322 330	114	15.5 56.5 68 12	.000 .000	.640 .640

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: To provide the most accurate valve adjustment on hydraulic

roller camshafts, the heads must be machined to accept

(99170-1). Refer to page 324 for details.

NOTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 302 cu.in. and 351W engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to

screw-in studs (on engines not originally equipped). On

engines equipped with bottleneck type studs, using 99768-

16 positive locking nuts will permit valve adjustment. For

engines equipped with pedestal mounted rocker arms

and hydraulic lifters, excessive lifter preload can be easily

remedied by using Crane's Rocker Arm Pedestal Shim Kit

page 325 for details.

NOTE: Special length pushrods can be ordered to provide proper

hydraulic lifter preload. See page 305 for ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming. Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.



Custom Grind Cams Also Available – Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	96870-16 ^c	99943-16 99969-16 ^d	99820-16 ^c	99097-1° 99087-1 ^f	36631-16 ⁹ 36625-16 ^h 95608-16 ^{h,i}	44975-1 ^{*j} 44984-1* ^k		44774-16 ¹ 36774-16 ^m 44746-16 ⁿ	36759-16° 36758-16° 36750-16°
	96870-16°	99943-16 99969-16 ^d	99820-16 ^c	99097-1° 99087-1 ^f	36631-16 ⁹ 36625-16 ^h 95608-16 ^{h,i}	44975-1 ^{*j} 44984-1* ^k		44774-16 ¹ 36774-16 ^m 44746-16 ⁿ	36759-16 ⁶ 36758-16 ⁶ 36750-16 ⁶
	96870-16 ^c	99943-16 99969-16 ^d	99820-16 ^c	99097-1° 99087-1 ^f	36631-16 ⁹ 36625-16 ^h 95608-16 ^{h,i}	44975-1* ^j 44984-1* ^k		44774-16 ¹ 36774-16 ^m 44746-16 ⁿ	36759-16 36758-16 36750-16
	96870-16°	99943-16 99969-16 ^d	99820-16 ^c	99097-1° 99087-1 ^f	36631-16 ⁹ 36625-16 ^h 95608-16 ^{h,i}	44975-1* ^j 44984-1* ^k		36774-16 ^m 44746-16 ⁿ	36759-16 36758-16 36750-16
	96870-16°	99943-16 99969-16 ^d	99820-16 ^c	99097-1° 99087-1 ^f	36631-16 ⁹ 36625-16 ^h 95608-16 ^{h,i}	44975-1* ^j 44984-1* ^k		36774-16 ^m 44746-16 ⁿ	36759-16 ⁶ 36758-16 ⁶ 36750-16 ⁶

- For use with standard Ford alignment bars.
- Vertical locking bar hydraulic roller lifters, no machining required. Cylinder head removal required for installation in 302 and 302 H.O. applications.
- Must machine cylinder heads.
- Requires Crane Multi Fit valve stem locks.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- For engines with non-adjustable pedestal mount rocker arms, heavy wall, heat treated. For 302 H.O. engines with adjustable rocker arms with Pushrod Guideplate Conversion Kit (36655-16), heavy wall, heat treated. See page 325 for details.
- Pro Series one-piece.
 Performance steel billet gears and roller chain set.
- Pro Series steel billet gears and roller chain set.

- I Crane Classic extruded, 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required.
- Crane Classic extruded, 1.6 ratio, 3/8" stud, must machine cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use
- 36655-16 Conversion Kit on pedestal mount cylinder heads for street applications. n Energizer 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required,
- includes Rocker Arm Pedestal Shim Kit.
- 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.6 ratio, 3/8" stud, must machine cylinder heads and install **99156-16** rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on pedestal mount cylinder heads for street applications.

					COM	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf	ts										
Brute low end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 7.75 to 8.75 compression ratio advised.	H-192/2667-2S-10	800- 4200	440501*	99280-16	192 204	248 260	110	(9) 21 37 (13)	.000 .000	.427 .456	
Great low end torque and HP, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, marine application: primarily used in 302 cu.in. (firing order change required) and 351W cu.in. near-stock engines for mild performance applications in heavy boats, O.K. for through-prop exhaust, 8.0 to 9.5 compression ratio advised. (50 state legal, pre-computer, C.A.R.B. E.O. D-225-32).	H-260-2	1200- 4800	443901 443902 ^a	99280-16	204 216	260 272	112	(5) 29 45 (9)		.456 .484	
Good mid-range and top end torque and HP, works well with most engine modifications, for non-roller equipped 351 cu.in. Lightning trucks with speed density (or mass airflow) style F.I.	2030	1400- 5200	444232*b	99280-16	206 214	268 276	114	(6) 32 46 (12)	.000	.448 .464	
Great low end torque and HP, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, marine application: primarily used in 302 cu.in. (firing order change required) and 351W cu.in. near-stock engines for mild performance applications in heavy boats, O.K. for through-prop exhaust, 8.0 to 9.5 compression ratio advised.	Z-256-2	1200- 5000	443501* 443502*b	99280-16	206 212	256 262	112	(4) 30 43 (11)		.461 .475	
Good low end and mid range torque, good idle, daily usage, off road, fuel efficiency plus performance, 2600-3000 cruise RPM, 8.75 to 10.0 compression ratio advised.	Energizer 272 H10	1600- 5200	18005° 180052°a	99280-16	216 216	272 272	110	3 33 43 (7)		.484 .484	
Good low end and mid range torque and HP, good idle, daily usage, off road, towing, economy, performance and fuel efficiency, 2600-3000 cruise RPM, marine application: primarily used in 351W cu.in. near-stock to mildly modified engines for mild performance applications in light boats, O.K. for through-prop exhaust, 8.75 to 10.0 compression ratio advised. Good w/centrifugal or small Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised, good for plate nitrous system. (50 state legal, pre-computer C.A.R.B. E.O. D-225-32).	H-272-2	1800- 5400	443941 443942 ^b	99280-16	216 228	272 284	112	1 35 51 (3)		.484 .512	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller lifters can be easily installed in these engines, providing the appropriate kit components are used. NOTE: Special length pushrods can be ordered to provide proper

NOTE: To provide the most accurate valve adjustment on hydraulic roller camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On engines equipped with bottleneck type studs, using 99768-

16 positive locking nuts will permit valve adjustment. For engines equipped with pedestal mounted rocker arms and hydraulic lifters, excessive lifter preload can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details.

NOTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 302 cu.in. and 351W engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to page 325 for details.

hydraulic lifter preload. See page 305 for ordering instructions and page 374 for checking your hydraulic lifter preload. NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming. Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: Left hand rotation hydraulic camshafts are available on special order. Contact Crane's Performance Consultants for



Custom Grind Cams Also Available - Call 866-388-5120 or go to cranecams.com for ordering information

					_			-	
CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
36308-1°	96803-16 ^c	99946-16		99097-1 ^d	95644-16° 36622-16 ^f	44975-1* ^g	36801-16 ^h 36800-16 ⁱ	36774-16 ⁱ 11746-16 ^k 44746-16 ⁱ	36750-16' 36759-16' 36758-16
36308-1 ^c	96803-16 ^c	99946-16		99097-1 ^d	95644-16° 36622-16 [†]	44975-1*9	36801-16 ^h 36800-16 ⁱ	36774-16 ^j 11746-16 ^k 44746-16 ^l	36750-16 ¹ 36759-16 ¹ 36758-16 ¹
36308-1°	96803-16 ^c	99946-16		99097-1 ^d	95644-16° 36622-16 ^f	44975-1* ^g	36801-16 ^h 36800-16 ⁱ	36774-16 ⁱ 11746-16 ^k 44746-16 ^l	36750-16 ¹ 36759-16 ¹ 36758-16 ¹
36308-1	96803-16°	99946-16		99097-1 ⁴	95644-16° 36622-16 ^f	44975-1* ⁹	36801-16 ^h 36800-16 ⁱ	36774-16 ⁱ 11746-16 ^k 44746-16 ^l	36750-16 ¹ 36759-16 ¹ 36758-16 ¹
36308-1°	96803-16 ^c	99946-16		99097-1 ^d	95644-16° 36622-16 ^f	44975-1* ⁹	36801-16 ^h 36800-16 ⁱ	36774-16 ^j 11746-16 ^k 44746-16 ^l	36750-16 36759-16 36758-16
36308-1°	96803-16°	99946-16		99097-1 ^d	95644-16° 36622-16 ^f	44975-1* ^g	36801-16 ^h 36800-16 ⁱ	36774-16 ⁱ 11746-16 ^k 44746-16 ^l	36750-16 ¹ 36759-16 ¹ 36758-16 ¹

Section Continued



- Cam and Lifter Kit, includes installation lubricants.
- Cam and Lifter Kit, includes installation lubricants, and rocker arm adjusting nuts.
- Contains standard diameter valve springs, no machining required.
- Machined steel, heat treated.
- Pro Series one-piece, for 351 engines, heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.

- guideplate cylinder heads.

 For 302 engines, heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.

 For 73-93 engines, performance steel billet gears and roller chain set.

 1.6 ratio, cast, rail type for 3/8" studs for 69-76 engines, non-adjustable with 5/16" top bottleneck studs, adjustable if straight 3/8" studs and locking nuts are installed.

 1.6 ratio, cast, non-rail type for 3/8" studs, must machine cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 77-93 neglectal means to display the design of the state pedestal mount cylinder heads for street applications.
- j Crane Classic extruded, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- k Energizer, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
 Energizer, 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required,
 - includes Rocker Arm Pedestal Shim Kit.
 - m 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
 - 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
 - $1.7\ ratio, non-adjustable, for pedestal\ mount\ cylinder\ heads, no\ machining\ required, includes$ Rocker Arm Pedestal Shim Kit.

					COM	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf	ts										
Good low end and mid range torque and HP, good idle, daily usage, off road, towing, economy, performance and fuel efficiency, 2600-3000 cruise RPM, marine application: primarily used in 351W cu.in. near-stock to mildly modified engines for mild performance applications in light boats, OK for through-prop exhaust, 8.75 to 10.0 compression ratio advised. Good w/centrifugal or small Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised, good for plate nitrous system.	Z-268-2	1800- 5600	443511" 443512" ^a	99280-16	218 224	268 274	112	2 36 49 (5)		.490 .504	
Performance usage, bracket racing, Street, Heavy, auto trans w/3000+ converter, oval track: Street Stock, 4-bbl, 1/4-3/8 mile, serious off road, 9.0 to 10.5 compression ratio advised.	H-220/307-2-10	2400- 5800	440131*	99280-16 99380-16 [®]	220 230	280 290	110	5 35 50 0		.491 .509	
Performance usage, Street Stock, Enduro, Hobby, 2-bbl or 4-bbl, 1/4-3/8 mile, 9.0 to 10.5 compression ratio advised.	H-222/3114-10	2600- 6000	440211*	99280-16 99380-16*b	222 222	278 278	110	6 36 46 (4)		.498 .498	
Good mid range RPM torque and HP, fair idle, moderate performance usage, bracket racing, good w/aluminum cylinder heads, auto trans w/2000+ converter, 3000-3400 cruise RPM, 9.25 to 11.0 compression ratio advised. Good w/centrifugal or Roots supercharger, 10 lbs. Maximum boost w/8.5 maximum compression ratio advised, good w/plate or manifold nitrous system.	H-224/315-251-10	2800- 6200	440221°	99280-16 99380-16 ^{-b}	224 230	274 280	110	7 37 50 0	.000 .000	.504 .518	
Performance usage, bracket racing, Street, Heavy, auto trans w/3000+ converter, oval track: Street Stock, Enduro, Hobby, 4-bbl, 1/4-3/8 mile, 9.5 to 11.0 compression ratio advised.	H-226/314-2-10	2800- 6200	440141*	99280-16 99380-16*b	226 236	286 296	110	8 38 53 3		.502 .520	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: To provide the most accurate valve adjustment on hydraulic roller camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On

engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. For engines equipped with pedestal mounted rocker arms and hydraulic lifters, excessive lifter preload can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details.

NOTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 302 cu.in. and 351W engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to page 325 for details.

NOTE: Special length pushrods can be ordered to provide proper hydraulic lifter preload. See page 305 for ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming. Contact Crane's Performance consultants for details.

Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: Left hand rotation hydraulic camshafts are available on special order. Contact Crane's Performance Consultants for details.



CRANE VALV	VE TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 31
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL Rocker Arms	— ALUMINUN Crane Classic Energizer	
36308-1°	96803-16 ^c	99946-16		99097-1 ^f	95644-16 ^h 36622-16 ⁱ	44975-1* ^j	36801-16 ¹ 36800-16 ^m	36774-16° 11746-16° 44746-16°	36750-16 36759-16 36758-16
	96874-16 ^d	99943-16 99969-16°	99820-16 ^d	99097-1 ^f 99094-1 ^g	95644-16 ^h 36622-16 ⁱ	44975-1 ^{*j} 44984-1 ^{*k}	36801-16 ¹ 36800-16 ^m	36774-16 ⁿ 11746-16 ^o 44746-16 ^p	36750-16 36759-16 36758-16
	96874-16 ^d	99943-16 99969-16°	99820-16 ^d	99097-1 ^f 99094-1 ^g	95644-16 ^h 36622-16 ⁱ	44975-1* ^j 44984-1* ^k	36801-16 ¹ 36800-16 ^m	36774-16 ⁿ 11746-16 ^o 44746-16 ^p	36750-10 36759-10 36758-10
	96874-16 ^d	99943-16 99969-16°	99820-16 ^d	99097-1 ^f 99094-1 ^g	95644-16 ^h 36622-16 ⁱ	44975-1 ^{*j} 44984-1 ^{*k}	36801-16 ¹ 36800-16 ^m	36774-16 ⁿ 11746-16 ^o 44746-16 ^p	36750-16 36759-16 36758-16
	96874-16 ^d	99943-16 99969-16°	99820-16 ^d	99097-1 ^f 99094-1 ^g	95644-16 ^h 36622-16 ⁱ	44975-1* ^j 44984-1* ^k	36801-16 ¹ 36800-16 ^m	36774-16 ⁿ 11746-16 ^o 44746-16 ^p	36750-1 36759-1 36758-1

Section Continued



- Cam and Lifter Kit, includes installation lubricants, and rocker arm adjusting nuts.
- Optional Hi Intensity hydraulic lifters, see page 292 for details.
- Contains standard diameter valve springs, no machining required.
- Must machine cylinder heads.
 Requires Crane Multi Fit valve locks.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Pro Series one-piece, for 351 engines, for use with or without pushrod guideplate cylinder heads. For 302 engines, heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads. **q**
- For 73-93 engines, performance steel billet gears and roller chain set.
- For 73-93 engines, Pro Series steel billet gears and roller chain set. 1.6 ratio, cast, rail type for 3/8" studs for 69-76 engines, non-adjustable with 5/16" top bottleneck studs, adjustable if straight 3/8" studs and locking nuts are installed.
- 1.6 ratio, cast, non-rail type for 3/8" studs, must machine cylinder heads and install **99156-16** rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 77-93 pedestal mount cylinder heads for street applications.
- n Crane Classic extruded, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.

 Energizer, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00
- pedestal mount cylinder heads for street applications.
- Energizer, 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install **99156-16** rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.

					COM	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Application		KANGE	EITIISSIOTIS Code	LIFIERS	IIIL/EXII.	IIIL/EXII.	Separation	IIIL/EXII	EXII.	EXII.	
Hydraulic Lifter Camshaf Good mid range to upper RPM torque and HP, fair idle, moderate performance usage, bracket racing, auto trans w/2500+ converter, 3200-3600 cruise RPM, 9.5 to 11.0 compression ratio advised. Good w/centrifugal or Roots supercharger, 10 lbs. Maximum boost w/8.5 maximum compression ratio advised, good w/plate or manifold nitrous system.	H-286-2	2800- 6600	444551° 444552°a €3	99280-16 99380-16 ^{°b}	226 236	286 296	112	6 40 55 1	.000 .000	.502 .520	
Performance usage, good mid-range to upper RPM torque and HP, Street Stock, Enduro, Hobby, 2-bbl or 4-bbl, 1/4-3/8 mile, serious off road, 9.0 to 10.5 compression ratio advised.	H-228/3200-6	2800- 6400	440551*	99280-16 99380-16 [®]	228 228	284 284	106	12 36 44 4	.000		
Performance usage, bracket racing, Street, Heavy, auto trans w/3000+ converter, oval track 1/4-3/8 mile: Street Stock, Enduro, Hobby, 4-bbl, 10.0 to 11.5 compression ratio advised.	H-230/318-2-8	3000- 6600	440151*	99280-16 99380-16 [®]	230 240	290 300	108	12 38 53 7	.000	.509 .526	
Performance usage, radical street, bracket racing, good mid range to upper RPM torque and HP, Street, Heavy, auto trans w/3000+ converter, oval track: good low to mid-range torque and HP, Street Stock, Enduro, Hobby, 2-bbl or 4-bbl, 1/4-3/8 mile, 10.0 to 11.5 compression ratio advised.	H-234/3294-25-10	3200- 6800	440161*	99280-16 99380-16*b	234 238	290 294	110	12 42 54 4		.527 .536	
Performance usage, bracket racing, good upper RPM torque and HP, Street, Heavy, Pro ET, auto trans w/race converter, 10.5 to 11.5 compression ratio advised.	H-236/325-2S-10	3400- 7000	440171°	99280-16 99380-16 [®]	236 240	296 300	110	13 43 55 5	.000	.520 .526	
Performance usage, bracket racing, good upper RPM HP, Street, Heavy, Pro ET, good w/manifold nitrous system, auto trans w/race converter, 10.5 to 11.5 compression ratio advised. Good with supercharger, 15 lbs. maximum boost w/8.0 maximum compression ratio advised.	H-236/325-25-14	3400- 7200	440231*	99280-16 99380-16 ^{*b}	236 240	296 300	114	9 47 59 1	.000 .000	.520 .526	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kit available. See page

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: To provide the most accurate valve adjustment on hydraulic

NOTE: To provide the most accurate valve adjustment on hydraulic roller camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. For

engines equipped with pedestal mounted rocker arms and hydraulic lifters, excessive lifter preload can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details. NOTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud

OTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 302 cu.in. and 351W engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to page 325 for details.

IOTE: Special length pushrods can be ordered to provide proper hydraulic lifter preload. See page 305 for ordering instructions and page 374 for checking your hydraulic lifter preload. NOTE:

NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming. Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: Left hand rotation hydraulic camshafts are available on special order. Contact Crane's Performance Consultants for details.



CRANE VAL	VE TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 31
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	96874-16 ^c	99943-16 99969-16 ^d	99820-16 ^c	99097-1° 99094-1 ^f	95644-16 ⁹ 36622-16 ^h	44975-1* ⁱ 44984-1* ^j	36801-16 ^k 36800-16 ^l	36774-16" 11746-16" 44746-16°	36750-1 36759-1 36758-1
	96874-16°	99943-16 99969-16 ^d	99820-16 ^c	99097-1° 99094-1 ^f	95644-16 ⁹ 36622-16 ^h	44975-1 ^{*i} 44984-1 ^{*j}	36801-16 ^k 36800-16 ^l	36774-16 ^m 11746-16 ⁿ 44746-16°	36750-1 36759-1 36758-1
	96874-16°	99943-16 99969-16 ^d	99820-16 ^c	99097-1° 99094-1 ^f	95644-16 ⁹ 36622-16 ^h	44975-1*i 44984-1* ^j	36801-16 ^k 36800-16 ^l	36774-16 ^m 11746-16 ⁿ 44746-16°	36750-1 36759-1 36758-1
	96874-16 ^c	99943-16 99969-16 ^d	99820-16 ^c	99097-1° 99094-1 ^f	95644-16 ^g 36622-16 ^h	44975-1 ^{*i} 44984-1 ^{*j}	36801-16 ^k 36800-16 ^l	36774-16 ^m 11746-16 ⁿ 44746-16°	36750-1 36759-1 36758-1
	96874-16°	99943-16 99969-16 ^d	99820-16 ^c	99097-1° 99094-1 ^f	95644-16 ⁹ 36622-16 ^h	44975-1* ¹ 44984-1* ^j	36801-16 ^k 36800-16 ^l	36774-16 ^m 11746-16 ⁿ 44746-16°	36750-1 36759-1 36758-1
	96874-16 ^c	99943-16 99969-16 ^d	99820-16 ^c	99097-1° 99094-1 ^f	95644-16 ⁹ 36622-16 ^h	44975-1*i 44984-1* ^j	36801-16 ^k 36800-16 ^l	36774-16 ^m 11746-16 ⁿ 44746-16°	36750-1 36759-1 36758-1

Section Continued



- Cam and Lifter Kit, includes installation lubricants, and rocker arm adjusting nuts.
- Optional Hi Intensity hydraulic lifters, see page 292 for details.
- Must machine cylinder heads.
- Requires Crane Multi Fit valve locks. Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Pro Series one piece, for 351 engines, for use with or without pushrod guideplate cylinder heads. For 302 engines, heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads. For 73-93 engines, performance steel billet gears and roller chain set.

- For 73-93 engines, Pro Series steel billet gears and roller chain set.

 1.6 ratio, cast, rail type for 3/8" studs for 69-76 engines, non-adjustable with 5/16" top bottleneck studs, adjustable if straight 3/8" studs and locking nuts are installed.
- 1.6 ratio, cast, non-rail type for 3/8" studs, must machine cylinder heads and install **99156-16** rocker arm studs and **36650-1** pushrod guideplates, or use **36655-16** Conversion Kit on 77-93 pedestal mount cylinder heads for street applications.
- m Crane Classic extruded, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- n Energizer, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- o Energizer, 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install **99156-16** rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- **q** 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.

					COM	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf	ts										
Rough idle, performance usage, radical street, good upper RPM HP, bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.5 to 112.0 compression ratio advised. Good w/Roots supercharger, 15 lbs. maximum boost w/8.0 maximum compression ratio advised, good w/manifold nitrous system.	H-238/3347-2-10	3400- 7200	440661*	99280-16 99380-16*ª	238 248	294 304	110	14 44 59 9	.000 .000	.536 .560	
Moderate competition, bracket racing, Heavy, Pro ET, Super ET, auto trans w/race converter, 11.0 to 12.0 compression ratio advised.	H-242/310-6	3400- 7000	440241*	99280-16 99380-16*a	242 242	300 300	106	19 43 51 11	.000	.496 .496	
Moderate competition, bracket racing, Heavy, Pro ET, Super ET, auto trans w/race converter, 11.0 to 12.5 com- pression ratio advised.	H-246/3334-6	3600- 7200	440181°	99280-16 99380-16*a	246 246	306 306	106	21 45 53 13	.000	.533 .533	
Moderate competition, good upper RPM HP, bracket racing, auto trans w/race converter, 11.5 to 13.0 compression ratio advised.	H-246/336-2S-8	3800- 7200	440191°	99280-16 99380-16*a	246 254	306 314	108	20 46 60 14	.000	.538 .550	
Competition only, good upper RPM HP, bracket racing w/light car, flat tappet restricted classes, auto trans w/race converter, 12.5 minimum compression ratio advised.	H-260/360-25-8	4200- 7200	440201°	99280-16 99380-16*ª	260 268	330 338	108	27 53 67 21	.000	.576 .595	

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Norwide the most accurate valve adjustment on hydraulic

NOTE: To provide the most accurate valve adjustment on hydraulic roller camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. For

engines equipped with pedestal mounted rocker arms and hydraulic lifters, excessive lifter preload can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details. NOTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud

OTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 302 cu.in. and 351W engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to page 325 for details.

IOTE: Special length pushrods can be ordered to provide proper hydraulic lifter preload. See page 305 for ordering instructions and page 374 for checking your hydraulic lifter preload. NOTE:

NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming. Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: Left hand rotation hydraulic camshafts are available on special order. Contact Crane's Performance Consultants for details.



CRANE VALV	E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	96874-16 ^b	99943-16 99969-16 ^c	99820-16 ^b	99097-1 ^d 99094-1 ^e	95644-16 ^f 36622-16 ^g	44975-1* ^h 44984-1* ⁱ	36801-16 ⁱ 36800-16 ^k	36774-16 ¹ 11746-16 ^m 44746-16 ⁿ	36750-16 ⁶ 36759-16 ⁶ 36758-16 ⁶
	96874-16 ^b	99943-16 99969-16 ^c	99820-16 ^b	99097-1 ^d 99094-1 ^e	95644-16 ^f 36622-16 ^g	44975-1*h 44984-1*i	36801-16 ^j 36800-16 ^k	36774-16 ¹ 11746-16 ^m 44746-16 ⁿ	36750-16 ⁶ 36759-16 ⁶ 36758-16 ⁶
								44/40-10	30730-10
	96874-16 ^b	99943-16 99969-16 ^c	99820-16 ^b	99097-1 ⁴ 99094-1°	95644-16 ^f 36622-16 ^g	44975-1* ^h 44984-1* ⁱ	36801-16 ^j 36800-16 ^k	36774-16 ¹ 11746-16 ^m 44746-16 ⁿ	36750-16 36759-16 36758-16
	96874-16 ^b	99943-16 99969-16 ^c	99820-16 ^b	99097-1 ^d 99094-1 ^e	95644-16 ^f 36622-16 ^g	44975-1*h 44984-1*i	36801-16 ^j 36800-16 ^k	36774-16 ¹ 11746-16 ^m 44746-16 ⁿ	36750-16 36759-16 36758-16
	96874-16 ^b	99943-16 99969-16 ^c	99820-16 ^b	99097-1 ^d 99094-1°	95644-16 ^f 36622-16 ^g	44975-1*h 44984-1*i	36801-16 ^j 36800-16 ^k	36774-16 ¹ 11746-16 ^m 44746-16 ⁿ	36750-16 36759-16 36758-16

- Optional Hi Intensity hydraulic lifters, see page 292 for details.
- Must machine cylinder heads.
- Requires Crane Multi Fit valve locks.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Pro Series one-piece, for 351 engines, heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
- For 302 engines, heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads. For 73-93 engines, performance steel billet gears and roller chain set.

- For 73-93 engines, Pro Series steel billet gears and roller chain set.

 1.6 ratio, cast, rail type for 3/8" studs for 69-76 engines, non-adjustable with 5/16" top bottleneck studs, adjustable if straight 3/8" studs and locking nuts are installed.
- 1.6 ratio, cast, non-rail type for 3/8" studs, must machine cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 77-93 pedestal mount cylinder heads for street applications.
- I Crane Classic extruded, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- m Energizer, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- n Energizer, 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install **99156-16** rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- 1.6 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Camsha	fts — Retrofit									
Excellent low end torque and HP, smooth idle, daily usage, towing, economy, also mild turbocharged, 2200-3000 cruise RPM, 8.0 to 9.5 compression ratio advised.	2020	800- 4800	444211*a,b 444212*a,b,c	36530-16 ^d 36532-16 ^e	208 216	262 270	112	(3) 31 45 (9)	.000 .000	.530 .530
Good low end torque and HP, good idle, daily usage, performance and fuel efficiency, off road, towing, 2400-3000 cruise RPM, 8.75 to 10.0 compression ratio advised.	HR-216/325-25-12	1400- 5400	449541*a,b	36530-16 ^d 36532-16 ^e	216 224	278 286	112	1 35 49 (5)	.000	.520 .542
Good low end and mid range torque and HP, good idle, moderate performance usage, 2600-3200 cruise RPM, good w/plate nitrous system, 9.0 to 10.5 compression ratio advised. Also good w/supercharger, 20 lbs. maximum boost w/ 8.5 maximum compression ratio advised.	HR-220/332-252-14	1600- 5600	449631*a,b	36530-16 ^d 36532-16 ^e	220 228	282 290	114	1 39 53 (5)	.000 .000	.531 .552
Good low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2000+ converter, serious off road, 2800-3400 cruise RPM, 9.5 to 10.75 compression ratio advised.	HR-224/339-2S-12	1800- 5800	449601*a,b	36530-16 ^d 36532-16 ^e	224 232	286 294	112	5 39 53 (1)	.000	.542 .563
Good mid range torque and HP, fair idle, performance usage, bracket racing, auto trans with 2500+ converter, 3000-3600 cruise RPM, 10.0 to 11.5 compression ratio advised. Also good w/centrifugal or Roots supercharger, 24 lbs. maximum boost with 8.5 maximum compression ratio advised, also good with manifold nitrous system.	HR-228/345-251-14	2400- 6400	449681*a,b	36530-16 ^d 36532-16 ^e	228 232	290 294	114	5 43 55 (3)	.000 .000	.552 .563

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Cylinder head removal will be required in 82-84 302 H.O. applications in order to install the **36532-16** or **36560-16** hydraulic roller tappets.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: To provide the most accurate valve adjustment on hydraulic roller camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. For engines equipped with pedestal mounted rocker arms and hydraulic lifters, excessive lifter preload can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details.

NOTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 302 cu.in. and 351W engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to page 325 for details.

NOTE: Special length pushrods can be ordered to provide proper hydraulic lifter preload. See page 305 for ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming. Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.



CRANE VALV	/E TRAIN CC	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
44308-1 ^f	96870-16 ⁹	99943-16 99969-16 ^h	99820-16 ⁹	99097-1 ⁱ 99087-1 ^j	95636-16 ^k 95640-16 ^l	44975-1* ^m 44984-1* ⁿ	36801-16° 36800-16°	36774-16 ^q 11746-16 ^r 44746-16 ^s	36750-16 ^t 36759-16 ^u 36758-16 ^v
44308-1 ^f	96870-16 ⁹	99943-16 99969-16 ^h	99820-16 ^h	99097-1 ⁱ 99087-1 ^j	95636-16 ^k 95640-16 ^l	44975-1* ^m 44984-1* ⁿ	36801-16° 36800-16°	36774-16 ^q 11746-16 ^r 44746-16 ^s	36750-16 ^t 36759-16 ^u 36758-16 ^v
	96870-16 ⁹	99943-16 99969-16 ^h	99820-16 ^h	99097-1 ⁱ 99087-1 ^j	95636-16 ^k 95640-16 ^l	44975-1* ^m 44984-1* ⁿ	36801-16° 36800-16°	36774-16 ^q 11746-16 ^r 44746-16 ^s	36750-16 ^t 36759-16 ^u 36758-16 ^v
	96870-16 ⁹	99943-16 99969-16 ^h	99820-16 ^h	99097-1 ⁱ 99087-1 ^j	95636-16 ^k 95640-16 ⁱ	44975-1* ^m 44984-1* ⁿ	36801-16° 36800-16°	36774-16 ^q 11746-16 ^r 44746-16 ^s	36750-16 ^t 36759-16 ^u 36758-16 ^v
	96870-16 ⁹	99943-16 99969-16 ^h	99820-16 ^h	99097-1 ⁱ 99087-1 ^j	95636-16 ^k 95640-16 ^l	44975-1* ^m 44984-1* ⁿ	36801-16° 36800-16°	36774-16 ^q 11746-16 ^r 44746-16 ^s	36750-16 ^t 36759-16 ^u 36758-16 ^v

Section Continued



- Camshaft has standard base circle diameter, for use with 36532-16 or 36560-16 hydraulic roller lifters. Also applicable to 94-97 351W engines.
- Requires 36970-1 (.467" I.D.) or 44970-1 (.531" I.D.) steel, or 36990-1 (.467" I.D.) or 44990-1 (.531"I.D.) aluminum-bronze distributor drive gear.
- c Cam and spring kit, includes 44308-1 kit, containing valve springs, valve spring retainers, and valve
- For use with standard Ford alignment bars, on engines originally equipped with hydraulic roller lifters.
- Vertical locking bar hydraulic roller lifters, no machining required. Cylinder head removal required in 82-84 302 H.O. applications. Appropriate pushrods required.
- Optional spring, retainer, and lock kit for 79-93 engines, no machining required.
- Must machine cylinder heads.
- Requires Crane Multi Fit valve locks.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Pro Series one-piece, for 351W engines with non-adjustable pedestal mount rocker arms.
- Pro Series one -piece, for 351W engines with adjustable rocker arms with Pushrod Guideplate Conversion Kit (**36655-16**). See page 325 for details. For 73-93 engines, performance steel billet gears and roller chain set.
- For 73-93 engines, Pro Series steel billet gears and roller chain set.

- 1.6 ratio, cast, rail type for 3/8" studs. Non-adjustable with 5/16" top bottleneck studs, adjustable with straight 3/8" studs and locking nuts.
- 1.6 ratio, cast, non-rail type for 3/8" studs, must machine cylinder heads and install **99156-16** rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 77-93 pedestal mount cylinder heads for street applications.
- Crane Classic extruded, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- Energizer, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- s Energizer, 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.6 ratio, 3/8" stud, must machine cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 77-93 pedestal mount cylinder heads for street applications.
- 1.6 ratio, non-adjustable, for 77-93 pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- 1.7 ratio, non-adjustable, for 77-93 pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.

					COM	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Camsha	fts — Retrofit									
Good mid range torque and HP, fair idle, performance usage, supercharged, nitrous, bracket racing, auto trans w/3000+ converter, 3400-3800 cruise RPM, 10.0 to 11.5 compression ratio advised.	HR-232/352-2S1-12	2600- 6600	449561*a,b	36530-16 ^c 36532-16 ^d	232 240	294 302	112	9 43 57 3	.000 .000	.563 .584
Good mid to upper RPM torque and HP, rough idle, performance usage, bracket racing, auto trans w/3000+converter, 3600-4000 cruise RPM, 10.5 to 12.0 compression ratio advised.	HR-236/359-2S-10	2800- 6800	449641*a,b	36530-16 ^c 36532-16 ^d	236 244	298 306	110	13 43 57 7	.000	.574 .595
Moderate performance usage, rough idle, bracket racing, auto trans w/3500+ converter, good w/manifold nitrous system,3600-4000 cruise RPM, 10.5 to 12.0 compression ratio advised. Also good w/centrifugal or Roots supercharger, 28 lbs. maximum boost w/8.5 maximum compression ratio.	HR-240/365-251-14	3000- 7000	449711*a,b	36530-16 ^c 36532-16 ^d	240 244	302 306	114	11 49 61 3	.000 .000	.584 .595
Moderate performance usage, rough idle, performance usage, supercharged, nitrous, for 400+ cu.in., bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, 11.5 minimum compression ratio advised.	HR-244/372-25-12	3200- 7000	449571*a,b	36530-16 ^c 36532-16 ^d	244 256	306 318	112	15 49 65 11	.000	.595 .595
Performance usage, for 400+ cu.in., bracket racing, good w/large plate nitrous, auto trans w/4000+ converter, 12.5 minimum compression ratio advised. Also good w/centrifugal or Roots supercharger, 34 lbs. maximum boost w/8.5 maximum compression ratio.	HR-252/400-25-14	3600- 7200	449741*a,b	36532-16 ^d	252 260	322 330	114	15.5 56.5 68 12	.000 .000	.640 .640

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Cylinder head removal will be required in 82-84 302 H.O. applications in order to install the **36532-16** or **36560-16** hydraulic roller tappets.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O., and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: To provide the most accurate valve adjustment on hydraulic roller camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. For engines equipped with pedestal mounted rocker arms and hydraulic lifters, excessive lifter preload can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details.

NOTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 302 cu.in. and 351W engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to page 325 for details.

NOTE: Special length pushrods can be ordered to provide proper hydraulic lifter preload. See page 305 for ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Some engines have long valve stems which will result in excessive valve string assembly height. Different springs and

NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming. Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.



CRANE VALV	E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	96870-16°	99943-16 99969-16 ^f	99820-16°	99097-1 ⁹ 99087-1 ^h	95636-16 ⁱ 95640-16 ^j	44975-1 ^{*k} 44984-1* ⁱ	36801-16 ^m 36800-16 ⁿ	36774-16° 11746-16° 44746-16°	36750-16' 36759-16' 36758-16'
	96870-16°	99943-16 99969-16 ^f	99820-16°	99097-1 ⁹ 99087-1 ^h	95636-16 ⁱ 95640-16 ^j	44975-1° ^k 44984-1° ^l	36801-16 ^m 36800-16 ⁿ	36774-16° 11746-16° 44746-16°	36750-16 ^r 36759-16 ^s 36758-16 ^t
	96870-16°	99943-16 99969-16 ^f	99820-16°	99097-1 ⁹ 99087-1 ^h	95636-16 ⁱ 95640-16 ⁱ	44975-1 ^{*k} 44984-1* ¹	36801-16 ^m 36800-16 ⁿ	36774-16° 11746-16° 44746-16°	36750-16 [°] 36759-16 [°] 36758-16 [°]
	96870-16°	99943-16 99969-16 ^f	99820-16°	99097-1 ⁹ 99087-1 ^h	95636-16 ⁱ 95640-16 ^j	44975-1 ^{*k} 44984-1" ^I	36801-16 ^m 36800-16 ⁿ	36774-16° 11746-16 ^p 44746-16 ^q	36750-16' 36759-16' 36758-16'
	96870-16°	99943-16 99969-16 ^f	99820-16°	99097-1 ⁹ 99087-1 ^h	95636-16 ⁱ 95640-16 ^j	44975-1* ^k 44984-1* ^l	36801-16 ^m 36800-16 ⁿ	36774-16° 11746-16° 44746-16°	36750-16' 36759-16' 36758-16'

- a Camshaft has standard base circle diameter, for use with 36532-16 or 36560-16 hydraulic roller lifters. Also applicable to 94-97 351W engines.
- b Requires 36970-1 (.467" I.D.) or 44970-1 (.531" I.D.) steel, or 36990-1 (.467" I.D.) or 44990-1 (.531" I.D.) aluminum-bronze distributor drive gear.
- c For use with standard Ford alignment bars, on engines originally equipped with hydraulic roller lifters.
- d Vertical locking bar hydraulic roller lifters, no machining required. Cylinder head removal required in 82-84 302 H.O. applications. Appropriate pushrods required.
- e Must machine cylinder heads.
- f Requires Crane Multi Fit valve locks.
- **g** Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- For 351W engines with non-adjustable pedestal mount rocker arms.
- Pro Series one -piece, for 351W engines with adjustable rocker arms with Pushrod Guideplate Conversion Kit (36655-16). See page 325 for details.
- k For 73-93 engines, performance steel billet gears and roller chain set.
- For 73-93 engines, Pro Series steel billet gears and roller chain set.
- m 1.6 ratio, cast, rail type for 3/8" studs. Non-adjustable with 5/16" top bottleneck studs, adjustable with straight 3/8" studs and locking nuts.

- n 1.6 ratio, cast, non-rail type for 3/8" studs, must machine cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 77-93 pedestal mount cylinder heads for street applications.
- Crane Classic extruded, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- P Energizer, 1.6 ratio 3/8" stud, must machine 1966-00 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 1977-00 pedestal mount cylinder heads for street applications.
- Energizer, 1.7 ratio, non-adjustable, for pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- r 1.6 ratio, 3/8" stud, must machine cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 77-93 pedestal mount cylinder heads for street applications.
- 1.6 ratio, non-adjustable, for 77-93 pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.
- t 1.7 ratio, non-adjustable, for 77-93 pedestal mount cylinder heads, no machining required, includes Rocker Arm Pedestal Shim Kit.

					СОМ	PLETE C	AM SPE	CIFICATION	ONS		
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 293	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
Mechanical Lifter Camsh Good mid range torque & HP, performance usage, brack-	afts F-238/3200-8	2000	441161*	00257.16	220	200	100	16 42	.022	F12	
et racing, Street, Heavy, ant, periormance usage, brack- et racing, Street, Heavy, auto trans w/3000+ converter, oval track Sportsman, etc., 2-bbl or 4-bbl, 1/4-3/8 mile, serious off road, 10.5 to 11.5 compression ratio advised.	F-238/3200-8	2800- 6600	441161	99257-16	238 238	300 300	108	16 42 52 6	.022		
Performance usage, bracket racing, good mid-range torque, Heavy, Pro ET, auto trans w/race converter, oval track Sportsman, IMCA, etc., 2-bbl or 4-bbl, 1/4-3/8 mile, 11.0 to 12.5 compression ratio advised.	F-246/3467-252-6	3200- 6800	440881*	99257-16	246 250	278 282	106	20 46 54 16	.012 .012		
Performance usage, bracket racing, good mid-range torque and HP, Heavy, Pro ET, auto trans w/race converter, oval track Late Model, Sportsman, IMCA, etc., 4-bbl, 1/4-3/8 mile, serious off road, 11.0 to 12.5 compression ratio advised.	F-248/3334-2-8	3400- 7200	441231*	99257-16	248 258	310 320	108	21 47 62 16	.022 .022		
Rough idle, performance usage, radical street, good upper RPM HP, bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.5 to 112.0 compression ratio advised. Good w/Roots supercharger, 15 lbs. maximum boost w/8.0 maximum compression ratio advised, good w/manifold nitrous system.	F-252/3574-2S1-10	3800- 7400	440991*	99257-16	252 256	288 292	110	20 52 62 14	.026 .026		
Performance usage, bracket racing, good mid-range HP, Pro, Pro ET, Super ET, auto trans w/race converter, oval track Late Model, etc., 4-bbl, 3/8-1/2 mile, 11.5 mini- mum compression ratio advised.	F-252/3574-2S-6	3800- 7200	440981*	99257-16	252 260	288 296	106	22 50 58 22	.026 .026		
Performance usage, bracket racing, good mid-range HP, Pro, Pro ET, Super Pro, auto trans w/race converter, oval track: Late Model, etc., 4-bbl, 3/8-1/2 mile, 11.5 minimum compression ratio advised.	F-256/3634-2S-6	4000- 7400	441301°	99257-16	256 264	292 300	106	25 51 61 23	.026 .026		
Performance usage, bracket racing, good mid to upper RPM HP, Pro, Super Pro, etc., auto trans w/race converter, oval track Late Model, etc., 2-bbl or 4-bbl, 3/8-1/2 mile, 11.5 minimum compression ratio advised.	F-260/3694-257-6	4200- 7600	441431*	99257-16	260 264	296 300	106	27 53 61 23	.026 .026		
Competition only, bracket racing, good upper RPM HP, Pro, Super Pro, auto trans w/race converter, high RPM long oval track, 12.0 minimum compression ratio advised.	F-268/394-2S5-8	4600- 8000	441551*	99257-16	268 272	304 308	108	29 59 67 25	.018 .018		
Competition only, good mid and upper RPM torque and HP, flat tappet restricted classes, bracket racing, auto trans w/race converter, 1/2 - 5/8 mile oval track, good with aftermarket cylinder heads, 12.0 minimum compression ratio advised.	F-272/400-25-6	4800- 8200	441591°	99257-16	272 276	308 312	106	32 60 66 30	.018 .018	.640 .650	
Radical competition only, good upper RPM torque and HP, flat tappet restricted classes, bracket racing, good with aftermarket cylinder heads, auto trans w/race converter, 12.5 minimum compression ratio advised.	F-276/406-251-8	5000- 8400	441621*	99257-16	276 284	312 320	108	34 62 74 30	.018 .018		

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O. engines, and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: Ford 221 thru 302 camshafts can be used in 351 Windsor engines if the engine is changed to 221 thru 302 firing order (1-5-4-2-6-3-7-8). Ford 351W firing order is 1-3-7-2-6-5-4-8

NOTE: In order to effect valve adjustment when using mechanical lifter camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped). On engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment.

NOTE: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (36655-16) for street applications, enabling the 1977-00 302 cu.in. and 351W engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. Refer to page 325 for details.

NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming. Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: Left hand rotation mechanical camshafts are available on special order. Contact Crane's Performance Consultants for details



CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUI Crane Classi Energizer	M ROCKERS — C/ GOLD RACE
	96877-16ª	99943-16 99969-16 ^b	99820-16ª	99097-1° 99087-1 ^d	95644-16° 36622-16 ^f 95618-16 ^g	44975-1* ^h 44984-1* ⁱ		36774-16 ^j	36750-16 ^k 86757-16 ^l 36757-16 ^m
	96877-16ª	99943-16 99969-16 ^b	99820-16ª	99097-1° 99087-1 ^d	95644-16° 36622-16 ^f 95618-16 ^g	44975-1*h 44984-1*i		36774-16 ^j	36750-16 ^k 86757-16 ^l 36757-16 ^m
	96877-16ª	99943-16 99969-16 ^b	99820-16ª	99097-1° 99087-1ª	95644-16° 36622-16 ^f 95618-16 ^g	44975-1* ^h 44984-1* ⁱ		36774-16 ^j	36750-16 ^k 86757-16 ^l 36757-16 ^m
	96877-16ª	99943-16 99969-16 ^b	99820-16ª	99097-1° 99087-1 ^d	95644-16° 36622-16 ^f 95618-16 ^g	44975-1* ^h 44984-1* ⁱ		36774-16 ^j	36750-16 ^k 86757-16 ^l 36757-16 ^m
	96877-16ª	99943-16 99969-16 ^b	99820-16ª	99097-1° 99087-1 ^d	95644-16° 36622-16 ^f 95618-16 ^g	44975-1*h 44984-1*i		36774-16 ^j	36750-16 ^k 86757-16 ^l 36757-16 ^m
	96877-16ª	99943-16 99969-16 ^b	99820-16ª	99097-1° 99087-1ª	95644-16° 36622-16 ^f 95618-16 ^g	44975-1*h 44984-1*i		36774-16 ^j	36750-16 ^k 86757-16 ^l 36757-16 ^m
	96877-16ª	99943-16 99969-16 ^b	99820-16ª	99097-1° 99087-1 ^d	95644-16° 36622-16 ^f 95618-16 ^g	44975-1*h 44984-1*i		36774-16 ^j	36750-16 ^k 86757-16 ^l 36757-16 ^m
	96877-16ª	99956-16 99973-16 ^b	99820-16ª	99097-1° 99087-1 ^d	95644-16° 36622-16 ^f 95618-16 ^g	44975-1* ^h 44984-1* ⁱ		36774-16 ^j	36750-16 ^k 86757-16 ^l 36757-16 ^m
	96877-16ª	99956-16 99973-16 ^b	99820-16ª	99097-1° 99087-1ª	95644-16° 36622-16 ^f 95618-16 ^g	44975-1* ^h 44984-1* ⁱ		36774-16 ^j	36750-16 ^k 86757-16 ^l 36757-16 ^m
	96877-16ª	99956-16 99973-16 ^b	99820-16ª	99097-1° 99087-1ª	95644-16° 36622-16 ^f 95618-16 ^g	44975-1*h 44984-1*i		36774-16 ^j	36750-16 ^k 86757-16 ^l 36757-16 ^m

- Must machine cylinder heads. Requires Crane Multi Fit valve locks.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.

 Pro Series one-piece, for 351 engines, for use with or without pushrod guideplate cylinder heads.

 For 302 engines, heavy wall, heat treated, for use with or without pushrod guideplate cylinder
- Fro Series one-piece, for 302 engines, for use with or without pushrod guideplate cylinder heads. For 73-93 engines, performance steel billet gears and roller chain set.
- For 73-93 engines, Pro Series steel billet gears and roller chain set. Crane Classic extruded, 1.6 ratio, 3/8" stud, must machine 66-93 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 77-93 pedestal mount cylinder heads for street applications.
- k 1.6 ratio, 3/8" stud, must machine 66-93 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 77-93 pedestal mount cylinder
- heads for street applications.

 1. 6 ratio, 7/16" stud, must machine 66-93 cylinder heads and install **99157-16** rocker arm studs
- and **36650-1** pushrod guideplates.

 m 1.7 ratio, 7/16" stud, must machine 66-93 cylinder heads and install **99157-16** rocker arm studs and 36650-1 pushrod guideplates.

					СОМ	PLETE C	AM SPE	CIFICATION	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Mechanical Roller Camsh	afts										
Excellent low end and mid range torque and HP, good idle, daily performance usage, mild bracket racing, auto trans w/2500+ converter, 3000-3400 cruise RPM, 9.5 to 11.0 compression ratio advised.	SR-230/338-2S-10	2400- 6400	448501" ^a	44518-16 44570-16 ^b	230 238	280 288	110	10 40 54 4	.020 .020		
Rough idle, performance usage, good low to mid-range torque & HP, bracket racing, auto trans w/3000+ converter, good w/manifold nitrous system, 10.5 to 12.0 compression ratio advised. Good w/Roots supercharger, 16 lbs. maximum boost w/8.0 maximum compression ratio advised.	TR-244/3867-25-10	3200- 7000	448031*a	44518-16 44570-16 ^b	244 252	284 292	110	15 49 59 13	.022 .022		
Fair idle, moderate performance usage, good mid-range torque and HP, bracket racing, auto trans w/3500+ converter, good w/manifold nitrous system,3800-4200 cruise RPM, 10.5 to 12.0 compression ratio advised. Good w/Roots supercharger, 16 lbs. maximum boost w/8.0 maximum compression ratio advised.	SR-246/362-2S-10	3400- 7200	448601*a	44518-16 44570-16 ^b	246 254	296 304	110	15 51 59 15	.020 .020		
Performance usage, bracket racing, good mid-range torque and HP, Heavy, Pro, etc., auto trans w/race converter, oval track 2-bbl or 4-bbl, 1/4-3/8 mile, 11.0 to 12.5 compression ratio advised.	R-252/420-2S-8	3600- 7400	448801" ^a	44518-16 44570-16 ^b	252 258	284 290	108	22 50 61 17	.020 .020		
Performance usage, bracket racing, good mid-range torque and HP, Heavy, Pro, etc., auto trans w/race converter, oval track 2-bbl or 4-bbl, 1/4-3/8 mile, 11.0 to 12.5 compression ratio advised.	R-254/420-252-8	3800- 7600	448821°a	44518-16 44570-16 ^b	254 258	286 290	108	23 51 61 17	.020 .020		
Rough idle, performance usage, w/manifold nitrous system, good mid and upper RPM torque and HP, bracket racing, auto trans w/3500+ converter, 4200-4600 cruise RPM, 11.0 minimum compression ratio advised. Good w/Roots supercharger, 20 lbs. maximum boost w/8.0 maximum compression ratio advised.	SR-254/374-2S-10	3800- 7800	448511*a	44518-16 44570-16 ^b	254 262	304 312	110	22 52 66 16	.020 .020		
Performance usage, bracket racing, good mid to upper RPM torque and HP, Pro, Super Pro, etc., auto trans w/race converter, oval track, 2-bbl or 4-bbl, 1/4-3/8 mile, 12.0 minimum compression ratio advised.	R-258/420-2S-8	4000- 7600	448831" ^a	44518-16 44570-16 ^b	258 262	290 294	108	25 53 63 19	.020 .020		
Rough idle, performance usage, w/large nitrous system, good mid to upper RPM torque & HP, bracket racing, auto trans w/3500+ converter, 11.5 minimum compression ratio advised. Good w/Roots supercharger, 20 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-258/420-25-10	4000- 7800	448861" ^a	44518-16 44570-16 ^b	258 262	290 294	110	23 55 65 17	.020 .020		
Performance usage, bracket racing, good mid to upper RPM HP, Pro, Super Pro, etc., auto trans w/race converter, good with small nitrous system, aftermarket cylinder heads advised, 12.0 minimum compression ratio advised.	R-260/452-2S-10	4000- 8000	448301°a	44518-16 44570-16 ^b	260 268	289 300	112	25 55 68 20	.020 .020		
Performance usage, bracket racing, good mid to upper RPM torque and HP, Pro, Super Pro, etc., auto trans w/ race converter, oval track, 2-bbl or 4-bbl, 3/8-1/2 mile, 12.0 minimum compression ratio advised.	R-262/420-253-8	4200- 7800	448841*a	44518-16 44570-16 ^b	262 268	294 300	108	27 55 66 22	.020 .020		

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Camshafts for engines with 52mm, 52.8mm (2.081"), and 55mm diameter camshaft bearing journals are available on special order.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O. engines, and all 94-97 351 Windsor engines are equipped

with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: Ford 221 thru 302 camshafts can be used in 351 Windsor engines if the engine is changed to 221 thru 302 firing order (1-5-4-2-6-3-7-8). Ford 351W firing order is 1-3-7- 2-6-5-4-8.

NOTE: In order to effect valve adjustment when using roller lifter camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped).

NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming. Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.



CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	99893-16 ^c	99953-16	99820-16 ^c	99097-1°	95644-16 ^g 36622-16 ^h 95618-16 ⁱ	44975-1° ^j 44984-1° ^k		36774-16 ¹	36750-16 ^m 86757-16 ⁿ 36757-16°
	99885-16°	99956-16 99970-16 ^d	99826-16 ^c	99097-1° 99087-1 ^f	95644-16 ⁹ 36622-16 ^h 95618-16 ⁱ	44975-1 ^{*j} 44984-1* ^k		36774-16 ¹	36750-16 ^m 86757-16 ⁿ 36757-16 ^o
	99893-16 ^c	99953-16	99820-16 ^c	99097-1°	95644-16 ⁹ 36622-16 ^h 95618-16 ⁱ	44975-1 ^{°)} 44984-1 ^{°k}		36774-16 ¹	36750-16 ^m 86757-16 ⁿ 36757-16°
	99885-16°	99956-16 99970-16 ^d	99826-16°	99097-1° 99087-1 ^f	95644-16 ⁹ 36622-16 ^h 95618-16 ⁱ	44975-1° ^j 44984-1° ^k		36774-16 ¹	36750-16 ^m 86757-16 ⁿ 36757-16 ^o
	99885-16°	99956-16 99970-16 ^d	99826-16°	99097-1° 99087-1 ^f	95644-16 ⁹ 36622-16 ^h 95618-16 ⁱ	44975-1* ^j 44984-1* ^k		36774-16 ¹	36750-16 ^m 86757-16 ⁿ 36757-16°
	99893-16 ^c	99953-16	99820-16 ^c	99097-1°	95644-16 ⁹ 36622-16 ^h 95618-16 ⁱ	44975-1 ^{*j} 44984-1* ^k		36774-16 ¹	36750-16 ^m 86757-16 ⁿ 36757-16 ^o
	99885-16°	99956-16 99970-16 ^d	99826-16°	99097-1° 99087-1 ^f	95644-16 ^g 36622-16 ^h 95618-16 ⁱ	44975-1* ^j 44984-1* ^k		36774-16 ^l	36750-16 ^m 86757-16 ⁿ 36757-16°
	99885-16°	99956-16 99970-16 ^d	99826-16 ^c	99097-1° 99087-1 ^f	95644-16 ⁹ 36622-16 ^h 95618-16 ⁱ	44975-1* ⁱ 44984-1* ^k		36774-16 ¹	36750-16 ^m 86757-16 ⁿ 36757-16 ^o
	99885-16°	99956-16 99970-16 ^d	99826-16'	99097-1° 99087-1 ^f	95644-16 ^g 36622-16 ^h 95618-16 ⁱ	44975-1* ^j 44984-1* ^k		36774-16 ¹	36750-16 ^m 86757-16 ⁿ 36757-16°
	99885-16°	99956-16 99970-16 ^d	99826-16°	99097-1° 99087-1 ^f	95644-16 ^g 36622-16 ^h 95618-16 ⁱ	44975-1* ^j 44984-1* ^k		36774-16 ¹	36750-16 ^m 86757-16 ⁿ 36757-16°

Section Continued



- Requires **36970-1** (.467" l.D.), **36971-1** (.500" l.D.), or **44970-1** (.531" l.D. SVO) steel, or **36990-1** (.467" l.D.), **36989-1** (.500" l.D.), or **44990-1** (.531" l.D. SVO), aluminum-bronze distributor drive gear, and 7/16-20 x 1-1/4" grade 8 cam gear bolt and hardened washer.
- Ultra Pro Series roller lifters.
- Must machine cylinder heads. Requires Crane Multi Fit valve locks.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Pro Series one-piece, for 351 engines, for use with or without pushrod guideplate cylinder heads. For 302 engines, heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
- Pro Series one-piece, for 302 engines, for use with or without pushrod guideplate cylinder heads. For 73-93 engines, performance steel billet gears and roller chain set.
- **k** For 73-93 engines, Pro Series steel billet gears and roller chain set.
 - Crane Classic extruded, 1.6 ratio, 3/8" stud, must machine 66-93 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 77-93 pedestal mount cylinder heads for street applications.
- m 1.6 ratio, 3/8" stud, must machine 66-93 cylinder heads and install 99156-16 rocker arm studs and **36650-1** pushrod guideplates, or use **36655-16** Conversion Kit on 77-93 pedestal mount cylinder heads for street applications.
- n 1.6 ratio, 7/16" stud, must machine 66-93 cylinder heads and install **99157-16** rocker arm studs and 36650-1 pushrod guideplates.
- 1.7 ratio, 7/16" stud, must machine 66-93 cylinder heads and install **99157-16** rocker arm studs and 36650-1 pushrod guideplates.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 296	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Lash Hot Int.	Gross Lift Int.
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.
Mechanical Roller Camsh										
Rough idle, performance usage, good w/manifold nitrous system, good upper RPM HP, bracket racing, auto trans w/4000+ converter, 4400-4800 cruise RPM, 11.5 minimum compression ratio advised. Good w/Roots supercharger, 22 lbs. maximum boost w/8.0 maximum compression ratio advised.	SR-262/374-2S-10	4400- 7800	448671*a	44518-16 44570-16 ^b	262 274	312 323	110	26 56 72 22	.020 .024	.598 .584
Competition only, good w/large nitrous system, good mid to upper RPM HP, bracket racing, auto trans w/race converter, 12.0 minimum compression ratio advised. Good w/Roots supercharger, 24 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-266/420-253-10	4600- 8000	448871*a	44518-16 44570-16 ^b	266 276	298 308	110	27 59 72 24		.672 .672
Competition only, good mid to upper RPM HP, bracket racing, auto trans w/race converter, 12.0 minimum compression ratio advised, aftermarket aluminum cylinder heads advised, good w/large nitrous system. Good w/Roots supercharger, 24 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-266/452-2S-10	4600- 8200	448311*a	44570-16 ^b	266 276	295 306	110	28 58 73 23	.020 .022	
Performance usage, bracket racing, good upper RPM torque and HP, Super Pro, etc., auto trans w/race converter, oval track, high RPM 3/8-1/2 mile, 12.0 minimum compression ratio advised.	R-268/420-251-8	4800- 8200	448851" ^a	44518-16 44570-16 ^b	268 272	300 304	108	30 58 68 24	.020 .020	.672 .672
Competition only, bracket racing, good upper RPM torque and HP, Super Pro, etc., auto trans w/race converter, aftermarket aluminum cylinder heads advised, 12.0 minimum compression ratio advised.	R-272/4381-251-8	5000- 8400	448891" ^a	44518-16 44570-16 ^b	272 278	304 310	108	31 61 70 28	.020 .022	.701 .701
Competition only, bracket racing, good upper RPM torque and HP, Super Pro, Super Gas, etc., auto trans w/race converter, aftermarket aluminum cylinder heads advised, 12.5 minimum compression ratio advised.	R-276/4334-25-8	5200- 8400	448291" ^a	44518-16 44570-16 ^b	276 284	316 284	108	33 63 73 31	.026 .026	.693 .683
Competition only, bracket racing, good upper RPM torque and HP, Super Pro, Super Gas, etc., auto trans w/race converter, aftermarket aluminum cylinder heads advised, 12.5 minimum compression ratio advised.	R-280/452-25-10	5400- 8600	448881" ^a	44570-16 ^b	280 288	310 320	110	35 65 78 30	.020 .020	.723 .672
Competition only, good upper RPM HP, stick or auto trans w/race converter, designed for large manifold nitrous system, professionally prepared cylinder heads, 13.5 minimum compression ratio advised.	R-284/466-2S-15	5400- 8800	448321*a	44570-16 ^b	284 296	316 336	115	30 74 87 29	.020 .030	.746 .753
Competition only, good upper RPM HP, stick or auto trans w/race converter, professionally prepared cylinder heads, 13.5 minimum compression ratio advised.	R-286/456-251-10	5200- 8800	448331*a	44570-16 ^b	286 290	326 330	110	36 70 78 32		.730 .734

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Camshafts for engines with 52mm, 52.8mm (2.081"), and 55mm diameter camshaft bearing journals are available on special order.

NOTE: Many 1985-87 302 engines, all 88-97 302 passenger car engines, all 96-00 302 truck engines, all 85-95 302 H.O. engines, and all 94-97 351 Windsor engines are equipped with hydraulic roller camshafts and lifters. Conventional hydraulic, mechanical, or roller lifters can be easily installed in these engines, providing the appropriate kit components are used.

NOTE: Ford 221 thru 302 camshafts can be used in 351 Windsor engines if the engine is changed to 221 thru 302 firing order (1-5-4-2-6-3-7-8). Ford 351W firing order is 1-3-7-2-6-5-4-8

NOTE: In order to effect valve adjustment when using roller lifter camshafts, the heads must be machined to accept screw-in studs (on engines not originally equipped).

NOTE: Some engines have long valve stems which will result in excessive valve spring assembly height. Different springs and retainers may be required to prevent excessive shimming. Contact Crane's Performance consultants for details.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 44975-1 or 44984-1 timing chain and assemblies, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE Springs	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM Crane Classi Energizer	
	99893-16°	99953-16	99820-16 ^c	99097-1 ^f	95644-16 ^h 36622-16 ⁱ 95618-16 ^j	44975-1 ^{*k} 44984-1* ⁱ		36774-16°	36750-16° 86757-16° 36757-16°
	99885-16°	99956-16 99970-16 ^d	99826-16 ^c	99097-1 ^f 99087-1 ^g	95644-16 ^h 36622-16 ⁱ 95618-16 ^j	44975-1* ^k 44984-1* ¹		36774-16 ^m	36750-16° 86757-16° 36757-16°
	99885-16°	99956-16 99970-16 ^d	99826-16 ^c	99097-1 ^f 99087-1 ^g	95644-16 ^h 95618-16 ^j	44975-1* ^k 44984-1" ^l		36774-16 ^m	36750-16 ⁿ 86757-16 ^o 36757-16 ^p
	99885-16°	99956-16 99970-16 ^d	99826-16 ^c	99097-1 ^f 99087-1 ^g	95644-16 ^h 36622-16 ⁱ 95618-16 ^j	44975-1* ^k 44984-1* ^l		36774-16 ^m	36750-16° 86757-16° 36757-16°
	99885-16°	99956-16 99970-16 ^d	99826-16 ^c	99097-1 ^f 99087-1 ^g	95644-16 ^h 36622-16 ⁱ 95618-16 ^j	44975-1*k 44984-1*l		36774-16 ^m	36750-16 ⁿ 86757-16 ^o 36757-16 ^p
	99885-16°	99956-16 99970-16 ^d	99826-16 ^c	99097-1 ^f 99087-1 ^g	95644-16 ^h 36622-16 ⁱ 95618-16 ^j	44975-1" ^k 44984-1" ^l		36774-16 ^m	36750-16° 86757-16° 36757-16°
	96886-16°	99681-16°	99826-16°	99097-1 ^f	95644-16 ^h 95618-16 ^j	44984-1° ¹			36750-16° 86757-16° 36757-16°
	96886-16°	99681-16°	99826-16 ^c	99097-1 ^f	95644-16 ^h 95618-16 ^j	44984-1* ¹			36750-16° 86757-16° 36757-16°
	96886-16°	99681-16°	99826-16 ^c	99097-1 ^f	95644-16 ^h 95618-16 ^j	44984-1* ¹			36750-16 ⁿ 86757-16 ^o 36757-16 ^p

- a Requires 36970-1 (.467" l.D.), 36971-1 (.500" l.D.), or 44970-1 (.531" l.D. SVO) steel, or 36990-1 (.467" l.D.), 36989-1 (.500" l.D.), or 44990-1 (.531" l.D. SVO), aluminum-bronze distributor drive gear, and 7/16-20 x 1-1/4" grade 8 cam gear bolt and hardened washer.
- **b** Ultra Pro Series roller lifters.
- c Must machine cylinder heads.
- **d** Requires Crane Multi Fit valve locks.
- e Titanium, must use 99097-1 valve stem locks (included with the retainers).
- f Machined steel, heat treated.
- g Machined steel, heat treated, Multi Fit.
- For Series one-piece, for 351 engines, for use with or without pushrod guideplate cylinder heads.
 For 302 engines, heavy wall, heat treated, for use with or without pushrod guideplate cylinder heads.
- Pro Series one-piece, for 302 engines, for use with or without pushrod guideplate cylinder heads.
- k For 73-93 engines, performance steel billet gears and roller chain set.
- For 73-93 engines, Pro Series steel billet gears and roller chain set.

- m Crane Classic extruded, 1.6 ratio, 3/8" stud, must machine 66-93 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 77-93 pedestal mount cylinder heads for street applications.
 n 1.6 ratio, 3/8" stud, must machine 66-93 cylinder heads and install 99156-16 rocker arm studs and
- n 1.6 ratio, 3/8" stud, must machine 66-93 cylinder heads and install 99156-16 rocker arm studs and 36650-1 pushrod guideplates, or use 36655-16 Conversion Kit on 77-93 pedestal mount cylinder heads for street applications.
- 1.6 ratio, 7/16" stud, must machine 66-93 cylinder heads and install 99157-16 rocker arm studs and 36650-1 pushrod guideplates.
- 1.7 ratio, 7/16" stud, must machine 66-93 cylinder heads and install 99157-16 rocker arm studs and 36650-1 pushrod guideplates.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Lifter Camshat		IVANOL	LITIISSIOTIS COUC	LITTERS	IIII/ LAII.	III(/ LAII.	Jeparation	IIIL/ LAII	LAII.	LAII.
Brute low end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 7.75 to 8.75 compression ratio advised.	H-192/2667-25-14	800- 4200	520581°	99280-16	192 204	248 260	114	(13) 25 41 (17)	.000	
Good low end torque, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-260-2	1200- 4800	523901* 523902*a	99280-16	204 214	260 276	112	(5) 29 44 (10)	.000	
Good low end torque and HP, smooth idle, daily usage, fuel economy, light towing, off road, 2200-2700 cruise RPM, 8.5 to 10.0 compression ratio advised.	Energizer 266 H10	1400- 4800	13303° 133032°b	99280-16	210 210	266 266	110	0 30 40 (10)	.000	
Excellent low end and mid range torque and HP, good idle, daily usage, off road, towing, fuel economy, 2400-2800 cruise RPM, 8.5 to 10.0 compression ratio advised.	H-266-2	1500- 5000	523921° 523922°a	99280-16	210 218	266 280	112	(2) 32 46 (8)	.000	
Good low end and mid range torque and HP, good idle, daily usage, off road, highway towing, fuel efficiency plus performance, 2600-3000 cruise RPM, 8.75 to 10.0 com- pression ratio advised.	Energizer 272 H10	1600- 5200	13304° 133042°a	99280-16	216 216	272 272	110	3 33 43 (7)	.000	
Good low end and mid range torque, good idle, daily usage and off road, towing, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	H-272-2	1800- 5400	523941* 523942*b	99280-16	216 228	272 284	112	1 35 51 (3)	.000	
Good mid range torque and HP, good to fair idle, daily usage, mild bracket racing, auto trans w/2500+ converter, 2700-3200 cruise RPM, 9.5 to 10.75 compression ratio advised.	Energizer 278 H10	2200- 5600	13313* 133132*a	99280-16 99380-16*	222 222	278 278	110	6 36 46 (4)	.000	
Good mid range torque and HP, good idle, daily performance usage, mild bracket racing, auto trans w/2000+converter, 3000-3400 cruise RPM, 9.5 to 10.75 compression ratio advised.	H-278-2	2200- 5800	523801* 523802*a	99280-16 99380-16*	222 234	278 290	114	2 40 56 (2)	.000	
Rough idle, moderate performance usage, limited oval track, bracket racing, auto trans w/3000+ converter, 9.5 to 11.0 compression ratio advised.	H-226/314-2S-6	2400- 6000	520341*	99280-16 99380-16* ^c	226 230	286 290	106	11 35 45 5	.000	
Good mid range to upper RPM torque and HP, fair idle, moderate performance usage, bracket racing, auto trans w/2500+ converter, 3200-3600 cruise RPM, 9.5 to 11.0 compression ratio advised.	H-288-2	2400- 6200	524421* 524422*a	99280-16 99380-16*	226 230	288 292	110	8 38 50 0	.000	

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

IMPORTANT: If your hydraulic lifter preload is excessive, this can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details.

IMPORTANT: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (52655-16) for street applications, enabling the 351C-351M-400 cu.in. engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. See page 325 for details. NOTE: To provide the most accurate valve adjustment on hydraulic lifter camshafts, the heads must be machined to accept 99159-16 screw-in studs and 52650-1 pushrod guideplates. Special length pushrods can be ordered to provide proper hydraulic lifter preload. Refer to page 305 for special pushrod ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 52975-1 timing chain and gear assembly, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

IMPORTANT NOTE: Many problems can occur if the proper valve spring retainers are not used on 351C-351M and 400 cu.in. engines. Ford made a number of production changes in these engines, possibly causing a misapplication of parts. Please refer to page 195 to insure that the proper components are being used.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUI Crane Classi Energizer	M ROCKERS — C/ Gold Race
52308-1 ^d 35308-1 ^e	96801-16 ^f 99839-16 ^g	99944-16 ⁱ 99948-16 ⁱ 99969-16 ^k		99097-1¹ 99094-1™	52621-16° 95650-16°	52975-1* ^p	52800-16 ^q	27774-16' 27744-16'	27750-16 ^t 27771-16 ^u
52308-1 ^d 35308-1 ^e	96801-16 ^f 99839-16 ^g	99944-16 ⁱ 99948-16 ⁱ 99969-16 ^k		99097-1¹ 99094-1™	52621-16° 95650-16°	52975-1*p	52800-16 ^q	27774-16 ^r 27744-16 ^s	27750-16 ^t 27771-16 ^u
52308-1 ^d 35308-1 ^e	96801-16 ^f 99839-16 ^g	99944-16 ⁱ 99948-16 ⁱ 99969-16 ^k		99097-1¹ 99094-1™	52621-16° 95650-16°	52975-1*p	52800-16 ^q	27774-16 ^r 27744-16 ^s	27750-16 ^t 27771-16 ^u
52308-1 ^d 35308-1 ^e	96801-16 ^f 99839-16 ^g	99944-16 ⁱ 99948-16 ^j 99969-16 ^k		99097-1¹ 99094-1™	52621-16° 95650-16°	52975-1*p	52800-16 ^q	27774-16 ^r 27744-16 ^s	27750-16 ^t 27771-16 ^u
52308-1 ^d 35308-1 ^e	96801-16 ^f 99839-16 ^g	99944-16 ⁱ 99948-16 ⁱ 99969-16 ^k		99097-1 ¹ 99094-1 ^m	52621-16° 95650-16°	52975-1* ^p	52800-16 ^q	27774-16 ^r 27744-16 ^s	27750-16 ^t 27771-16 ^u
52308-1 ^d 35308-1 ^e	96801-16 ^f 99839-16 ^g	99944-16 ⁱ 99948-16 ⁱ 99969-16 ^k		99097-1¹ 99094-1™	52621-16° 95650-16°	52975-1* ^p	52800-16 ^q	27774-16 ^r 27744-16 ^s	27750-16 ^t 27771-16 ^u
52308-1 ^d 35308-1 ^e	96801-16 ^f 99839-16 ^g	99944-16 ⁱ 99948-16 ⁱ 99969-16 ^k		99097-1¹ 99094-1™	52621-16° 95650-16°	52975-1*p	52800-16 ^q	27774-16 ^r 27744-16 ^s	27750-16 ^t 27771-16 ^u
52308-1 ^d 35308-1 ^e	96801-16 ^f 99839-16 ^g	99944-16 ⁱ 99948-16 ^j 99969-16 ^k		99097-1 ¹ 99094-1 ^m	52621-16 ⁿ 95650-16°	52975-1* ^p	52800-16 ^q	27774-16 [°] 27744-16 [°]	27750-16 ^t 27771-16 ^u
	96877-16 ^h	99944-16 ⁱ 99948-16 ^j 99969-16 ^k		99097-1 ¹ 99094-1 ^m	52621-16° 95650-16°	52975-1*p	52800-16 ^q	27774-16 ^r 27744-16 ^s	27750-16 ^t 27771-16 ^u
52308-1 ^d 35308-1 ^e	96801-16 ^f 99839-16 ^g	99944-16 ⁱ 99948-16 ^j 99969-16 ^k		99097-1 ¹ 99094-1 ^m	52621-16° 95650-16°	52975-1*p	52800-16 ^q	27774-16 ^r 27744-16 ^s	27750-16 ^t 27771-16 ^u

Section Continued



- Cam and Lifter Kit, includes installation lubricants.
- Cam and Lifter Kit, includes assembly lubricant
- Optional Hi Intensity hydraulic liferers, see page 292 for details.
 For 70-77 351C-351M-400 engines, contains standard diameter valve springs, no machining required.
- e For 71-72 Boss 351 and 79-82 351M-400 engines, contains standard diameter valve springs, no machining required.
- Standard diameter valve springs, no machining required.
- Optional high rate 1.800" assembly height springs.
- Must machine cylinder heads. 11/32" type, see **IMPORTANT NOTE** for correct application.
- 3/8" type, see **IMPORTANT NOTE** for correct application.
- Requires Crane Multi Fit valve locks.
- Machined steel, heat treated 11/32" single groove type, see IMPORTANT NOTE for correct application.
- m Machined steel, heat treated, Multi Fit 11/32" single groove type, see IMPORTANT NOTE for correct application.
- For 70-74 351C, heavy wall, heat treated, for use with or without pushrod guideplate cylinder

- Pro Series one-piece, for 71-72 Boss 351, for use with or without pushrod guideplate cylinder heads.

- Performance steel billet gears and roller chain set.
 1.71 ratio, for 351C-351M-400 engines, pedestal mount, non-adjustable.
 Crane Classic extruded, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.
- Energizer 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite
- 1.73 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.
- 1.73 ratio Wide Body, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.

						COM	PLETE CA	AM SPE	CIFICATI	ONS		
		Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 293	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Gross Lift Int.	
	Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
	draulic Lifter Camshaf mid range HP, fair idle, moderate performance		2600	13305*	00200 16	220	204	112	7 41	000	FFA	
usage er, 340	, mild bracket racing, auto trans w/2500+ convert- 00-3800 cruise RPM, 9.5 to 11.0 compression ratio	Energizer 284 H12	2600- 6400	133052*a	99280-16 99380-16*d	228 228	284 284	112	7 41 51 (3)	.000	.554 .554	
advise	d.			3								
forma verter	mid range to upper RPM HP, fair idle, moderate per- nce usage, bracket racing, auto trans w/2500+ con- . 3400-3800 cruise RPM, 10.0 to 11.5 compression dvised. Good w/nitrous, also mild supercharged.	Н-292-2	2800- 6600	524551*	99280-16 99380-16*d	230 234	292 296	114	6 44 56 (2)	.000	.536 .545	
	upper RPM HP, rough idle, performance usage,	H-238/3347-10	3200-	520641*	99280-16	238	294	110	14 44	.000	.579	
bracke w/300	tracing, oval track 3/8-1/2 mile, auto trans 00+ converter, 3400-3800 cruise RPM, 10.75 to ompression ratio advised.	11-230/3347-10	6800	\$	99380-16*d	238	294	110	54 4		.579	
Rough	n idle, performance usage, good upper RPM HP, et racing, auto trans w/3500+ converter, 11.25 to	H-250/340-2S-10	3600- 7200	520651*	99280-16 99380-16*d	250 254	310 314	110	20 50 62 12	.000	.588 .595	
13.0 c	ompression ratio advised.		7200	•	77300-10	234	314		02 12	.000	.575	
Hyd	draulic Roller Camsha	fts — Retrofit		·								
Excell usage ing, m	ent low end torque and HP, good idle, daily , performance and fuel efficiency, off road, tow- nild turbocharged, 2400-3200 cruise RPM, 8.75 0 compression ratio advised.	HR-216/325-2S-12	1600- 5600	529541*b,c	36532-16°	216 224	278 286	112	1 35 49 (5)	.000 .000	.562 .586	
erate trans	low and mid range torque and HP, fair idle, mod- performance usage, mild bracket racing, auto w/2000+ converter, 2800-3400 cruise RPM, 9.5 75 compression ratio advised.	HR-224/339-2S-12	2000- 6000	529551*b,c	36532-16°	224 232	286 294	112	5 39 53 (1)	.000	.586 .609	
perfor w/250	mid range torque and HP, fair idle, moderate rmance usage, mild bracket racing, auto trans 30+ converter, 3200-3800 cruise RPM, 10.0 to compression ratio advised.	HR-228/345-2S-12	2500- 6500	529801*b,c	36532-16°	228 232	290 294	112	7 41 53 (1)	.000	.597 .609	
idle, r	mid range to upper RPM torque and HP, rough adical street, bracket racing, auto trans w/2500+rter, 3400-4000 cruise RPM, 10.0 to 11.5 comon ratio advised.	HR-232/352-2S-10	2600- 6800	529821*b,c	36532-16°	232 236	294 298	110	11 41 53 3	.000	.609 .621	
idle, p	mid range to upper RPM torque and HP, rough performance usage, mild bracket racing, auto w/3000+ converter, 3600-4200 cruise RPM, 10.5 0 compression ratio advised.	HR-236/359-2S-12	3000- 7000	529811*b,c	36532-16°	236 240	298 302	112	11 45 57 3	.000 .000	.621 .631	
and H 4200-	idle, performance usage, good upper RPM torque P, bracket racing, auto trans w/3500+ converter, 5000 cruise RPM, good with aftermarket cylinder , 11.0 to 12.5 compression ratio advised.	HR-240/365-2S-10	3200- 7200	529831*b,c	36532-16 ^e	240 244	302 306	110	15 45 57 7	.000	.631 .644	

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

IMPORTANT: If your hydraulic lifter preload is excessive, this can be easily remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details.

IMPORTANT: Crane offers a Pushrod Guideplate and Rocker Arm Stud Conversion Kit (52655-16) for street applications, enabling the 351C-351M-400 cu.in. engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. See page 325 for details. NOTE: To provide the most accurate valve adjustment on hydraulic lifter and hydraulic roller camshafts, the heads must be machined to accept 99159-16 screw-in studs and 52650-1 pushrod guideplates. Special length pushrods can be ordered to provide proper hydraulic lifter preload. Refer to page 305 for special pushrod ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 52975-1 timing chain and gear assembly, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

IMPORTANT NOTE: Many problems can occur if the proper valve spring retainers are not used on 351C-351M and 400 cu.in. engines. Ford made a number of production changes in these engines, possibly causing a misapplication of parts. Please refer to page 195 to insure that the proper components are being used.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	M ROCKERS — C/ Gold Race
	96877-16 ^f	99944-16 ⁹ 99948-16 ^h 99969-16 ⁱ	99820-16 ^f	99097-1 ^j 99094-1 ^k	52621-16 ^m 95650-16 ⁿ	52975-1* ^r	52800-16 ^s	27774-16 ^t 27744-16 ^u	27750-16 ^v 27771-16 ^w
	96877-16 ^f	99944-16 ⁹ 99948-16 ^h 99969-16 ⁱ	99820-16 ^f	99097-1 ^j 99094-1 ^k	52621-16 ^m 95650-16 ⁿ	52975-1* ^r	52800-16 ^s	27774-16 ^t 27744-16 ^u	27750-16 ^v 27771-16 ^w
	96877-16 ^f	99944-16 ⁹ 99948-16 ^h 99969-16 ⁱ	99820-16 ^f	99097-1 ^j 99094-1 ^k	52621-16 ^m 95650-16 ⁿ	52975-1* ^r	52800-16 ^s	27774-16 ^t 27744-16 ^u	27750-16 ^v 27771-16 ^w
	96877-16 ^f	99944-16 ⁹ 99948-16 ^h 99969-16 ⁱ	99820-16 ^f	99097-1 ^j 99094-1 ^k	52621-16 ^m 95650-16 ⁿ	52975-1* ^r	52800-16 ^s	27774-16 ^t 27744-16 ^u	27750-16 ^v 27771-16 ^w
	99890-16 ^f	99970-16 ¹	99820-16 ^f	99094-1 ^k	95654-16° 95658-16° 95636-16°	52975-1* ^r	52800-16 ^s	27774-16 ^t 27744-16 ^u	27750-16 ^v 27771-16 ^w
	99890-16 ^f	99970-16 ¹	99820-16 ^f	99094-1 ^k	95654-16° 95658-16° 95636-16°	52975-1* ^r	52800-16 ^s	27774-16 ^t 27744-16 ^u	27750-16 ^v 27771-16 ^w
	99890-16 ^f	99970-16 ¹	99820-16 ^f	99094-1 ^k	95654-16° 95658-16° 95636-16°	52975-1* ^r	52800-16 ^s	27774-16 ^t 27744-16 ^u	27750-16 ^v 27771-16 ^w
	99890-16 ^f	99970-16 ¹	99820-16 ^f	99094-1 ^k	95654-16° 95658-16° 95636-16°	52975-1* ^r	52800-16 ^s	27774-16 ^t 27744-16 ^u	27750-16 ^v 27771-16 ^w
	99890-16 ^f	99970-16 ¹	99820-16 ^f	99094-1 ^k	95654-16° 95658-16° 95636-16°	52975-1* ^r	52800-16 ^s	27774-16 ^t 27744-16 ^u	27750-16 ^v 27771-16 ^w
	99890-16 ^f	99970-16 ¹	99820-16 ^f	99094-1 ^k	95654-16° 95658-16° 95636-16°	52975-1* ^r	52800-16 ^s	27774-16 ^t 27744-16 ^u	27750-16 ^v 27771-16 ^w

- Cam and Lifter Kit, includes assembly lubricant.
- Camshaft has standard base circle diameter, for use with 36532-16 hydraulic roller lifters.
- Requires 52970-1 (.500"I.D.) or 52971-1 (.531"I.D.) steel or 52990-1 (.500"I.D.) or 52989-1 (.531"I.D.) aluminum-bronze distributor drive gear.
- Optional Hi Intensity hydraulic lifters, see page 292 for details.
- Vertical locking bar hydraulic roller lifters, no machining required. Appropriate pushrods required.
- Must machine cylinder heads.
- 11/32" type, see **IMPORTANT NOTE** for correct application.
- 3/8" type, see **IMPORTANT NOTE** for correct application.
- Requires Crane Multi Fit valve locks with 11/32" single groove valve stems. Machined steel, heat treated 11/32" single groove type, see **IMPORTANT NOTE** for correct application.
- Machined steel, heat treated, Multi Fit 11/32" single groove type, see **IMPORTANT NOTE** for correct
- Multi Fit type retainers. Use 99094-1 valve stem locks for single groove 11/32" applications, and standard valve stem locks for multiple groove 3/8" type applications. See IMPORTANT NOTE for correct application.
- m For 70-74 351C, heavy wall, heat treated.
- n Pro Series one-piece, for 71-72 Boss 351.

- o Pro Series, one-piece, for 71-82 351M-400 engines with non-adjustable pedestal-mount rocker
- Pro Series, one-piece, for 71-82 351M-400 engines with adjustable rocker arms with Crane's Pushrod Guideplate Conversion Kit (52655-16). See page 325 for details.
- Pro Series, one-piece, for 70-74 351C engines with adjustable rocker arms with Crane's Pushrod Guideplate Conversion Kit (52655-16). See page 325 for details.
- Performace steel billet gears and roller chain set.
- 1.71 ratio, for 351C-351M-400 engines, pedestal mount, non-adjustable.
- Crane Classic extruded, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.
- Energizer 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.

 1.73 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.

 1.73 ratio Wide Body, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.

					COM	PLETE C	AM SPE	CIFICATION	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Mechanical Lifter Camsh	afts						·			
Replacement for factory Boss 351 camshaft.	BluePrinted D1ZZ-6250-B	2000- 6000	520321°	99257-16	228 228	294 294	109	3 45 55 (7)	.024 .026	
Good low end and mid range torque and HP, fair idle, moderate performance usage, limited oval track, mild bracket racing, auto trans w/2000+ converter, 3200- 3600 cruise RPM, 10.0 to 11.0 compression raito advised.	F-232/330-25-8	2800- 6600	521131*	99257-16	232 238	264 270	108	(5) 29 44 (10)	.020 .022	.571 .581
Good low end and mid range torque and HP, fair idle, moderate performance usage, limited oval track, mild bracket racing, auto trans w/2500+ converter, 3400- 3800 cruise RPM, 10.5 to 11.5 compression raito advised.	F-238/3200-2-8	2800- 6600	521141*	99257-16	238 248	300 310	108	16 42 57 11	.022 .022	
Good mid range torque and HP, rough idle, performance usage, short oval track, bracket racing, auto trans w/3500+ converter, 11.0 to 12.5 compression raito advised.	F-246/3294-2-8	3200- 7000	521211*	99257-16	246 256	282 292	108	18 48 59 17	.026 .026	.570 .590
Good mid range to upper RPM torque and HP, rough idle, performance usage, bracket racing, auto trans w/race converter, also mild nitrous, mild supercharged, 11.5 minimum compression ratio advised.	F-256/3634-251-10	4000- 7500	521321°	99257-16	256 266	292 302	110	22 54 66 20		.629 .610
Good mid range to upper RPM HP, performance usage, 1/4 - 1/2 mile oval track, bracket racing, auto trans w/race converter, 11.5 minimum compression ratio advised.	F-260/3694-6	4200- 7600	521421*	99257-16	260 260	296 296	106	26 54 58 22		.639 .639
Competition only, good mid and upper RPM torque and HP, flat tappet restricted classes, bracket racing, 1/2 - 5/8 mile oval track, good with aftermarket cylinder heads, auto trans w/race converter, 12.0 minimum compression ratio advised.	F-266/400-2S-8	4600- 8000	521501°	99257-16	266 276	298 312	108	30 56 70 26	.018 .018	.692 .702
Radical competition only, good upper RPM torque and HP, flat tappet restricted classes, bracket racing, good with aftermarket cylinder heads, auto trans w/race converter, 12.5 minimum compression ratio advised.	F-276/3934-8	4800- 8200	521631°	99257-16	276 276	312 312	108	33 63 69 27		.681 .681

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: In order to effect valve adjustment on 351C-351M-400 cu.in. engines when using mechanical lifter camshafts, the heads must be machined to accept 99159-16 screw-in studs and

52650-1 pushrod guideplates.

NOTE: On engines with cylinder heads equipped with exhaust valve rotators, valve springs and retainers must be changed to allow for proper valve travel.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 52975-1 timing chain and gear assembly, a pre-1972 crankshaft

sprocket, or degreeing in your camshaft. The **non-retarded** sprocket will have the alignment dot and keyway slot directly in line with each other.

IMPORTANT NOTE: Many problems can occur if the proper valve spring retainers are not used on 351C-351M and 400 cu.in. engines. Ford made a number of production changes in these engines, possibly causing a misapplication of parts. Please refer to page 195 to insure that the proper components are being used.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 31
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	96870-16ª	99969-16 ^b	99820-16ª	99094-1 ^c	52621-16 ^d 95650-16 ^e	52975-1* ^f		27774-16 ⁹	27750-1 27771-1
	96870-16ª	99969-16 ^b	99820-16ª	99094-1	52621-16 ^d 95650-16 ^e	52975-1*f		27774-16 ⁹	27750-1 27771-1
	96870-16ª	99969-16 ^b	99820-16ª	99094-1	52621-16 ^d 95650-16 ^e	52975-1*f		27774-16 ⁹	27750-1 27771-1
	96870-16ª	99969-16 ^b	99820-16ª	99094-1	52621-16 ^d 95650-16 ^e	52975-1*f		27774-16 ⁹	27750-1 27771-1
	96870-16ª	99969-16 ^b	99820-16ª	99094-1	52621-16 ^d 95650-16 ^e	52975-1*f		27774-16 ⁹	27750-1 27771-1
	96870-16ª	99969-16 ^b	99820-16ª	99094-1°	52621-16 ^d 95650-16 ^e	52975-1*f		27774-16 ⁹	27750-1 27771-1
	96870-16ª	99969-16 ^b	99820-16ª	99094-1°	52621-16 ^d 95650-16 ^e	52975-1*f		27774-16 ⁹	27750-1 27771-1
	96870-16ª	99969-16 ^b	99820-16ª	99094-1°	52621-16 ^d 95650-16 ^e	52975-1*f		27774-16 ⁹	27750-1 27771-1

a Must machine cylinder heads.

Requires appropriate Crane Multi Fit valve locks, see IMPORTANT NOTE for correct application.
 Machined steel, heat treated, Multi Fit 11/32" single groove type, see IMPORTANT NOTE for correct

d For 70-74 351C, heavy wall, heat treated, for use with pushrod guideplate cylinder heads.

Pro Series one piece, for 71-72 Boss 351, for use with pushrod guideplate cylinder heads.

f Performance steel billet gears and roller chain set.

g Crane Classic extruded, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.

h 1.73 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.
 i 1.73 ratio Wide Body, requires 7/16" rocker arm studs and pushrod guideplates. See notes on op-

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Mechanical Roller Camsh	afts									
Good low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 10.5 to 11.5 compression ratio advised.	SR-238/350-2S-12	2800- 6800	528511*a	44518-16 44570-16 ^b	238 246	288 296	112	12 46 60 6	.020 .020	
Good mid range torque and HP, rough idle, moderate performance usage, short oval track, bracket racing, auto trans w/3000+ converter, 11.0 to 12.5 compression ratio advised.	R-246/3236-2-8	3200- 7200	528371*a	44518-16 44570-16 ^b	246 256	284 294	108	20 46 61 15	.024 .026	.560 .585
Good mid range torque and HP, rough idle, moderate performance usage, mild bracket racing, auto trans w/3000+ converter, 3600-4000 cruise RPM, 11.0 to 12.0 compression ratio advised.	SR-246/362-25-12	3200- 7200	528521*a	44518-16 44570-16 ^b	246 254	296 304	112	16 50 64 10	.020 .020	.626 .647
Good mid range torque and HP, rough idle, performance usage, oval track, bracket racing, auto trans w/race converter, 11.5 to 12.5 compression ratio advised.	R-252/420-2-8	3600- 7600	528801*a	44518-16 44570-16 ^b	252 262	284 294	108	22 50 63 19		.727 .727
Good mid range to upper RPM torque and HP, rough idle, performance usage, oval track, bracket racing, auto trans w/race converter, 12.0 minimum compression ratio advised.	R-262/420-2-8	4000- 8000	528811*a	44518-16 44570-16 ^b	262 272	294 304	108	27 55 68 24		.727 .727
Competition only, good mid range to upper RPM torque and HP, bracket racing, NMRA, NMCA, auto trans w/race converter, 12.5 minimum compression ratio advised.	R-262/4381-25-8	4200- 8200	528411*a	44518-16 44570-16 ^b	262 268	294 300	108	26 56 65 23	.026 .022	.758 .758
Competition only, good upper RPM HP, bracket racing, auto trans w/race converter, 12.5 minimum compression ratio advised.	R-272/420-2-8	4400- 8200	528821*a	44570-16 ^b	272 282	304 314	108	32 60 73 29	.020 .020	.727 .727
Radical competition only, good upper RPM HP, bracket racing, NMCA, NMRA, good with nitrous, auto trans w/race converter, 13.5 minimum compression ratio advised.	R-278/5002-25-12	4600- 8400	528831" ^a	44570-16 ^b	278 292	306 320	112	32 66 83 29		.865 .865
Radical competition only, good upper RPM HP, bracket racing, NMCA, NMRA, good w/ 400+ cu.in. and after-market cylinder heads, auto trans w/race converter, 14.0 minimum compression ratio advised.	R-282/5001-25-10	5000- 8800	528841*a	44570-16 ^b	282 286	314 318	110	33.5 68.5 78 28	.020 .016	.865 .832

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: In order to effect valve adjustment on 351C-351M-400 cu.in. engines when using roller lifter camshafts, the heads must be machined to accept 99159-16 screw-in studs & 52650-1 pushrod guideplates.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 52975-1 timing chain and gear assembly, a pre-1972 crankshaft sprocket, or degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

IMPORTANT NOTE: Many problems can occur if the proper valve spring retainers are not used on 351C-351M and 400 cu.in. engines. Ford made a number of production changes in these engines, possibly causing a misapplication of parts. Please refer to page 195 to insure that the proper components are being used.



CRANE VALV	E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	99893-16 ^c	99953-16° 99954-16 ^f	99820-16 ^d	99097-1 ⁱ 99094-1 ^j	52621-16 ^k 95650-16 ^l	52975-1* ^m		27774-16 ⁿ	27750-16° 27771-16°
	99893-16°	99953-16° 99954-16 ^f	99820-16 ^d	99097-1 ⁱ 99094-1 ^j	52621-16 ^k 95650-16 ^l	52975-1* ^m		27774-16 ⁿ	27750-16° 27771-16 ^p
	99893-16 ^c	99953-16° 99954-16 ^f	99820-16 ^d	99097-1 ⁱ 99094-1 ^j	52621-16 ^k 95650-16 ^l	52975-1* ^m		27774-16 ⁿ	27750-16° 27771-16 ^p
	99885-16 ^c	99956-16 ^e 99970-16 ^f	99820-16 ^d	99097-1 ⁱ 99094-1 ^j	52621-16 ^k 95650-16 ^l	52975-1* ^m		27774-16 ⁿ	27750-16° 27771-16 ^p
	99885-16°	99956-16° 99970-16 ^f	99820-16 ^d	99097-1 ⁱ 99094-1 ^j	52621-16 ^k 95650-16 ^l	52975-1*m		27774-16 ⁿ	27750-16° 27771-16°
	99885-16°	99956-16° 99970-16 ^f	99820-16 ^d	99097-1 ⁱ 99094-1 ^j	52621-16 ^k 95650-16 ^l	52975-1* ^m		27774-16 ⁿ	27750-16° 27771-16°
	99885-16°	99956-16° 99970-16 ^f	99820-16 ^d	99097-1 ⁱ 99094-1 ^j	52621-16 ^k 95650-16 ^l	52975-1*m		27774-16 ⁿ	27750-16° 27771-16°
	96888-16 ^c 961226-16 ^{c,d}	99681-16 ⁹ 99661-16 ⁵	99820-16 ^d	99097-1 ⁱ	52621-16 ^k 95650-16 ^l	52975-1* ^m			27750-16° 27771-16°
	96888-16 ^c 961226-16 ^{c,d}	99681-16 ⁹ 99661-16 ⁵	99820-16 ^d	99097-1 ⁱ	52621-16 ^k 95650-16 ^l	52975-1*m			27750-16° 27771-16 ^p

- Requires 52970-1 (.500"I.D.) or 52971-1 (.531"I.D.) steel, or 52990-1 (.500"I.D.) or 52989-1 (.531" I.D.) aluminum-bronze distributor drive gear.
- Ultra Pro Series roller lifters.

- Must machine rollier linters.

 Must machine cylinder heads.

 For 2.100" assembly height, requires 99661-16 titanium retainers.

 11/32" type, see IMPORTANT NOTE and page 195 for correct application.

 3/8" type, see IMPORTANT NOTE and page 195 for correct application.

 Titanium 11/32" type, must use 99097-1 valve stem locks, included with the retainers, see IMPOR-TANT NOTE for correct application.

 Titanium, for 961226-16 valve springs, requires Crane Multi Fit valve stem locks.

 Machined steel, heat treated 11/32" single groove type, see IMPORTANT NOTE for correct application.

- j Machined steel, heat treated Multi Fit 11/32" single groove type, see IMPORTANT NOTE for correct
- For 70-74 351C, heavy wall, heat treated, for use with pushrod guideplate cylinder heads.

- for 71-72 Boss 351, for use with or without pushrod guideplate cylinder heads.
 m Performance steel billet gears and roller chain set.
 n Crane Classic extruded, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.
- 1.73 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.
- 1.73 ratio Wide Body, requires 7/16" rocker arm studs and pushrod guideplates. See notes on op-

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	rpm Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 286 FOLLOWERS	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Valve Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Roller Followei	r Camshafts										
Good low end and mid range torque and HP, good idle, daily usage, off road, mild supercharged, mild nitrous, 2200–2600 cruise RPM.	HR-218/500-2-16	2000- 5000	379501*a		218 228	254 264	116	(2) 40 55 (7)	.000 .000	.500 .500	
Good mid range torque and HP, fair idle, performance usage, bracket racing, computer upgrades required, 2600-3000 cruise RPM.	HR-228/500-2S-12	2400- 6200	379511°a		228 234	264 270	112	7 41 54 0	.000	.500 .500	
Excellent low end torque and HP, smooth idle, daily usage, towing, 1600-2200 cruise RPM.	HR-212/550-2S-15	1600- 5500	379601"b		212 218	248 254	115	(4) 36 49 (11)	.000	.550 .550	
Good low end and mid range torque and HP, good idle, daily usage, off road, mild supercharged, mild nitrous, 2200-2600 cruise RPM.	HR-218/550-2-16	2000- 5800	379611°b		218 228	254 264	116	(2) 40 55 7	.000	.550 .550	
Good mid range torque and HP, fair idle, performance usage, bracket racing, auto w/2000+ converter, computer upgrades required, must check valve to piston clearance, 2600-3000 cruise RPM.	HR-228/550-2S-12	2400- 6200	379621*b		228 234	264 270	112	7 41 54 0	.000	.550 .550	
Good mid range to upper RPM torque and HP, rough idle, performance usage, bracket racing, auto w/2500+ converter, increased compression ratio required, computer upgrades required, must check valve to piston clearance, 2800-3400 cruise RPM. Also mild supercharged or nitrous.	HR-236/600-25-14	2800- 6600	379631*b		236 242	272 278	114	6 50 57 5	.000 .000	.600 .600	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

NOTE: Installing camshafts having greater than .500° valve lift in other than Performance Improvement 2V cylinder heads will require cylinder head machining to achieve correct valve spring assembly heights.

IMPORTANT NOTE: 1997 and later applications will require Ford bolt-on gears: Ford part number F8AZ-6256-AA for the right gear, and F8AZ-6256-BA for the left gear. One of the YF7Z-6279-AA bolt kits, two F1AZ-6278-A washers, and two F3AZ-6265-A spacers will also be required.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC/ ENERGIZER	ROCKERS — GOLD RACE
	37830-16°	37660-16 ^d							
	37830-16°	37660-16 ^d							
	37830-16°	37660-16 ^d							
	37830-16°	37660-16 ^d							
	37830-16°	37660-16 ^d							
	37830-16°	37660-16 ^d							
	3/030-10	3/000-10							

a Pair of camshafts for 1992 and later engines with standard cylinder heads. 1997 and later applications will require Ford bolt-on gears: Ford part number F8AZ-6256-AA for the right gear, and F8AZ-6256-BA for the left gear.

b Pair of camshafts for 1999 and later engines with Power Improvement cylinder heads. Requires Ford bolt-on gears: Ford part number F8AZ-6256-AA for the right gear, and F8AZ-6256-BA for the left gear.

Standard diameter ovate wire valve springs, no machining required. Can be used with stock valve spring retainers.

d Titanium retainers, for use with standard valve stem locks.

				COMPLETE CAM SPECIFICATIONS							
Application	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 286	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Clo @ .050 Valve Li	" Ho ft In	t Lift t. Int.	
Application	Grind Number	RANGE	Emissions Code	FOLLOWERS	Int/Exh.	Int/Exh.	Separation	Int/Ext	Ex	n. Exh.	
Hydraulic Roller Follower Good low end and mid range torque and HP, good idle, daily usage, off road, computer upgrades required, mild supercharged, mild nitrous, 2200-2600 cruise RPM.	* Camshafts HR-218/500-12	2000- 5800	409501*a,e 409502*b,e 409503*c,e 409504*d,e	•	218 218	254 254	112	(3) 4 ⁷ 41 (3		00 .500 00 .500	
Good low end and mid range torque and HP, good idle, daily usage, off road, computer upgrades required, mild supercharged, mild nitrous, 2600-3000 cruise RPM.	HR-228/500-12	2400- 6200	409511*a,e 409512*b,e 409513*c,e 409514*d,e	•	228 228	264 264	112	2 46 46 2			
Good mid range to upper RPM torque and HP, rough idle, performance usage, bracket racing, auto w/2500+ converter, increased compression ratio required, computer upgrades required, must check valve to piston clearance, 2800-3400 cruise RPM. Also mild supercharged or nitrous.	HR-234/500-12	2800- 6600	409521*a,e 409522*b,e 409523*c,e 409524*d,e	•	234 234	270 270	112	5 49 49 5			
Good mid range torque and HP for 5.7L, good idle, per- formance usage, off road, computer upgrades required, mild supercharged, mild nitrous, 2600-3200 cruise RPM.	HR-230/575-12	2400- 6200	409601*a,e,f 409602*b,e,f	•	230	266	112	3 47	' .00	0 .575	
Good mid range to upper RPM torque and HP for 5.7L, rough idle, performance usage, bracket racing, auto w/2500+ converter, increased compression ratio required, computer upgrades required, must check valve to piston clearance, 2800-3400 cruise RPM. Also mild supercharged or nitrous.	HR-234/575-12	2800- 6600	409611*a,e,f 409612*b,e,f	•	234	270	112	7 49	00. (0 .575	
Good upper RPM torque and HP for 5.7L, rough idle, per- formance usage, bracket racing, auto w/2800+ converter, increased compression ratio required, computer upgrades required, must check valve to piston clearance, 3000-3600 cruise RPM. Also mild supercharged or nitrous.	HR-238/575-12	3200- 6800	409621*a,e,f 409622*b,e,f	•	238	274	112	7 5	.00	0 .575	

Ford-Mercury V-8 05-10

4.6-5.4 Litre SOHC 3 Valve

Hydraulic Roller Followe	r Camshafts							
Good low end and mid range torque and HP, smooth idle, daily usage, 5.4L towing, 2200-2600 cruise RPM, valve spring upgrades required. Also mild supercharged or mild nitrous.	ZHR-208/468-2S-14	1800- 5000	399501 ^{*j}	204 224	256 272	114	(5) 33 51 (7)	.000 .468 .000 .516
Good mid range torque and HP, good idle, performance usage, bracket racing, good w/supercharger or mild nitrous, 2600-3000 cruise RPM, valve spring and computer upgrades required.	ZHR-216/492-2S-14	2200- 5400	399511° ^{j,k}	216 236	264 284	114	(1) 37 57 (1)	.000 .492 .000 .552
Good mid to upper RPM torque and HP, fair idle, performance usage, bracket racing, auto trans w2000+ converter, 11.0+ compression ratio advised, 3000-3600 cruise RPM, valve spring and computer upgrades required.	ZHR-228/528-2S-12	2600- 6200	399521° ^{j,k}	228 244	276 292	112	7 41 59 5	.000 .528 .000 .576
Good upper RPM HP, rough idle, performance usage, bracket racing, auto trans w2500+ converter, 11.0+ compression ratio advised, 3200-3800 cruise RPM, valve spring and computer upgrades required.	ZHR-236/552-2S-12	2800- 6600	399531"j.k	236 252	284 300	112	11 45 63 9	.000 .552 .000 .600

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT NOTE: The 4V high lift (.575") intake camshafts listed

are for use in 4.7 or 5.4L cylinder heads that have aftermarket intake valves with relocated valve lock grooves (with the valve tip extending 10.65mm above the groove). This permits the necessary assembly height required, without follower interference. IMPORTANT NOTE: In 3V applications, the use of stock pistons, cam phaser, and factory tuning can cause possible exhaust valve to piston contact when using performance camshafts. One, or more, of the following changes must occur: Install a fixed position cam gear that eliminates phaser retard; Install aftermarket pistons with increased piston to valve clearances; Install aftermarket tuning with altered phaser strategy.

NOTE: When changing 3-valve camshafts, use Ford timing chain and wedge handle ESST 303-636 and ESST 303-637 to hold chain in place. When changing valve springs, use Ford valve spring compressor ESST 303-1039.



CRANE VALV									
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 31.
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	N ROCKERS – C/ GOLD RACE
	40830-32 ^g	40660-32 ⁱ							
	40830-32 ⁹	40660-32 ⁱ							
	40020 229	40660 221							
	40830-329	40660-32 ⁱ							
	37830-16 ^h	37660-16 ⁱ							
	37830-16 ^h	37660-16 ⁱ							
	37830-16 ^h	37660-16 ⁱ							
	37830-24 ¹	39660-24 ^m							
	37830-24 ¹	39660-24 ^m							
	37830-24 ¹	39660-24 ^m							
	37830-24 ¹	39660-24 ^m							

- Left intake camshaft.
- Right intake camshaft.
- Left exhaust camshaft.
- Right exhaust camshaft.
- Install adjustable cam gears for best performance. Install aftermarket tuning to achieve desired
- performance levels.

 Intake valves with relocated keeper grooves must be installed, along with recommended valve springs and retainers.
- Standard diameter ovate wire valve springs, requires 40660-32 retainers.

- h Standard diameter ovate wire valve springs, requires 37660-16 retainers.
 i Titanium retainers, for use with standard valve stem locks.
 j Must install 37830-24 valve springs and 39660-24 valve spring retainers.
 k The use of stock pistons, cam phaser, and factory tuning can cause possible exhaust valve to piston contact. At least one of the following is necessary: Install a fixed position cam gear that eliminates phaser retard; Install aftermarket pistons with increased piston to valve clearance; Install aftermarket tuning with altered phaser strategy.
 I Standard diameter ovate wire valve springs requires 37660-24 retainers
- Standard diameter ovate wire valve springs, requires 37660-24 retainers.
- **m** Titanium retainers, for use with standard valve stem locks.

Ford Big Block V8 Tech Tips & Notes

1963-1976 352-360-390-406-410-427-428 FE V8

Ford's legendary big block FE engine series provided the foundation for their passenger car, truck and performance applications for nearly two decades. Actually, this series was introduced in 1958, with the early 332-352-390 FE engines having a different camshaft and cam drive configuration than the 1963-1976 engines, preventing their direct interchangeability. The early engines did not have a camshaft thrustplate, but relied on a spring to control cam endplay. These engines can use the later camshafts if the thrustplate is installed by removing the plugs in the front of the block on either side of the cam thrust surface, and tapping the holes for the 5/16-18 attaching bolts. A later model timing chain and gear set will also have to be installed.

There were also FT engines, used in truck applications. These were basically the same powerplants as the FE, but with four-ring pistons installed.

For marine usage, some left hand rotation engines were produced, requiring a special camshaft and distributor drive gear.

Crane's 34 prefix designates this engine series, with a full line of camshafts and valve train components available. Hydraulic, retrofit hydraulic roller, mechanical, and mechanical roller camshafts are offered.

Do not confuse the FE with the MEL engine family that Ford offered from 1958 to 1968 (383-410-430-462 cu.in.). Note that a 410 cu.in. engine was also included in that series. About the only common parts between the two engine families were the lifters and the rocker arms.

FE engines were factory equipped with either hydraulic and mechanical lifter camshafts from the factory, depending upon horsepower requirements. The factory adjustable shaft mounted rocker arms have a 1.76:1 ratio, while the non-adjustable rockers have a 1.73:1 ratio. Lifter bores are inline, as are the valves in the cylinder heads.

Oiling for the top end of the engine is directed up through passages in the block and heads, through the rocker shaft stands and shafts, then out via holes on the rocker arms.

Watch for the 1965-1967 side-oiler 427 engines (and some rare 390 versions) specifically designed for mechanical lifter only usage. These blocks do not have oil galleys to supply hydraulic lifters. Therefore, hydraulic and hydraulic roller camshafts and lifters can not be used. The camshafts used in these blocks also require grooves in the second and fourth cam bearing journals (.044" wide and .035" deep, with a .022" radius) for proper oiling.

Cylinder head configurations ranged from the basic lowrise, the drag race and oval track oriented high-rise, a medium-rise, and the tunnel port. All employed the same valve layout, so no camshaft changes were required. The rocker arm shaft stands varied per version, although the low-riser and the tunnel port did share the same components.

A thriving aftermarket provides sufficient components to

build an FE from scratch. We plan on supplying camshaft and valve train components for well into the future for this icon of Ford performance.

1963-1965 427 SOHC V8

Developed for oval track and drag racing, the single overhead cam 427 V8 was a real show of engineering force from Ford. Although this engine was banned from use at the big ovals, drag racing certainly benefited from this escalation of factory technology. Crane was fortunate to be involved in camshaft design for these engines from the beginning, and continues to custom produce camshafts for The "cammer". We also offer valve springs, retainers, and valve locks. Our 32-prefix designates these camshafts.

Based on a variant of the 427 FE side oiler block, the iron cylinder heads incorporate one camshaft per bank, actuating valves in a hemispherical combustion chamber via shaft mounted mechanical roller followers, which have an effective 1.32:1 ratio. Valve lash adjustments are achieved by installing varying thickness lash caps on top of the valves. Single and dual four barrel carbureted versions were factory produced. There were a limited number of aluminum cylinder heads produced for the factory supported racers, but these did not come installed on any engines.

Although never officially "factory" installed in any vehicles, connected outside contractors did obtain complete engines, and put them into Mustangs, Fairlanes, and Galaxies for sale to the racing community.

This engine is also experiencing a rebirth by the aftermarket, with numerous components being offered. Expect more reproduction parts to be available in the next year.

1968-1997 370-429-460 (7.5L) V8

The final Ford big block family is the 385 series. Replacing the FE, newer casting techniques were used, along with more efficient cylinder heads, and a lighter valve train.

Crane's 35 prefix indicates parts specific to these engines. Hydraulic, retrofit hydraulic roller, mechanical, and mechanical roller camshafts and a full line of valve train components are offered.

The lifter bores in the block are inline, but the valves are staggered in the cylinder heads for better breathing and combustion. The standard 1.73:1 ratio rocker arms are stamped steel and either stud mounted (1968-1971) or pedestal mounted (1972-1997). The rocker arms were primarily non-adjustable, with a few exceptions. The 1970-1971 Cobra Jet 429 engines had adjustable rocker arms and pushrod guideplates, while the 1970-1971 Super Cobra Jet 429's came equipped with mechanical lifter camshafts and adjustable rocker arms and guideplates.

Oiling for the top end of the engine is conducted through the lifters and pushrods, providing lubrication for the rocker arm pivots and valve springs.

The 1968-1971 engines are equipped with bottleneck configuration rocker arm studs. Our **99768-16** positive locking



nuts can be installed to permit individual valve adjustment. To conveniently convert the non-adjustable pedestal mounted rocker arm cylinder heads to a fully adjustable configuration, Crane offers two Pushrod Guideplate and Rocker Arm Stud conversion kits. Part number 52655-16 enables the installation of 7/16" stud mounted rocker arms and 5/16" diameter pushrods, while part number 35655-16 is for 7/16" stud mounted rocker arms and 3/8" diameter pushrods. Either set installs on the cylinder heads with no machining required, and are suitable for most street and moderate performance applications. For racing, we advise that the heads be machined for our 99159-16 7/16" diameter studs, and heat treated pushrod guideplates. There are also a number of aftermarket cylinder heads available that already include studs and guideplates, permitting full adjustment.

For serious racing applications, we offer 8620 steel billet camshafts with either the standard firing order (1-5-4-2-6-3-7-8), or the SFO1 firing order (1-5-4-8-6-3-7-2).

1969-1970 429 Boss Hemi V8

Available only in the Boss 429 Mustang and the Torino Talladega, this rare variation of the 385 series has a number of unique features. Although quite similar to the standard blocks, the Boss has a dry deck surface, requiring individual sealing rings at the cylinder head interface in order to properly seal around each cylinder, and also around each oil and water passage. The other feature of the Boss block is the oiling system, with oiling to the top end coming up through passages in the block, cylinder heads, and rocker arm shafts, not up the pushrods.

Crane's 30 prefix indicates parts specific to these engines. Hydraulic, retrofit hydraulic roller, mechanical, and mechanical roller camshafts and a full line of valve train components are offered. Even though the camshaft is interchangeable with the 385 series engines, the different rocker arm ratios and valve spring requirements necessitate a different specification card.

The "semi-hemi" cylinder heads are aluminum, and offered in oval track and street versions. The oval track heads had 1.75:1 ratio intake and exhaust rocker arms, with smaller diameter rocker shafts than the street version, which was equipped with 1.65:1 intake and 1.75:1 exhaust rocker arms. Different length pushrods are required for the intake and exhaust valves. Specific hydraulic and mechanical roller lifters are also required for proper pushrod clearance, due to the different angular displacement of the intake and exhaust pushrods.

For serious racing applications, we offer 8620 steel billet camshafts with either the standard firing order (1-5-4-2-6-3-7-8), or the SFO1 firing order (1-5-4-8-6-3-7-2).

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
A 15 15	Camshaft Series/	RPM POWER	Camshaft PART NUMBER/	See pg. 293	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	Open/Close @ .050" Cam Lift	Hot Int.	Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/Exh	Exh.	Exh.	
Hydraulic Lifter Camshaf Brute low end torque, F-150 pickup, smooth idle, daily	H-248-2	800-	343971*	00201 16	102	248	11.4	(12) 25	.000	460	
usage, fuel economy, 1600-2200 cruise RPM, 7.75 to 8.75 compression ratio advised.	п-240-2	4200	3439/1	99281-16	192 204	260	114	(13) 25 41 (17)	.000		
Good low end torque, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-260-2	1200- 4800	343901° 343902°a	99281-16	204 216	260 272	112	(5) 29 45 (9)	.000		
Good low and mid range torque, smooth idle, daily usage, light towing, off road, 2200-2700 cruise RPM, 8.5 to 10.0 compression ratio advised.	Energizer 266 H10	1400- 4800	13404* 134042*a	99281-16	210 210	266 266	110	0 30 40 (10)	.000 .000		
Good mid range torque, good idle, daily usage, off road, highway towing, fuel efficiency plus performance, 2600- 3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	Energizer 272 H10	1800- 5200	13405* 134052*a	99281-16	216 216	272 272	110	3 33 43 (7)	.000		
Good low and mid-range torque, good idle, daily usage and off road, towing, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.75 compression ratio advised.	H-272-2	1800- 5200	343941* 343942* ^a	99281-16	216 228	272 284	112	1 35 51 (3)	.000 .000	.533 .563	
Replacement for over-the-counter Ford Factory Performance camshaft (also referred to as SK-39789)	BluePrinted C8AX-6250-C	1800- 5200	340301	99281-16	220 230	278 290	116	(1) 41 56 (6)	.000	.498 .498	
Good mid-range torque, good idle, daily performance usage, mild bracket racing, 3000-3400 cruise RPM, 9.5 to 10.75 compression ratio advised.	H-278-2	2000- 5400	343801* 343802*a	99281-16 99381-16 ^{*b}	222 234	278 290	114	2 40 56 (2)	.000 .000		
Good mid-range torque and HP, fair idle, moderate performance usage, bracket racing, 3200-3600 cruise RPM, 9.5 to 11.0 compression ratio advised.	H-288	2200- 5600	344341* 344342*a	99281-16 99381-16 ^{*b}	226 226	288 288	112	6 40 50 (4)	.000		
Fair idle, performance usage, good mid-range HP, 3800- 4200 cruise RPM, 10.0 to 11.5 compression ratio advised.	H-296-2	2800- 6200	344621°	99281-16 99381-16*b	234 238	296 300	112	10 44 56 2	.000 .000		
Rough idle, performance usage, good mid-range and upper RPM torque and HP, auto trans w/2500+ converter, good with aftermarket aluminum cylinder heads, 3600- 4000 cruise RPM, 10.0 to 11.5 compression ratio advised.	H-298	3000- 6500	344561*	99281-16 99381-16*b	236 236	298 298	108	15 41 51 5	.000		
Performance usage, good upper RPM torque and HP, bracket racing, auto trans w/3500+ converter, good with aftermarket aluminum cylinder heads, 10.5 to 12.0 com- pression ratio advised.	H-246/330-10	3400- 6800	340721°	99281-16 99381-16 ^{*b}	246 246	308 308	110	18 48 58 8	.000 .000		

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Specify if late 62-406 cu.in. or 63-76 block is used, as the cam is different than the one used in 58-62 block.

NOTE: All grinds shown use the stock Ford 1.76 ratio adjustable rocker arms - Ford part number B8A-6564-B or Crane adjustable ductile iron rocker arms, 34772-16, in order to achieve the listed gross valve lift figures.

NOTE: To provide the most accurate valve adjustment on hydraulic lifter camshafts, the use of Crane adjustable rocker arms (34772-16 or 34791-1) and appropriate pushrods (34621-16 or 95819-16) is highly recommended.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: Some cylinder heads have removable lower spring seats with an inner spring step. This step must be removed to allow the inner springs to set flush with the outer springs.



	CRANE VALV	/E TRAIN CO	MPONENTS						
'	See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 32
	VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCKERS – Crane Classic/ Gold Energizer race
	13309-1	96801-16 ^c	99957-16 99969-16°	99822-16 ^d	99098-1 ^f	34621-16 ⁹ 95819-16 ^h		34772-16 ⁱ	34791-1 ^j
	13309-1 ^c	96801-16°	99957-16 99969-16°	99822-16 ^d	99098-1 ^f	34621-16 ⁹ 95819-16 ^h		34772-16 ⁱ	34791-1 ^j
	13309-1	96801-16 ^c	99957-16 99969-16°	99822-16 ^d	99098-1 ^f	34621-16 ⁹ 95819-16 ^h		34772-16 ⁱ	34791-1 ^j
	13309-1	96801-16 ^c	99957-16 99969-16°	99822-16 ^d	99098-1 ^f	34621-16 ⁹ 95819-16 ^h		34772-16 ⁱ	34791-1 ^j
	13309-1 ^c	96801-16°	99957-16 99969-16°	99822-16 ^d	99098-1 ^f	34621-16 ⁹ 95819-16 ^h		34772-16 ⁱ	34791-1 ^j
	13309-1 ^c	96801-16°	99957-16 99969-16°	99822-16 ^d	99098-1 ^f	34621-16 ⁹ 95819-16 ^h		34772-16 ⁱ	34791-1 ^j
	13309-1 ^c	96801-16°	99957-16 99969-16°	99822-16 ^d	99098-1 ^f	34621-16 ⁹ 95819-16 ^h		34772-16 ⁱ	34791-1 ^j
	13309-1 ^c	96801-16°	99957-16 99969-16°	99822-16 ^d	99098-1 ^f	34621-16 ⁹ 95819-16 ^h		34772-16 ⁱ	34791-1 ^j
		96877-16 ^d	99969-16°	99822-16 ^d	99098-1 ^f	34621-16 ⁹ 95819-16 ^h		34772-16 ⁱ	34791-1 ^j
		96877-16 ^d	99969-16°	99822-16 ^d	99098-1 ^f	34621-16 ⁹ 95819-16 ^h		34772-16 ⁱ	34791-1 ^j
		96877-16 ^d	99969-16°	99822-16 ^d	99098-1 ^f	34621-16 ^g 95819-16 ^h		34772-16 ⁱ	34791-1 ^j

Cam and Lifter Kit, includes installation lubricants.

Optional Hi Intensity hydraulic lifters, see page 292 for details.

Standard diameter valve springs, no machining required.

Must machine cylinder heads.

Requires **99098-1** valve locks. Machined steel, heat treated.

Heavy wall, heat treated, for use with **34772-16** adjustable rocker arms with ball type adjusters.

Pro Series one-piece, for use with **34791-1** adjustable rocker arms with cup type adjusters.

^{1.76} ratio, ductile iron, adjustable, requires appropriate **34645-16** Crane pushrods.

^{1.76} ratio, complete with shafts, stands, and hardware. For low rise and Edelbrock cylinder heads, requires appropriate **95819-16** Crane pushrods.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Roller Camsha	fts — Retrofit	t									
Good low end torque, smooth idle, daily usage, towing, economy, also mild turbocharged, 2200-3000 cruise RPM, 8.0 to 9.5 compression ratio advised.	HR-214/319-2S-12	1400- 5400	349511 ^{*a}	35532-16 ^b	214 222	276 284	112	0 34 48 (6)	.000 .000		
Excellent low and mid-range torque and HP, good idle, moderate performance usage, mild bracket racing, 2800- 3400 cruise RPM, 9.5 to 10.75 compression ratio advised.	HR-222/320-251-12	1800- 5600	349551*a	35532-16 ^b	222 226	286 290	112	3 39 49 (3)	.000		
Excellent low and mid-range torque and HP, fair idle, moderate performance usage, mild bracket racing, 3000- 3600 cruise RPM, good with aftermarket aluminum cylin- der heads, 10.0 to 11.5 compression ratio advised.	HR-226/3201-25-12	2000- 5800	349561" ^a	35532-16 ^b	226 236	290 302	112	5 41 54 2	.000 .000		
Excellent mid-range & upper RPM HP, lightweight kit car, rough idle, performance usage, good mid-range HP, mild bracket racing, auto trans w/2500+ converter, works well with aftermarket aluminum cylinder heads, 3600-4200 cruise RPM, 10.5 to 12.0 compression ratio advised.	HR-234/354-2S-12	2400- 6200	349571°a	35532-16 ^b	234 242	298 306	112	9 45 57 5	.000		
Good mid-range and upper RPM HP, lightweight kit car, rough idle, performance usage, mild bracket racing, auto trans w/3000+ converter, good with 450+ cu.in., good with aftermarket aluminum cylinder heads, 3800-4400 cruise RPM, 11.0 to 13.0 compression ratio advised.	HR-242/350-2S-12	2800- 6400	349581°a	35532-16 ^b	242 248	308 312	112	13 49 60 8	.000 .000		
Mechanical Lifter Camsh	afts										
Good mid range torque, fair idle, moderate performance usage, good low and mid-range HP, off road, bracket rac- ing, 3400-3800 cruise RPM, mild supercharged, 10.0 to 11.5 compression ratio advised.	F-238/3200-2-14	2400- 6000	341191°	99257-16 99256-16°	238 248	300 310	114	10 48 63 5	.026 .026		
Replacement for factory 425 HP, 427 cu.in. camshaft.	BluePrinted C3AZ-6250-AA	3000- 6600	340321*	99257-16 99256-16°	244 244	284 284	114	13 51 61 3	.018 .022		
Good mid range torque and HP, rough idle, moderate performance usage, good mid-range HP, 3600-4200 cruise RPM, 10.5 to 12.0 compression ratio advised.	F-248/3334-12	3400- 7000	340471*	99257-16 99256-16°	248 248	310 312	112	17 51 61 7	.026 .026		
Moderate competition only, good mid and upper RPM torque and HP, bracket racing, auto w/race converter, 11.5 to 12.5 compression ratio advised.	F-254/382-2S-10	3800- 7200	341341°	99257-16 99256-16°	254 262	286 298	110	22 52 65 17	.018 .018		
Moderate competition only, good mid and upper RPM HP, bracket racing, auto w/race converter, good with aftermarket aluminum cylinder heads, 12.0 minimum compression ratio advised.	F-266/3528-8	4200- 7600	341461°	99257-16 99256-16°	266 266	302 302	108	30 56 66 20	.026 .026		

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for détails.

NOTE: Specify if late 62-406 cu.in. or 63-76 block is used, as the cam is different than the one used in 58-62 block.

NOTE: All grinds shown use the stock Ford 1.76 ratio adjustable rocker arms - Ford part number B8A-6564-B or Crane adjustable ductile iron rocker arms, **34772-16**, in order to achieve the listed gross valve lift figures.

NOTE: To provide the most accurate valve adjustment on hydraulic roller camshafts, the use of Crane adjustable rocker arms (34772-16 or 34791-1) and appropriate pushrods (special order or 95805-16) is highly recommended.

NOTE: To effect valve adjustment with mechanical lifter camshafts, the use of Crane adjustable rocker arms (34772-16 or 34791-1) and the appropriate pushrods is required.

NOTE: In order to use these mechanical lifter camshafts in mechani-

cal lifter only side oiler type blocks, you must groove the center of #2 and #4 cam bearing journals with a .022" radius (.044" width) and .035" deep.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket.
This may cause idling and performance problems when installing aftermarket camshafts. We recommend using a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: Some cylinder heads have removable lower spring seats with an inner spring step. This step must be removed to allow the inner springs to set flush with the outer springs.



CRANE VALV	/E TRAIN CO	MPONENTS						
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 32
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCKERS - Crane Classic/ Gold Energizer Race
	99896-16 ^d 99832-16 ^e	99970-16 ^f 99976-16 ^g	99822-16 ^d	99099-1 ⁱ	j 95805-16 ^k		34772-16 ^p	34791-19
	99896-16 ^d 99832-16 ^e	99970-16 ^f 99976-16 ^g	99822-16 ^d	99099-1 ⁱ	^j 95805-16 ^k		34772-16 ^p	34791-1
	99896-16 ^d 99832-16 ^e	99970-16 ^f 99976-16 ^g	99822-16 ^d	99099-1 ⁱ	^j 95805-16 ^k		34772-16 ^p	34791-1
	99896-16 ^d 99832-16 ^e	99970-16 ^f 99976-16 ^g	99822-16 ^d	99099-1 ⁱ	j 95805-16 ^k		34772-16 ^p	34791-1
	99896-16 ^d 99832-16 ^e	99970-16 ^f 99976-16 ^g	99822-16 ^d	99099-1 ⁱ	^j 95805-16 ^k		34772-16 ^p	34791-1
	96877-16 ^d	99969-16 ^h	99822-16 ^d	99098-1 ⁱ	34621-16 ¹ 34622-16 ^m 95819-16 ⁿ 95847-16°		34772-16 ^p	34791-1
	96877-16 ^d	99969-16 ^h	99822-16 ^d	99098-1 ⁱ	34621-16 ¹ 34622-16 ^m 95819-16 ⁿ 95847-16°		34772-16 ^p	34791-1
	96877-16 ^d	99969-16 ^h	99822-16 ^d	99098-1 ⁱ	34621-16 ¹ 34622-16 ^m 95819-16 ⁿ 95847-16°		34772-16 ^p	34791-1
	96877-16 ^d	99969-16 ^h	99822-16 ^d	99098-1 ⁱ	34621-16 ¹ 34622-16 ^m 95819-16 ⁿ 95847-16°		34772-16 ^p	34791-1
	96877-16 ^d	99969-16 ^h	99822-16 ^d	99098-1 ⁱ	34621-16 ¹ 34622-16 ^m 95819-16 ⁿ 95847-16°		34772-16 ^p	34791-1

- Requires 34970-1 (.467"1.D.) steel, or 34990-1 (.467"1.D.) aluminum-bronze distributor drive gear, k
 and 7/16-14 x 1-1/8" grade 8 cam gear bolt and hardened washer.
- b Vertical locking bar hydraulic roller lifters, no machining required. Special length pushrods are required, refer to page 305 for special pushrod ordering instructions.
- Shell-type lifters, requires 34622-16 pushrods for 34772-16 rocker arms, or 95847-16 pushrods for 34791-1 rocker arms.
- **d** Must machine cylinder heads.
- e Ovate wire beehive spring, requires 99976-16 retainers.
- f Requires 99099-1 valve locks.
- g Steel, for 99832-16 beehive springs.
- h Requires 99098-1 valve locks.
- i Machined steel, heat treated.
- j Special length pushrods are required for standard non-adjustable or 34772-16 adjustable rocker arms. See page 305 for special pushrod ordering instructions.

- k For use with 34791-1 adjustable rocker arms with cup type adjusters.
- Heavy wall, heat treated, for use with 99257-16 lifters and 34772-16 adjustable rocker arms.
- m Heavý wall, heat treated, for use with 99256-16 lifters and 34772-16 adjustable rocker arms.
 n Pro Series one-piece, for use with 99257-16 lifters and 34791-1 adjustable rocker arms with cup type adjusters.
- Pro Series one-piece, for use with 99256-16 lifters and 34791-1 adjustable rocker arms with cup type adjusters.
- **p** 1.76 ratio, ductile iron, adjustable, requires appropriate Crane pushrods.
- q 1.76 ratio, with cup type adjusters, complete with shafts, stands, and hardware. For low rise and Edelbrock cylinder heads, requires appropriate Crane pushrods.

RPM Camshaft Duration Degrees Degrees @ .C Camshaft Series/ POWER PART NUMBER/ @ .050" Duration Lobe Cam Application Grind Number RANGE Emissions Code LIFTERS Int/Exh. Int/Exh. Separation Int/ Mechanical Roller Camshafts	49 5	.020 .020	Gross Lift Int. Exh.
Excellent low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2800+ converter, 3200-3600 cruise rpm, 10.5 to 11.5 compression ratio advised.	5 49	.020	
moderate performance usage, mild bracket racing, auto 6600 35570-16 ^b 248 298 63 trans w/2800+ converter, 3200-3600 cruise rpm, 10.5 to 11.5 compression ratio advised.	5 49	.020	
Evaluat mid range targue and UD frigidle moderate CD 249/263 25 10 2000 249521 a 20510 16 240 205 110 10			
performance usage, bracket racing, auto trans w/3500+ 6800 35570-16 ^b 256 292 63 converter, 3800-4200 cruise RPM, 11.0 to 12.0 compression ratio advised.		.020	.637 .658
Good mid range torque and HP, rough idle, performance usage, bracket racing, auto trans w/3500+ converter, 11.0 8 22 420-2-8 7200 8 35570-16 262 294 63 to 12.5 compression ratio advised.		.020 .020	
Good mid range HP, rough idle, performance usage, bracket racing, auto trans w/race converter, also large plate or manifold nitrous system, 12.0 minimum compression ratio advised.		.020 .020	
Competition only, good upper RPM HP, bracket racing, auto trans w/race converter, also manifold nitrous system, good with aftermarket aluminum cylinder heads, 12.0 minimum compression ratio advised. R-266/420-2-10 4200- 348831*a 30518-16 266 298 110 27 308 72		.020 .020	.739 .739
Competition only, good upper RPM HP, bracket racing, auto trans w/race converter, also large manifold nitrous system, good with aftermarket aluminum cylinder heads, 12.5 minimum compression ratio advised. R-276/420-2-10 4600- 8200 348841*a 30518-16 276 308 318 77 37 39570-16* 38570-16* 38570-16* 38570-16* 39570-16		.020 .020	.739 .739
Competition only, good upper RPM HP, manual trans or auto trans w/race converter and trans brake, good with aftermarket aluminum cylinder heads, 13.0 minimum compression ratio advised. R-276/4334-252-10 4800-348291*a 35570-16*b 276 316 110 31 282 322 74			.763 .727
Competition only, good upper RPM HP, manual trans or auto trans w/race converter and trans brake, good with aftermarket aluminum cylinder heads, 13.0 minimum compression ratio advised.		.028 .026	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.
IMPORTANT: Adjustable Vacuum Advance Kit available. See page

333 for details.

NOTE: Specify if late 62-406 cu.in. or 63-76 block is used, as the cam is different than the one used in 58-62 block.

NOTE: In order to use these camshafts in mechanical lifter only side oiler type blocks, you must groove the center of #2 and #4 cam bearing journals with a .022" radius (.044" width) and .035" deep.

NOTE: All grinds shown use the stock Ford 1.76 ratio adjustable rocker arms - Ford part number B8A-6564-B or Crane adjustable ductile iron rocker arms, 34772-16, in order to achieve the listed gross valve lift figures.

NOTE: To effect valve adjustment with roller lifter camshafts, the use of Crane adjustable rocker arms (34772-16 or 34791-1) and appropriate pushrods (34641-16 or 95818-16) is required.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: Some cylinder heads have removable lower spring seats with an inner spring step. This step must be removed to allow the inner springs to set flush with the outer springs.



CRANE VALV	/F TRAIN.CO	MPONENTS						
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315 See pg. 32
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	CAST ROCKER ARMS	— ALUMINUM ROCKERS Crane Classic/ Gold Energizer Race
	99893-16 99832-16 ^c	99954-16 99976-16 ^f	99822-16 ^d	99098-1 ⁱ	34641-16 ⁱ 95818-16 ^k		34772-16 ¹	34791-1
	99893-16 99832-16 ^c	99954-16 99976-16 ^f	99822-16 ^d	99098-1 ⁱ	34641-16 ⁱ 95818-16 ^k		34772-16 ¹	34791-1
	96886-16 ^d	99955-16	99822-16 ^d	99098-1 ⁱ	34641-16 ⁱ 95818-16 ^k		34772-16 ¹	34791-1'
	96886-16 ^d	99955-16	99822-16 ^d	99098-1 ⁱ	34641-16 ⁱ 95818-16 ^k		34772-16 ¹	34791-1'
	96886-16 ^d	99955-16	99822-16 ^d	99098-1 ⁱ	34641-16 ^j 95818-16 ^k		34772-16 ¹	34791-1
	96886-16 ^d	99955-16	99822-16 ^d	99098-1 ⁱ	34641-16 ^j 95818-16 ^k		34772-16 ¹	34791-1'
	96880-16 ^d 961246-16 ^e	99679-16 ⁹ 99662-16 ^h	99822-16 ^d	99098-1 ⁱ	34641-16 ^j 95818-16 ^k		34772-16 ¹	34791-1
	96880-16 ^d 961246-16 ^e	99679-16 ^g 99662-16 ^h	99822-16 ^d	99098-1 ⁱ	34641-16 ⁱ 95818-16 ^k		34772-16 ¹	34791-1'

Ultra Pro Series roller lifters.

Must machine cylinder heads.

Steel for 99832-16 beehive springs.

Machined steel, heat treated.

For use with 34772-16 adjustable rocker arms, heavy wall, heat treated.

k Pro Series one-piece, for use with 34791-1 adjustable rocker arms with cup type adjusters.

I 1.76 ratio, ductile iron, adjustable, requires appropriate **34641-16** Crane pushrods.

Requires 34970-1 (.467" l.D.) steel, or 34990-1 (.467" l.D.) aluminum-bronze distributor drive gear, h Titanium, for 961246-16 valve springs. and 7/16-14 x 1-1/8" grade 8 cam gear bolt and hardened washer.

Ovate wire beehive spring, requires 99976-16 retainers.

Triple, for 2.050" assembly height, requires **99662-16** titanium retainers.

Must use 99098-1 valve stem locks, included with the retainers.

m 1.76 ratio, with cup type adjusters, complete with shafts, stands, and hardware. For low rise and Edelbrock cylinder heads, requires appropriate 95818-16 Crane pushrods.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Lifter Camshaf		KANGE	ETHISSIONS Code	LIFIERS	IIIL/EXII.	IIIL/EXII.	Separation	IIIL/EXII	EXII.	EXII.
	H-192/2667-25-10	800- 4200	350501°	99280-16°	192 204	248 260	110	(9) 21 37 (13)		.456 .487
Good low end torque, smooth idle, daily usage, EFI compatible, off road, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-260-2	1200- 4800	353901* 353902*a	99280-16°	204 216	260 272	112	(5) 29 45 (9)	.000	.487 .518
Good low end torque, towing, good idle, daily usage, mild off road, economy, good low and mid-range torque and HP, also mild turbocharged, 2400-2800 cruise RPM, 8.5 to 10.0 compression ratio advised.	H-266-2	1400- 5000	353931* 353932*a	99280-16°	210 218	266 274	114	(4) 34 48 (10)	.000 .000	.487 .504
Excellent low end and mid range torque and HP, good idle, daily usage and off road, towing, performance and fuel efficiency, marine performance, mild supercharged, 2200-2600 cruise RPM, 8.75 to 10.5 compression ratio advised.	H-272-2	1800- 5400	353941* 353942*a	99280-16 ^c	216 228	272 284	112	1 35 51 (3)		.518 .513
Fair idle, performance usage, good mid-range torque and HP, auto w/2200+ converter, 3200-3600 cruise RPM, serious off road, heavy limited oval track, bracket racing: Street, Heavy; 9.0 to 10.5 compression ratio advised.	H-226/314-2-8	2200- 5800	350541*	99280-16 ^c 99380-16 ^{c,d}	226 236	286 296	108	10 36 51 5	.000 .000	.537 .556
Fair idle, performance usage, good mid-range HP, auto w/2500+ converter, 3400-3800 cruise RPM, oval track: Street Stock, Enduro, Hobby, 1/4-3/8 mile; bracket racing: Street, Heavy, Pro E.T., Super E.T.; Also mild supercharged, 9.5 to 11.0 compression ratio advised.	H-288-2	2400- 6000	354551° 354552°b	99280-16 ^c 99380-16 ^{c,d}	226 230	288 292	112	6 40 52 (2)	.000 .000	.522 .530

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.
IMPORTANT: Adjustable Vacuum Advance Kit available. See page

333 for details.

IMPORTANT: Check your hydraulic lifter preload, with your original pushrods, to first determine if different pushrods may be required. On 72-97 engines, if your hydraulic lifter preload is excessive, this can be remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details.

IMPORTANT: Crane offers Pushrod Guideplate and Rocker Arm Stud Conversion Kits, (35655-16 and 52655-16) for street applications, enabling the 370-429-460 cu.in. engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. See page 325 for details.

NOTE: To provide the most accurate valve adjustment on hydraulic lifter camshafts, in other than 429 Super C.J. engines a method of effecting valve adjustment is required. On 68-71 engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. On 72-97 engines, the heads must be machined to use 99159-16 screw-in studs and pushrod guideplates. Special length pushrods can be ordered to provide proper

hydraulic lifter preload. Refer to page 305 for special pushrod ordering instructions, and page 374 for checking your hydraulic lifter preload.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our **35975-1** timing chain and gear set, a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: These camshafts also fit the 1969-70 Ford 429 Boss Hemi V-8 engines. Some kit components will differ. Contact Crane's Performance Consultants for details.



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CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 31.
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN CRANE CLASSIC ENERGIZER	
35308-1°	96801-16° 99839-16 ^f	99944-16 99969-16 ⁹	99820-16 ^h	99097-1 ⁱ 99094-1 ^j	35622-16 ^k 35621-16 ^l	35975-1* ⁿ	52800-16°	27774-16 ^p 27744-16 ^q	27750-10 27771-10
35308-1°	96801-16 ^e 99839-16 ^f	99944-16 99969-16 ⁹	99820-16 ^h	99097-1 ⁱ 99094-1 ^j	35622-16 ^k 35621-16 ^l	35975-1*n	52800-16°	27774-16 ^p 27744-16 ^q	27750-16 27771-16
35308-1°	96801-16° 99839-16 ^f	99944-16 99969-16 ⁹	99820-16 ^h	99097-1 ⁱ 99094-1 ^j	35622-16 ^k 35621-16 ^l	35975-1*n	52800-16°	27774-16 ^p 27744-16 ^q	27750-10 27771-10
35308-1°	96801-16° 99839-16 ^f	99944-16 99969-16 ⁹	99820-16 ^h	99097-1 ⁱ 99094-1 ^j	35622-16 ^k 35621-16 ^l	35975-1* ⁿ	52800-16°	27774-16 ^p 27744-16 ^q	27750-1 27771-1
	99893-16	99953-16	99820-16 ^h	99097-1 ⁱ	35622-16 ^k 35621-16 ^l 95653-16 ^m	35975-1*n	52800-16°	27774-16 ^p 27744-16 ^q	27750-10 27771-10
	99893-16	99953-16	99820-16 ^h	99097-1 ⁱ	35622-16 ^k 35621-16 ^l 95653-16 ^m	35975-1*n	52800-16°	27774-16 ^p 27744-16 ^q	27750-1 27771-1

Section Continued



- Cam and Lifter Kit, includes installation lubricants.

- Cam, lifter, valve spring, and retainer kit, includes installation lubricants.

 May require appropriate Crane pushrods, see IMPORTANT NOTE on opposite page.

 Optional Hi Intensity hydraulic lifters, see page 292 for details.

 Contains standard diameter valve springs, no machining required for installation.

 Optional 1.800" assembly height springs, requires 99969-16 retainers and 99094-1 valve locks.

 Requires 99094-1 Multi Fit valve locks.
- Must machine cylinder heads.
- Machined steel, heat treated. Machined steel, heat treated Multi Fit.
- Heavy wall, heat treated, for non-guideplate or guideplate cylinder heads.
- For 429 Super CJ, heavy wall, heat treated, for use with pushrod guideplate cylinder heads.
- Pro Series one-piece, for use with pushrod guideplate cylinder heads.
- Performance steel billet gears and roller chain set.

- o 1.71 ratio, pedestal mount, non-adjustable, for 72-97 engines.
- 1.71 ratio, pedestal mount, non-adjustable, for 72-97 engines.
 Crane Classic extruded, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.
 Energizer, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer Available, see page 363.
 1.73 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.
 1.73 ratio Wide Body, requires 7/16" rocker arm studs and pushrod guideplates. Valve Train Stabilizer available. see page 363.

- available, see page 363.

					СОМ	PLETE C	AM SPE	CIFICAT	IONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf	its										
Fair idle, performance usage, good mid-range HP, 3600- 4000 cruise RPM, auto w/3000+ converter, bracket rac- ing: Pro E.T., Super E.T., Super Pro; good with plate nitrous system, 11.0 to 12.0 compression ratio advised. Good with supercharger, 15 lbs. maximum boost w/8.5 maximum compression ratio advised.	H-230/318-2-14	2600- 6200	350551*	99280-16 ^b 99380-16 ^{b,c}	230 240	290 300	114	6 44 59 1	.000 .000		
Fair idle, performance usage, good mid-range HP, 3800- 4200 cruise RPM, auto w/3000+ converter, oval track: Street Stock, Enduro, Hobby, 3/8-1/2 mile; bracket racing: Pro E.T., Super E.T., Super Pro, Hot Rod; 10.0 to 11.5 com- pression ratio advised.	H-296-2	3000- 6600	354561° 354562°a	99280-16 ^b 99380-16 ^{b,c}	236 240	296 300	110	13 43 55 5	.000 .000	.556 .563	
Performance usage, good upper RPM HP, rough idle, bracket racing, auto w/race converter, good with mani- fold nitrous system, 11.5 to 13.0 compression ratio advised.	H-244/3439-25-12	3200- 6800	350561*	99280-16 ^b 99380-16 ^{b,c}	244 252	300 308	112	15 49 63 9	.000 .000	.588 .599	
Performance usage, good upper RPM HP, bracket racing, auto w/race converter, aluminum cylinder heads advised, 12.0 to 13.5 compression ratio advised.	H-248/3500-8	3400- 7000	350681°	99280-16 ^b 99380-16 ^{b,c}	248 248	304 304	108	21 47 57 11	.000 .000	.599 .599	
Performance usage, good upper RPM HP, drag racing, auto w/race converter, good with manifold nitrous system, aluminum cylinder heads recommended, 13.5 to 14.5 compression ratio advised. Good w/Roots supercharger, 22 lbs. maximum boost w/8.5 maximum compression ratio advised.	H-252/364-25-12	3800- 7200	350571°	99280-16 ^b 99380-16 ^{b,c}	252 262	304 314	112	19 53 68 14	.000 .000	.622 .604	

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

IMPORTANT: Check your hydraulic lifter preload, with your original pushrods, to first determine if different pushrods may be required. On 72-97 engines, if your hydraulic lifter preload is excessive, this can be remedied by using Crane's Rocker Arm Pedestal Shim Kit (99170-1). Refer to page 324 for details.

IMPORTANT: Crane offers Pushrod Guideplate and Rocker Arm Stud Conversion Kits, (35655-16 and 52655-16) for street applications, enabling the 370-429-460 cu.in. engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. See page 325 for details. NOTE: To provide the most accurate valve adjustment on hydraulic lifter camshafts, in other than 429 Super C.J. engines, a method of effecting valve adjustment is required. On 68-71 engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. On 72-97 engines, the heads must be machined to use 99159-16 screw-in studs and pushrod quideplates.

OTE: Special length pushrods can be ordered to provide proper hydraulic lifter preload. Refer to page 305 for special pushrod ordering instructions, and page 374 for checking your hydraulic lifter preload. NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 35975-1 timing chain and gear set, a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: These camshafts also fit the 1969-70 Ford 429 Boss Hemi V-8 engines. Some kit components will differ. Contact Crane's Performance Consultants for details.



CRANE VALV	E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	99893-16	99953-16	99820-16 ⁴	99097-1°	35622-16 ^f 35621-16 ^g	35975-1* ⁱ	52800-16 ^j	27774-16 ^k 27744-16 ⁱ	27750-16 ^m 27771-16 ⁿ
	99893-16	99953-16	99820-16 ^d	99097-1°	35622-16 ^f 35621-16 ^g	35975-1* ⁱ	52800-16 ^j	27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ
	99893-16	99953-16	99820-16 ^d	99097-1°	35622-16 ^f 35621-16 ^g 95653-16 ^h	35975-1*i	52800-16 ^j	27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ
	99893-16	99953-16	99820-16 ^d	99097-1°	35622-16 ^f 35621-16 ^g	35975-1*i	52800-16 ^j	27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ
	99893-16	99953-16	99820-16 ^d	99097-1°	35622-16 ^f 35621-16 ^g 95653-16 ^h	35975-1*i	52800-16 ^j	27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ

- Cam, lifter, valve spring, and retainer kit, includes installation lubricants.
 May require appropriate Crane pushrods, see IMPORTANT NOTE on opposite page.
- Optional Hi Intensity hydraulic lifters, see page 292 for details.
- Must machine cylinder heads.
- Machined steel, heat treated.
- Heavy wall, heat treated, for non-guideplate or guideplate cylinder heads.
- For 429 Super CJ, heavy wall, heat treated, for use with pushrod guideplate cylinder heads.
- Pro Series one-piece, for use with pushrod guideplate cylinder heads.
- Performance steel billet gears and roller chain set.

- 1.71 ratio, pedestal mount, non-adjustable, for 72-97 engines.
- k Crane Classic extruded, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.
- I Energizer, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.
- m 1.73 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.
- n 1.73 ratio Wide Body, requires 7/16" rocker arm studs and pushrod guideplates. Valve Train Stabilizer available, see page 363.

					СОМ	PLETE C	AM SPE	CIFICATION	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Roller Camsha	fts — Retrofit	ŧ.					·				
Brute low end torque, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200-3000 cruise RPM, 8.0 to 9.5 compression ratio advised.	HR-200/311-25-12	800- 4600	359331*a	35532-16 ^b	200 212	262 274	112	(7) 27 43 (11)	.000 .000		
Excellent low end torque and HP, smooth idle, daily usage, off road, towing, performance and fuel efficiency, also mild turbocharged, 2400-3200 cruise RPM, 8.5 to 10.0 compression ratio advised.	HR-212/332-2S-14	1200- 5000	359371*a	35532-16 ^b	212 216	274 278	114	(3) 35 47 (11)	.000		
Good low end torque, good idle, daily usage, off road, towing, performance and fuel efficiency, 2600-3400 cruise RPM, 8.75 to 10.5 compression ratio advised.	HR-216/325-25-12	1400- 5400	359341*a	35532-16 ^b	216 224	278 286	112	1 35 49 (5)	.000 .000		
Good mid range torque and HP, fair idle, moderate per- formance usage, mild bracket racing, auto w/2500+ converter, mild supercharged, 3000-3800 cruise RPM, 9.5 to 11.0 compression ratio advised.	HR-228/345-25-14	2200- 6200	359351*a	35532-16 ^b	228 238	290 300	114	5 43 58 0	.000	.590 .614	
Good mid range torque and HP, rough idle, moderate performance usage, mild bracket racing with heavy car, serious off road, auto w/2800+ converter, 3200-3800 cruise RPM, 10.0 to 11.5 compression ratio advised.	HR-234/340-25-10	2400- 6400	359381*a	35532-16 ^b	234 242	300 308	110	12 42 56 6	.000 .000		
Good mid to upper RPM torque and HP, fair idle, performance usage, bracket racing, auto trans w/3000+ converter, also mild supercharged, best with 514+ cu.in., 10.5 to 12.0 compression ratio advised.	HR-238/359-2S-12	3000- 6600	359361*a	35532-16 ^b	238 246	300 308	112	12 46 60 6	.000		
Good mid to upper RPM torque and HP, rough idle, per- formance usage, bracket racing, auto trans w/3500+ converter, best with 514+ cu.in., 11.0 to 12.5 compres- sion ratio advised.	HR-246/372-25-12	3200- 6800	359391*a	35532-16 ^b	246 250	308 312	112	16 50 62 8		.636 .636	
Performance usage, bracket racing, auto trans w/race converter, good w/large manifold nitrous system, best with 540+ cu.in., 12.5 minimum compression ratio advised. Good with large Roots supercharger, 22 lbs. maximum boost w/8.5 maximum compression ratio advised.	HR-258/372-2S-14	3600- 6800	359401*a	35532-16 ^b	258 266	320 328	114	20 58 72 14		.636 .636	
Performance usage, best in 570+ cu.in., auto trans w/ race converter, 13.5 minimum compression ratio advised. Good with large Roots supercharger w/aluminum cylin- der heads, 26 lbs. maximum boost w/8.5 maximum compression ratio advised.	HR-264/400-2S-14	4000- 6800	359411°a	35532-16 ^b	264 268	334 338	114	22.5 61.5 72.5 15.5	.000 .000	.684 .684	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.
IMPORTANT: Adjustable Vacuum Advance Kit available. See page

333 for details.

NOTE: Special length pushrods must be ordered to provide proper hydraulic roller lifter preload. Refer to page 305 for special pushrod ordering instructions, and page 374 for checking your hydraulic lifter preload.

IMPORTANT: Crane offers Pushrod Guideplate and Rocker Arm Stud Conversion Kits, (**35655-16** and **52655-16**) for street applications, enabling the 370-429-460 cu.in. engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. See page 325

for details.

NOTE: To provide the most accurate valve adjustment on hydraulic roller lifter camshafts, in other than 429 Super C.J. engines, a method of effecting valve adjustment is required. On 68-71 engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. On 72-97 engines, the heads must be machined to use 429 Super C.J. rockers, studs, and pushrod guideplates.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 35975-1 timing chain and gear assembly, a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: These camshafts also fit the 1969-70 Ford 429 Boss Hemi V-8 engines. Some kit components will differ. Contact Crane's Performance Consultants for details.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUI Crane Classi Energizer	M ROCKERS — C/ Gold Race
	96870-16	99957-16 99969-16 ^c	99820-16 ^d	99097-1° 99094-1 ^f	95639-16 ⁹ 95641-16 ^h	35975-1* ⁱ	52800-16 ^j	27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ
	96870-16	99957-16 99969-16°	99820-16 ^d	99097-1° 99094-1 ^f	95639-16 ⁹ 95641-16 ^h	35975-1*i	52800-16 ^j	27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ
	96870-16	99957-16 99969-16	99820-16 ^d	99097-1° 99094-1 ^f	95639-16 ⁹ 95641-16 ^h	35975-1*i	52800-16 ^j	27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ
	99896-16	99956-16 99970-16°	99820-16 ^d	99097-1° 99094-1 ^f	95639-16 ⁹ 95641-16 ^h	35975-1*i	52800-16 ^j	27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ
	99896-16	99956-16 99970-16°	99820-16 ^d	99097-1° 99094-1 ^f	95639-16 ⁹ 95641-16 ^h	35975-1*i	52800-16 ^j	27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ
	99896-16	99956-16 99970-16 ^c	99820-16 ^d	99097-1° 99094-1 ^f	95639-16 ⁹ 95641-16 ^h	35975-1*i	52800-16 ^j	27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ
	99896-16	99956-16 99970-16	99820-16 ^d	99097-1° 99094-1 ^f	95639-16 ^g 95641-16 ^h	35975-1*i	52800-16 ^j	27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ
	99896-16	99956-16 99970-16 ^c	99820-16 ^d	99097-1° 99094-1 ^f	95639-16 ⁹ 95641-16 ^h	35975-1"	52800-16 ^j	27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ
	99896-16	99956-16 99970-16	99820-16 ^d	99097-1° 99094-1 ^f	95639-16 ⁹ 95641-16 ^h	35975-1*i		27774-16 ^k 27744-16 ^l	27750-16 ^m 27771-16 ⁿ

- Requires 52970-1 (.500"I.D.) or 52971-1 (.531"I.D.) steel, or 52990-1 (.500"I.D.) or 52989-1 (.531"LD.) aluminum-bronze distributor drive gear, and 7/16-20 x 1-1/4" grade 8 cam gear bolt and hardened washer.
- **b** Vertical locking bar hydraulic roller lifters, no machining required. Special length pushrods are required.
- Requires Crane Multi Fit valve locks. Must machine cylinder heads.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.
- Pro Series one-piece, for non-guideplate cylinder heads.
- Pro Series one-piece, for use with pushrod guideplate cylinder heads.

- Performance steel billet gears and roller chain set.

- rerrormance steel billet gears and foller chain set.
 1.71 ratio, pedestal mount, non-adjustable, for 72-97 engines.
 Crane Classic extruded, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.
 Energizer, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.
 1.73 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.
- Valve Train Stabilizer available, see page 363.

 n 1.73 ratio Wide Body, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Mechanical Lifter Camsh	afts										
Good low end and mid range torque and HP, fair idle, moderate performance usage, bracket racing: Super Pro, Hot Rod, auto trans w/2500+ converter; off road, 10.0 to 11.5 compression ratio advised.	F-238/3200-2-12	3000- 6600	351201°	99257-16 ^b	238 248	300 310	112	12 46 61 7	.022 .022		
Rough idle, performance usage, oval track: Late Model, Sportsman, 1/4-3/8 mile; bracket racing: Super Pro, Hot Rod, auto trans w/3000+ converter; serious off road, 10.5 to 12.0 compression ratio advised.	F-246/3294-2-8	3600- 7000	351211° 351212° ^a	99257-16 ^b	246 256	282 292	108	20 46 61 15		.563 .583	
Rough idle, performance usage, good mid to upper RPM torque and HP, bracket racing, auto trans w/3500+ converter, 11.0 to 12.5 compression ratio advised.	F-256/3412-2-8	4000- 7400	351341°	99257-16 ^b	256 266	292 302	108	25 51 66 20		.583 .603	
Fair idle, performance usage, good upper RPM torque and HP, bracket racing, good w/plate nitrous system, auto trans w/3500+ converter, 11.5 to 12.5 compression ratio advised.	F-256/3412-2-12	2200- 6200	351351°	99257-16 ^b	256 266	292 302	112	19 57 68 18		.583 .603	
Moderate competition only, good mid to upper RPM HP, bracket racing, auto trans w/3500+ converter, 11.5 to 13.0 compression ratio advised.	F-266/3528-2-8	4400- 7800	351511*	99257-16 ^b	266 276	302 312	108	30 56 71 25		.603 .624	
Moderate competition only, good mid to upper RPM HP, bracket racing, auto trans w/race converter, 12.5 minimum compression ratio advised.	F-272/3874-2S-8	4600- 8000	351601°	99257-16 ^b	272 280	308 316	108	33 59 73 27		.662 .683	
Competition only, good upper RPM HP, bracket racing, good with large plate or manifold nitrous system, auto trans w/race converter, 13.0 minimum compression ratio advised. Good w/large Roots supercharger, 22 lbs. maximum boost w/8.0 maximum compression ratio advised.	F-272/3874-2S-12	4800- 8200	351611*	99257-16 ^b	272 280	308 316	112	28 64 76 24		.662 .683	
Competition only, good upper RPM torque and HP, bracket racing in heavy car, good w/514+ cu.in., alunimum cylinder heads advised, auto trans w/race converter, 13.0 minimum compression ratio advised.	F-274/3934-2S-10	4600- 8200	351621°	99257-16 ^b	274 278	304 308	110	31 63 73 25	.012 .012		
Radical competition only, good upper RPM HP, flat tappet restricted classes, good w/540+ cu.in.w/ aluminum cylinder heads, auto trans w/race converter, 13.5 minimum compression ratio advised.	F-286/3765-25-12	5000- 8400	351631°	99257-16 ^b	286 292	322 332	112	34 72 83 29		.644 .653	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.
IMPORTANT: Adjustable Vacuum Advance Kit available. See page

333 for details.

IMPORTANT: Crane offers Pushrod Guideplate and Rocker Arm Stud Conversion Kits, (35655-16 and 52655-16) for street applications, enabling the 370-429-460 cu.in. engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. See page 325 for details.

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NOTE: When installing mechanical lifter series cams and kits, in other than 429 Super C.J. engines, a method of effecting valve adjustment is required. On 68-71 engines equipped with bottleneck type studs, using **99768-16** positive locking nuts will permit valve adjustment. On 72-97 engines, the heads must be machined to use 99159-16 screw-in studs and pushrod guideplates.

NOTE: Many 1972 and later Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 35975-1 timing chain and gear assembly, a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: These camshafts also fit the 1969-70 Ford 429 Boss Hemi V-8 engines. Some kit components will differ. Contact Crane's Performance Consultants for details.



CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUI Crane Classi Energizer	
	99890-16	99970-16 ^c	99820-16 ^d	99094-1°	35621-16 ^f 95653-16 ^g	35975-1*h		27774-16 ⁱ	27750-16 ^j 27771-16 ^k
	99890-16	99970-16 ^c	99820-16 ^d	99094-1°	35621-16 ^f 95653-16 ^g	35975-1*h		27774-16 ⁱ	27750-16 ^j 27771-16 ^k
	99890-16	99970-16°	99820-16 ^d	99094-1°	35621-16 ^f 95653-16 ^g	35975-1*h		27774-16 ⁱ	27750-16 ^j 27771-16 ^k
	99890-16	99970-16°	99820-16 ^d	99094-1°	35621-16 ^f 95653-16 ^g	35975-1*h		27774-16 ⁱ	27750-16 ^j 27771-16 ^k
	99890-16	99970-16°	99820-16 ^d	99094-1°	35621-16 ^f 95653-16 ^g	35975-1*h		27774-16 ⁱ	27750-16 ⁱ 27771-16 ^k
	99890-16	99970-16 ^c	99820-16 ^d	99094-1°	35621-16 ^f 95653-16 ^g	35975-1*h		27774-16 ⁱ	27750-16 ^j 27771-16 ^k
	99890-16	99970-16 ^c	99820-16 ^d	99094-1°	35621-16 ^f 95653-16 ^g	35975-1*h		27774-16 ⁱ	27750-16 ^j 27771-16 ^k
	99890-16	99970-16°	99820-16 ^d	99094-1°	35621-16 ^f 95653-16 ^g	35975-1*h		27774-16 ⁱ	27750-16 ^j 27771-16 ^k
	99890-16	99970-16°	99820-16 ^d	99094-1°	35621-16 ^f 95653-16 ^g	35975-1*h		27774-16 ⁱ	27750-16 ^j 27771-16 ^k

- Cam, lifter, valve spring, and retainer kit, includes installation lubricants.
- Requires appropriate Crane pushrods.
- Requires Crane Multi Fit valve locks.
- Must machine cylinder heads. Machined steel, heat treated, Multi Fit.
- Heavy wall, heat treated, for use with pushrod guideplate cylinder heads.
- Pro Séries one-piece, for use with pushrod guideplate cylinder heads.

- h Performance steel billet gears and roller chain set.
 i Crane Classic extruded, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.

 1.73 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.
- Valve Train Stabilizer available, see page 363.
- k 1.73 ratio Wide Body, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.

					COM	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Mechanical Roller Camsh		IVANGE	LITIISSIOTIS COUC	LII ILKS	IIIt/ LAII.	IIIt/ EXII.	Jeparation	IIIt/ LXII	LAII.	LAII.	
Excellent low and mid range torque, fair idle, moderate performance usage, good low and mid-range HP, mild bracket racing, auto trans w/2500+ converter, 10.5 to 11.5 compression ratio advised.	SR-232/338-25-12	2500- 6500	358501*a	30518-16 35570-16 ^b	232 240	282 290	112	9 46 57 3	.020 .020		
Good low and mid range torque and HP, fair idle, moderate performance usage, bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, 10.5 to 12.0 compression ratio advised.	SR-248/362-2S1-12	3000- 6800	358511*a	30518-16 35570-16 ^b	248 256	298 306	112	17 51 65 11	.020 .020	.619 .640	
Good low and mid range torque and HP, rough idle, per- formance usage, bracket racing, auto trans w/3000+ converter, 11.0 to 12.5 compression ratio advised.	R-252/420-2-10	3400- 7200	358801*a	30518-16 35570-16 ^b	252 262	284 294	110	20 52 65 17		.718 .718	
Good mid range torque to upper RPM torque & HP, rough idle, performance usage, 514+ cu.in., Pro Street, bracket racing, auto trans w/3500+ converter, 4200-4600 cruise RPM, 11.0 minimum compression ratio advised.	SR-252/400-2S-10	3200- 7000	358521*a	30518-16 35570-16 ^b	252 260	290 298	110	21 51 65 15	.020 .022		
Good mid range torque and HP, rough idle, radical street, performance usage, serious off road, bracket racing w/heavy car, auto trans w/3500+ converter, 11.5 to 12.5 minimum compression ratio advised.	R-258/420-2S-8	3600- 7400	358201*a	30518-16 35570-16 ^b	258 268	290 300	108	25 53 66 22		.718 .718	
Performance usage, good mid-range HP, bracket racing, good w/514+ cu.in., auto trans w/race converter, 12.5 minimum compression ratio advised. Good with manifold nitrous system.	R-266/434-25-12	3800- 7800	358211*a	30518-16 35570-16 ^b	266 278	300 310	112	25 61 75 23		.742 .718	
Performance usage, good mid-range HP, bracket racing, auto trans w/race converter, 12.5 minimum compression ratio advised.	R-268/420-2-10	4000- 7800	358821*a	30518-16 35570-16 ^b	268 278	300 310	110	28 60 73 25		.718 .718	

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

IMPORTANT: Crane offers Pushrod Guideplate and Rocker Arm Stud Conversion Kits, (35655-16 and 52655-16) for street applications, enabling the 370-429-460 cu.in. engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. See page 325 for details. NOTE: Roller camshafts with SF01 firing order (1-5-4-8-6-3-7-2) are available on special order. Contact Crane's Performance Consultants for details.

OTE: When installing roller lifter series cams and kits, in other than 429 Super C.J. engines, a method of effecting valve adjustment is required. On 68-71 engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. On 72-97 engines, the heads must be machined to use 99159-16 screw-in studs and pushrod guideplates. NOTE: Many 1972-97 Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 35975-1 timing chain and gear assembly, a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: These camshafts also fit the 1969-70 Ford 429 Boss Hemi V-8 engines. Some kit components will differ. Contact Crane's Performance Consultants for details.



CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 31
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUI Crane Classi Energizer	
	99893-16	99953-16	99820-16 ^d	99097-1°	35621-16 ⁹ 95653-16 ^h	35975-1* ⁱ		27774-16 ^j	27750-1 27771-1
	99893-16	99953-16	99820-16 ^d	99097-1°	35621-16 ⁹ 95653-16 ^h	35975-1*i		27774-16 ^j	27750-1 27771-1
	99885-16	99956-16 99974-16°	99820-16 ^d	99097-1° 99094-1 ^f	35621-16 ⁹ 95653-16 ^h	35975-1*i		27774-16 ^j	27750-1 27771-1
	99893-16	99953-16	99820-16 ^d	99097-1°	35621-16 ⁹ 95653-16 ^h	35975-1*i		27774-16 ^j	27750-1 27771-1
			<u> </u>						
	99885-16	99956-16 99974-16°	99820-16 ^d	99097-1° 99094-1 ^f	35621-16 ⁹ 95653-16 ^h	35975-1* ⁱ		27774-16 ^j	27750-1 27771-1
	99885-16	99956-16 99974-16 ^c	99820-16 ^d	99097-1° 99094-1 ^f	35621-16 ^g 95653-16 ^h	35975-1*i		27774-16 ^j	27750-1 27771-1
	99885-16	99956-16 99974-16°	99820-16 ^d	99097-1° 99094-1 ^f	35621-16 ⁹ 95653-16 ^h	35975-1*i		27774-16 ^j	27750-1 27771-1

Section Continued



- Requires 52970-1 (.500" I.D.) or 52971-1 (.531" I.D.) steel, or 52990-1 (.500" I.D.) or 52989-1 (.531" I.D.) aluminum-bronze distributor drive gear, and 7/16-20 x 1-1/4" grade 8 cam gear bolt and hardened washer.
- Ultra Pro Series roller lifters.
- Requires Crane Multi Fit valve locks.
- Must machine cylinder heads.
- Machined steel, heat treated.
- Machined steel, heat treated, Multi Fit.

- Heavy wall, heat treated, for use with pushrod guideplate cylinder heads.
- Pro Series one-piece.
- Performance steel billet gears and roller chain set.
- Crane Classic extruded, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See
- notes on opposite page. Valve Train Stabilizer available, see page 363.

 1.73 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.
- 1.73 ratio Wide Body, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.

					COM	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 296	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Mechanical Roller Camsh	afts										
Competition only, good upper RPM torque and HP, bracket racing, auto trans w/race converter, 12.5 minimum compression ratio advised.	R-272/420-251-10	4200- 8000	358831*a	30518-16 35570-16 ^b	272 280	304 312	110	30 62 74 26		.718 .718	
Competition only, good upper RPM torque and HP, bracket racing, good w/540+ cu.in w/aluminum cylinder heads, good with large manifold nitrous system, auto trans w/race converter, 12.5 minimum compression ratio advised. Good with large Roots supercharger, 24 lbs. maximum boost w/8.0 maximum compression ratio advised.	R-272/436-25-14	4200- 8200	358221*a	30518-16 35570-16 ^b	272 280	302 312	114	27 65 79 21		.746 .732	
Competition only, good upper RPM torque and HP, bracket racing, 510+ cu.in., auto trans w/race converter, 12.5 minimum compression ratio advised.	R-276/420-2-10	4400- 8200	358841*a	30518-16 35570-16 ^b	276 286	308 318	110	32 64 77 29	.020 .020	.718 .718	
Competition only, good upper RPM HP, bracket racing, good w/540+ cu.in w/aluminum cylinder heads, good with large manifold nitrous system, auto trans w/race converter, 13.0 minimum compression ratio advised. SFO1 firing order.	R-276/4334-2S-12 SF01	4600- 8400	358231" ^a	30518-16 35570-16 ^b	276 286	316 326	112	29 67 78 28		.741 .730	
Radical competition only, NMRA, Top Sportsman, large manifold nitrous system, good with 540+ cu.in., auto trans w/race converter, 14.0 minimum compression ratio advised. SFO1 firing order.	R-280/5152-2S-14 SF01	5000- 8800	358241*a	35570-16 ^b	280 296	310 336	114	31 69 87 29	.020 .030	.881 .805	
Radical competition only, Unlimited Street, Quick 16, Top Sportsman, large manifold nitrous system, very large cu.in., auto trans w/race converter, 14.5 minimum com- pression ratio advised. SFO1 firing order.	R-288/5152-25-16 SF01	5400- 9200	358251*a	35570-16 ^b	288 310	318 346	116	33 75 96 34	.020 .030	.881 .838	

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

IMPORTANT: Crane offers Pushrod Guideplate and Rocker Arm Stud Conversion Kits, (35655-16 and 52655-16) for street applications, enabling the 370-429-460 cu.in. engines with pedestal mounted rockers to have adjustable rocker arms without cylinder head removal or machining. See page 325 for details. NOTE: Roller camshafts with SF01 firing order (1-5-4-8-6-3-7-2) are available on special order. Contact Crane's Performance Consultants for details.

NOTE: When installing roller lifter series cams and kits, in other than 429 Super C.J. engines, a method of effecting valve adjustment is required. On 68-71 engines equipped with bottleneck type studs, using 99768-16 positive locking nuts will permit valve adjustment. On 72-97 engines, the heads must be machined to use 99159-16 screw-in studs and pushrod guideplates.

NOTE: Many 1972-97 Ford-Mercury V-8 engines are originally equipped with a retarded crankshaft sprocket. This may cause idling and performance problems when installing aftermarket camshafts. We recommend using our 35975-1 timing chain and gear assembly, a pre-1972 crankshaft sprocket, or by degreeing in your camshaft. The non-retarded sprocket will have the alignment dot and keyway slot directly in line with each other.

NOTE: These camshafts also fit the 1969-70 Ford 429 Boss Hemi V-8 engines. Some kit components will differ. Contact Crane's Performance Consultants for details.



CRANE VALV	E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	99885-16	99956-16 99974-16 ^f	99820-16°	99097-1 ^j 99094-1 ^k	35621-16 ¹ 95653-16 ^m	35975-1*0		27774-16 ^p	27750-16 27771-16
	99885-16	99956-16 99974-16 ^f	99820-16°	99097-1 ^j 99094-1 ^k	35621-16 ¹ 95653-16 ^m	35975-1* ⁰		27774-16 ^p	27750-16 27771-16
	99885-16	99956-16 99974-16 ^f	99820-16°	99097-1 ^j 99094-1 ^k	35621-16 ¹ 95653-16 ^m	35975-1*0		27774-16 ^p	27750-16 27771-16
	99885-16 961226-16 ^{c,e}	99956-16 99974-16 ^f 99661-16 ^g	99820-16°	99097-1 ^j 99094-1 ^k	35621-16 ¹ 95653-16 ^m	35975-1*0		27774-16 ^p	27750-16 27771-16
	96848-16 ^d 961356-16 ^{d,e}	99681-16 ⁱ 99663-16 ^h	99826-16°	99097-1 ^j	95810-16 ⁿ				27750-16 27771-16
	96848-16 ^d 961356-16 ^{d,e}	99681-16 ⁱ 99663-16 ^h	99826-16°	99097-1 ^j	95810-16 ⁿ				27750-16 27771-16

- Requires 52970-1 (.500"I.D.) or 52971-1 (.531"I.D.) steel, or 52990-1 (.500"I.D.) or 52989-1 (.531" I.D.) aluminum-bronze distributor drive gear, and 7/16-20 x 1-1/4" grade 8 cam gear bolt and hardened washer.
- Ultra Pro Series roller lifters.
- Requires 99661-16 titanium retainers.
- For 2.100" assembly height, requires **99663-16** titanium retainers.
- Must machine cylinder heads.
- Requires Crane Multi Fit valve locks.
- Titanium, for **961226-16** valve springs, requires Crane Multi Fit valve stem locks. Titanium, for **961356-16** valve springs, requires Crane Multi Fit valve stem locks. Must use **99097-1** valve stem locks, included with the retainers.

- Machined steel, heat treated.

- Machined steel, heat treated, Multi Fit.
- Heavy wall, heat treated, for use with pushrod guideplate cylinder heads.
- Pro Series one-piece.
- **n** Pro Series one-piece, 3/8" diameter, special guideplates required.
- Performance steel billet gears and roller chain set.
- Crane Classic extruded, 1.72 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve train stabilizer available, see page 363.
 1.73 ratio, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page.
- Alve train stabilizer available, see page 363.

 1.73 ratio Wide Body, requires 7/16" rocker arm studs and pushrod guideplates. See notes on opposite page. Valve Train Stabilizer available, see page 363.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 286 FOLLOWERS	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Valve Lift Int/Exh	Lash Cold Int. Exh.	Gross Lift Int. Exh.
		IMINUL	LITIDSIOTIS COUC	TOLLOWERS	IIIt/ LAII.	III(/ LAII.	Separation	III (LAII	LAII.	LAII.
Mechanical Follower Can	nshafts									
Good idle, daily usage, torque upgrade for stock engine,	HON-224/423-VTEC-11	2500-	252-0010*	VTEC:	224	258	110		.008	.423
OK with aftermarket intake/exhaust, good for use with		8500			210	238			.010	.386
supercharger or turbocharger.			A	PRI:	186	214	111	(15) 21	.008	.319
			•		186	214	110	39 (9)	.010	.319
				SEC:	190 190	218	110		.008	.327
						218			.010	.327
Performance usage, radical street, drag race, good upper RPM HP, high flowing cylinder head/intake/large exhaust	HON-232/443-VTEC-13	3000-	252-0012 [*]	VTEC:	232	266	112		.008	.443
advised, 12.0+ minimum compression ratio required.		9000		PRI:	218 186	246	112	(10) 25	.010	.386
davisca, 12.0 i illilililari compression ado requirea.			•	PKI:	186	214 214	113	(19) 25 43 (5)	.008	.319 .319
			~	SEC:	190	218	110	43 (3)	.008	.327
				JLC.	190	218	110		.010	.327
I	Stock (for comparison			VTEC:	217	247	112		.010	.397
	Stock (for comparison			VIEC:	217	247	112			.370
	purposes only)			PRI:	183	233	115			.300
				r M.	183	211	113			.300
				SEC:	187	215	113			.319
				520.	187	215				.319

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.



CRANE VALV	CRANE VALVE TRAIN COMPONENTS													
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317					
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING BELT AND SPROCKET ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC/ ENERGIZER	ROCKERS — GOLD RACE					

					СОМ	PLETE C	AM SPE	CIFICATION	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Mechanical Lifter Camsh	afts									
Replacement for factory 168553 Camshaft. This camshaft features oversize lobes to reduce wear. Part number 905-0003 pushrods required, as stock pushrods will be too long.	BluePrinted 553-0S	1000- 4500	340-0002		190 190	242 242	110	(15) 25 25 (15)		.357 .357
Good idle, daily usage, also mild supercharged, 2600- 3200 cruise RPM, 9.0 to 10.75 compression ratio advised.	F-222/280-2-10	1800- 5200	340-0010		222 232	260 270	110	6 36 51 1	.016 .018	.420 .441
Fair idle, good mid to upper RPM torque and HP, moderate performance usage, road course, hillclimb, 10.5 minimum compression ratio advised.	MG-T-3	2400- 5800	340-0012		234 234	294 294	110	12 42 52 2	.022 .024	.443 .443

MGA-MGB 4 cyl. 57-80

1598-1798cc

Mechanical Lifter Camsh	afts							
Replacement for factory 88G303 camshaft (1964-80 "2 groove").	BluePrinted 88G303	1000- 4500	342-0002	199 215	248 263	107.5	(7.5) 26.5 35.5 (0.5)	.012 .376 .014 .376
Good idle, daily usage, autocross, also mild supercharged, 2600-3200 cruise RPM, 9.0 to 10.75 compression ratio advised.	F-222/280-2-10	1800- 5200	342-0010	222 232	260 270	110	6 36 51 1	.014 .399 .016 .419
Fair idle, good mid to upper RPM torque and HP, moder- ate performance usage, road course, hillclimb, 10.5 mini- mum compression ratio advised.	F-232/294-8	2400- 5800	342-0012	232 232	270 270	108	13 39 49 3	.016 .419 .018 .419
Competition only, good upper RPM HP, road course, 12.0 minimum compression ratio advised.	F-260/338-6	4000- 7500	342-0107	260 260	312 312	106	28 52 60 20	.028 .482 .030 .482

MG Midget—Mini—Sprite 4 cyl. 57–84

BMCA 848-1275cc

	Mechanical Lifter Camsh	afts								
	Good idle, daily usage, autocross, also mild turbocharged, 2600-3200 cruise RPM, 9.0 to 10.5 compression ratio advised.	F-222/280-2-10	1800- 5200	344-0010	222 232	260 270	110	6 36 51 1	.012 .353 .014 .370	
	Fair idle, good mid to upper RPM torque and HP, moderate performance usage, autocross, hillclimb, 10.0 minimum compression ratio advised.	F-232/294-2-10	2200- 5600	344-0012	232 242	270 280	110	11 41 56 6	.012 .370 .014 .388	
Ī	Competition only, good upper RPM HP, road course, 12.0 minimum compression ratio advised.	F-256/3526-2S-02	4500- 8000	344-0102	256 266	290 300	102	26 50 55 31	.020 .444 .020 .449	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.



		OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 31
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM Crane Classic/ Energizer	ROCKERS - GOLD RACE
					905-0003				
					905-0003				
					905-0003				
	99884-8	99967-8			905-0004				
	99884-8	99967-8			905-0004				
	99884-8	99967-8			905-0004				
	99884-8	99967-8			905-0004				
_									

					СОМ	PLETE C	AM SPE	CIFICATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 286 FOLLOWERS	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Valve Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Follower	Camshafts									
Good idle, daily usage, performance upgrade for stock engine, aftermarket intake/exhaust and ECM advised, new valve springs recommended.	MIT-248-25R-10	800- 6500	435-0010°		208 200	248 240	110	(1.5) 29.5 34.5 (14.5)	.000 .000	.404 .384
Good idle, performance usage, street, drag race, OK with nitrous, aftermarket intake/exhaust and ECM advised, requires upgraded valve springs and retainers, valve guides must be shortened.	MIT-256-2SR-10	1200- 6800	435-0012*		216 208	256 248	110	4.5 31.5 40.5 (12.5)	.000	.424 .404
Fair idle, performance usage, for use with aftermarket turbo systems, intercooler advised, aftermarket intake/ low restriction exhaust and ECM required, requires upgraded valve springs and retainers, valve guides must be shortened.	MIT-264-2SR-10	1500- 7500	435-0014°		224 216	264 256	110	10.5 33.5 46.5 (10 <i>5</i>)	.000	.443 .424
	Stock (for comparison purposes only)				193 193	240 240	106.5			.335 .335

Mitsubishi 420A non-Turbo 1995		clip	se			DOI	HC 4V 2	2.0 L	itre
Hydraulic Roller Follower	r Camshafts								
Good idle, daily usage, performance upgrade for stock engine, aftermarket intake/exhaust and ECM advised, new valve springs recommended.	MIT-242-8	800- 6500	431-0010*	200 200	242 242	108	(5) 26 31 (11)		.354 .354
•			€3						
Good idle, performance usage, street, drag race, intended for use with nitrous, aftermarket intake/exhaust and ECM advised.	MIT-246-10	1200- 6800	431-0012*	204 204	246 246	110	(5) 29 35 (11)		.364 .364
•			€}						
Fair idle, performance usage, for use with aftermarket turbo systems, intercooler advised, aftermarket intake/ low restriction exhaust and ECM required.	MIT-246-25R-8	1500- 6800	431-0014°	204 196	246 238	108	(3) 27 29 (13)		.364 .344
<u> </u>			3						
Fair idle, moderate performance usage, drag race, good mid and upper RPM HP, high flowing cylinder head/intake/exhaust advised.	MIT-250-8	2000- 7200	431-0016*	208 208	250 250	108	0 28 36 (8)		.374 .374
mane, exhibit davised.			3						
Performance usage, drag race, good upper RPM HP, high flowing cylinder head/intake/large exhaust advised, 12.0+ minimum compression ratio required.	MIT-258-10	2500- 7500	431-0018*	216 216	258 258	110	2 34 42 (6)		.394 .394
•			3						
	Stock (for comparison purposes only)			192 196	243 243	109			.344 .315

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.
The 4G63 camshafts are suitable for both GEN 1 and GEN 2 engines.

Chrysler Neon 2.0L camshafts will not function properly in the 420A engines, as the cam lobe layout and cam sensor locations are different.

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.



Cu.	stoili Gi i	iliu Cullis I	AISO AVUIIUO	ie cuii oo	0 300 3120	or go to th			9	
CRAN	E VALVE	TRAIN CO	MPONENTS							
See pg.		See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 31.
VALVE S AND RET KIT	TAINER	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING BELT AND SPROCKET ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM I Crane Classic/ Energizer	ROCKERS - GOLD
KII	3	SPKINGS	KETAINEKS	SEALS	LUCKS	PUSHKUUS	ASSEMBLY	AKMS	ENEKGIZEK	KACE

					COM	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 286 FOLLOWERS	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Valve Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Roller Followe	Camshafts										
Good idle, daily usage, performance upgrade for stock engine, aftermarket intake/exhaust and ECM advised, new valve springs and retainers recommended.	MIT-248-2SR-10	800- 6500	440-0010°		208 200	248 240	110	(7.5) 35.5 28.5 (8.5)	.000	.404 .384	
Good idle, performance usage, street, drag race, OK with nitrous, aftermarket intake/exhaust and ECM advised, requires upgraded valve springs and retainers, valve guides must be shortened.	MIT-256-2SR-10	1200- 6800	440-0012*		216 208	256 248	110	(3.5) 39.5 32.5 (4.5)		.424 .404	
Fair idle, performance usage, for use with aftermarket turbo systems, intercooler advised, aftermarket intake/ low restriction exhaust and ECM required, requires upgraded valve springs and retainers, valve guides must be shortened.	MIT-264-2SR-10	1500- 7500	440-0014*		224 216	264 256	110	(0.5) 43.5 36.5 (0.5)		.444 .424	
	HKS 264 (for comparison purposes only)				200 200	264 264				.425 .402	
	HKS 272 (for comparison purposes only)				208 208	272 272				.425 .402	
	HKS 280 (for comparison purposes only)				216 216	280 280				.425 .402	

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.



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CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING BELT AND SPROCKET ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM Crane Classic/ Energizer	ROCKERS — GOLD RACE

Oldsmobile and Pontiac V8 Tech Tips & Notes

Oldsmobile V8 1967-1984 260-307 (5.0L) – 350 (5.7L) – 400-403-425-455 cu.in.

This popular Oldsmobile V8 engine family actually began in 1964, as a 330 cu.in. version. There are no "small block" or "big block" Olds V8's in this series, as the same basic engine architecture is used from the 260 to the 455 versions. Two different deck heights were used, depending upon displacement.

There were a number of changes from 1964 to 1967 that can complicate obtaining the correct camshaft and lifters, due to differing lifter bank angles and lifter diameters. The chart below will explain these by year and displacement. The 45 and 39 degree lifter bank ángle camshafts will physically interchange, but the improper application will cause incorrect valve timing from bank to bank. To be certain that you have the proper camshaft in your block, check the cam timing on each bank of the engine. A cranking compression test will also be an indication, especially if one side varies consistently from the other. Our 79-prefix designates the 45 degree bank angle camshafts (available on special order), while the 80-prefix is for the more common 39-degree bank angle applications. All of these engines have inline lifter bores and are equipped with 1.6:1 ratio non-adjustable rocker arms.

1966-1967 400 cu.in. and 425 cu.in. Toronado engines had .921" diameter lifters, while the others had .842" diameter hydraulic lifters. The .921" lifters can be difficult to obtain, and many folks will sleeve their lifter bores so that the .842" items can be used.

We offer complete lines of hydraulic, retrofit hydraulic roller, mechanical, and roller lifter camshafts and valve train components for these engines.

The carburized steel retrofit hydraulic roller and street roll-

er camshafts are equipped with a cast iron distributor drive gear and rear journal. These are noted by an IG suffix (Iron Gear), allowing the use of a standard type distributor gear for long term reliability.

There were also 260D and 350D cu.in. Diesel versions offered from 1978 to 1985, featuring more robust block and head castings. These engines had 39 degree bank angle camshafts and .842" flat faced lifters, with the exception of a few very early blocks intended for racing that were bored for .921" lifters.

From 1985 to 1990, this engine family continued with a 307 cu.in. powerplant, equipped with a 39 degree bank angle hydraulic roller camshaft and .921" diameter hydraulic roller lifters. Our 80-prefix camshafts can be used in these engines if a thrust spacer is fabricated, and the appropriate lifters are used.

The production cylinder heads can be machined for screwin rocker arm studs and pushrod guideplates, permitting adjustable stud mounted rocker arms to be installed. Heat treated pushrods will be required for guideplate compatibility. This will provide more accurate lifter preload adjustment for hydraulic lifter applications, and are necessary to achieve lash adjustment for mechanical and roller lifter equipped engines. A number of aftermarket cylinder heads have been offered over the years, in iron and aluminum versions, with most of them having provisions for adjustable rockers already incorporated.

In the late 70's and early 80's, General Motors interchanged engines throughout the product offerings. Pontiacs could have Oldsmobile engines, Buicks with Chevy engines, etc. Make sure of exactly what engine you have before proceeding with your service or modifications.

Much confusion has arisen from ordering the wrong cam, lifters and pushrods for the 64-84 Olds engines. The following table should be used to avoid error when placing your order.

Year	Cu. In.	Model	Lifter Dia.	Cam Bank Angle	Order Cam w/ Part No. beginning with	Hydraulic Cam Lifters	Mechanical Cam Lifters	Hydraulic Lifter Cam Pushrods
64	330	ALL	.842	45°	79-	99284-16*	99250-16	95647-16
65	330	ALL	.842	45°	79-	99284-16*	99250-16	95647-16
65	400	ALL	.842	45°	79-	99284-16*	99250-16	
65	425	ALL	.842	45°	79-	99284-16*	99250-16	
66	330	ALL	.842	45°	79-	99284-16*	99250-16	95647-16
66	400	ALL	.921	39°	80-			
66	425	ALL exc. Toronado	.842	45°	79-	99284-16*	99250-16	
66	425	Toronado Only	.921	39°	80-			
67	330	ALL	.842	45°	79-	99284-16*	99250-16	95647-16
67	400	ALL	.921	39°	80-			95647-16
67	425	ALL exc. Toronado	.842	39°	80-	99284-16*	99250-16	
67	425	Toronado Only	.921	39°	80-			95647-16
68-69	400	ALL	.842	39°	80-	99284-16*	99250-16	
68-80	350	ALL	.842	39°	80-	99284-16*	99250-16	95647-16
68-76	455	ALL	.842	39°	80-	99284-16*	99250-16	
75-82	260	ALL	.842	39°	80-	99284-16*	99250-16	95647-16
77-79	403	ALL	.842	39°	80-	99284-16*	99250-16	95647-16
80-84	307	ALL	.842	39°	80-	99284-16*	99250-16	95647-16

*Optional Hi Intensity hydraullic lifters (**99384-16***) are available, see page 292 for details



Oldsmobile DRCE V8

The DRCE (Drag Racing Corporate Engine) offered by Olds consisted of a block and cylinder heads based on big block Chevrolet dimensioning. The DRCE and DRCE2 engines were never vehicle installed, nor were they offered as an engine assembly. Directed towards Pro Stock racing, many improvements were made over the Chevy, with these components offered as basic building blocks for the particular engine builder. Different lifter bore angles and camshaft journal diameters were used, so if you obtain one of these engines, be certain of exactly what dimensioned version you have when requiring parts.

Crane offers custom ground camshafts and other components for the DRCE series of engines. Please contact us directly for your specific requirements.

Pontiac V8 1955-1981 265 (4.3L) – 287 301 (4.9L) – 316-326-347-350-370-389-400 (6.6L) – 421-428-455 cu.in.

The fabled Pontiac V8 family is also based on a common dimensioned foundation. There are no "small block" or "big block" versions. The exceptions that might be noted are the 1977-81 265 and 301 cu.in. lightweight engines, that require the use of Chevrolet lifters due to relocated oil galleries, and also have a different deck height (the cylinder heads and many other internal parts were also unique).

These engines are designated by our 28-prefix. The blocks have inline lifter bores with .842" diameter lifters. The standard rocker arm ratio is 1.5:1, with the exception of the 1959-63 Super Duty engines (cylinder head casting numbers 540306, 544127, and 9771980) that were equipped with 1.65:1 ratio rockers.

We offer complete lines of hydraulic, retrofit hydraulic roller, mechanical, and roller lifter camshafts and components for these engines. The carburized steel retrofit hydraulic roller and street roller camshafts are equipped with a cast iron distributor drive gear and rear journal. These are noted by an IG suffix (Iron Gear), allowing the use of a standard type distributor gear for long term reliability.

The same camshafts are applicable to nearly all of these engines. One unique exception occurred in the 1973-74 455 Super Duty, which had an undersize distributor drive gear on the camshaft, and an oversize gear on the distributor. A standard configuration camshaft can be installed in these engines, as long as a standard gear is also installed on the distributor. We did produce some of the small gear camshafts during that era, and they were designated by an "SD" suffix after the grind number.

There was also a totally unique 1969 "Race Only" Ram Air V engine with tunnel port heads that incorporated a different valve layout, requiring a special camshaft. If you are fortunate to have one of these rare engines, we can custom manufacture a steel billet roller camshaft for it.

There are also aftermarket cylinder blocks being offered today, which have options of different diameter cam bearing journals. We can also produce special steel billet roller camshafts for these applications.

Although the Pontiac V8 engines had stud mounted stamped steel rocker arms with pivot balls, there were a number of variations. There were a few exceptions for special versions, but the basics are as follows: The 1955 engines had straight 3/8" studs, with a crimped locking nut used for adjustment. The 1956-60 engines had bottleneck 3/8" studs, with a 5/16" threaded top section. The nuts were torqued against the step, and were non-adjustable. The 1961-81 engines had bottleneck 7/16" studs, with a 3/8" threaded top section, and were again non- adjustable. There were Super Duty heads equipped with straight 7/16' studs, having an adjustable configuration. The bottleneck versions can be made adjustable with the appropriate sized positive locking adjusting nuts, providing the most accurate adjustment for hydraulic camshafts, and are a necessity for mechanical lifter camshafts. Today's aftermarket aluminum cylinder heads have straight studs intended for an adjustable rocker configuration. We offer 1.5:1 and 1.65:1 ratio rocker arms for most popular combinations.

In the late 70's and early 80's, General Motors interchanged engines throughout the product offerings. Pontiacs could have Oldsmobile engines, Buicks with Chevy engines, etc. Make sure of exactly what engine you have before proceeding with your service or modifications.

					COM	PLETE C	AM SPE	CIFICATION	ONS		
Application	Camshaft Series/ Grind Number	rpm Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf	ts										
Brute low end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 7.75 to 8.75 compression ratio advised.	H-192/2667-25-10	800- 4200	800501*	99284-16 ^b	192 204	248 260	110	(9) 21 37 (13)	.000 .000	.427 .456	
Good low end torque, smooth idle, daily usage, off road, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-260-2	1200- 4800	803901* 803902*a	99284-16 ^b	204 216	260 272	112	(5) 29 45 (9)	.000	.456 .484	
Good low and mid range torque, good idle, daily usage, off road, towing, mild marine, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	H-272-2	1600- 5400	804541* 804542*a	99284-16 ^b	216 228	272 284	112	1 35 51 (3)	.000 .000	.484 .512	
Good mid range torque and HP, fair idle, moderate per- formance usage, marine perf, bracket racing, auto trans w/2500+ converter, 3200-3600 cruise RPM, 9.5 to 11.0 compression ratio advised.	H-284-2	2200- 5800	804551" 804552" ^a	99284-16 ^b 99384-16* ^c	222 230	284 292	110	6 36 50 0	.000	.480 .496	
Good mid range HP, fair idle, moderate performance usage, bracket racing, auto trans w/3000+ converter, 3600-4000 cruise RPM, 10.0 to 11.5 compression ratio advised.	H-292-2	2800- 6400	804461*	99284-16 ^b 99384-16* ^c	230 234	292 296	110	10 40 52 2		.496 .504	
Replacement for factory W-31 camshaft (advancing this camshaft 5 degrees will produce the equivalent specs of the 397328 W-30 camshaft).	402194	2600- 6000	800101	99284-16 ^b 99384-16* ^c	232 232	300 300	113.5	3 49 49 3	.000	.474 .474	
Good mid and upper RPM torque and HP, fair idle, performance usage, best in 425+ cu.in., bracket racing, auto trans w/3500+ converter, 10.5 to 12.0 compression ratio advised.	H-234/325-2-10	2800- 6400	800601*	99284-16 ^b 99384-16* ^c	234 244	304 314	110	12 42 57 7	.000 .000	.520 .542	
Good mid and upper RPM torque and HP, rough idle, performance usage, best in 455+ cu.in., bracket racing, auto trans w/3500+ converter, 10.5 to 12.0 compression ratio advised.	H-238/3347-2-10	3000- 6600	800661*	99284-16 ^b 99384-16* ^c	238 248	294 304	110	14 44 59 9	.000	.536 .560	
Good mid and upper RPM torque and HP, rough idle, performance usage, best in 455+ cu.in. with aluminum heads, bracket racing, auto trans w/3500+ converter, 11.0 to 12.5 compression ratio advised.	H-244/3439-25-10	3200- 6800	800741*	99284-16 ^b 99384-16 ^{*c}	244 256	300 312	110	17 47 63 13		.550 .560	
Good upper RPM and HP, rough idle, performance usage, best in 455+ cu.in. with aluminum heads, bracket rac- ing, auto trans w/3800+ converter, 11.5 minimum com- pression ratio advised.	H-248/3500-25-12	3400- 6800	800681"	99284-16 ^b 99384-16 ^{*c}	248 256	304 312	112	17 51 65 11		.560 .560	

Much confusion has arisen from ordering the wrong cam, lifters and pushrods fro the 64-84 Olds engines. See the chart on page 270 for IMPORTANT INFORMATION.

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: Refer to the chart on page 270 to determine which bank angle engine you have.

NOTE: Camshafts for the 45° bank angle engines (79-prefix) are available on special order.

IMPORTANT: Check your hydraulic lifter preload, with your original pushrods, to first determine if different pushrods may be required. Refer to page 374 for the fast and easy way to check hydraulic lifter preload. If your hydraulic lifter preload is excessive, this can be easily remedied by using Crane's Rocker Arm Bridge Shim Kit (99179-1). Refer to page 324 for details.

NOTE: 1985-1990 307 cu.in. engines are 39° bank angle and are equipped with hydraulic roller camshafts and lifters. Lifter diameter is .921". Conventional hydraulic, mechanical, or roller camshafts and lifters can be installed in these engines if a thrust spacer is fabricated and the appropriate kit components are used.

Since 1975 General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
36308-1 ^d	96803-16 ^d	99946-16		99097-1 ^d	g	80975-1*h	80800-16 ⁱ	28774-16* ^j	80757-16 ^l
30300 1	70003 10	<i>777</i> 40 10		77077 1		00273 1	00000 10	80744-16*k	00/3/ 10
36308-1 ^d	96803-16 ^d	99946-16		99097-1 ^d	g	80975-1*h	80800-16 ⁱ	28774-16 ^{*j} 80744-16 ^{*k}	80757-16 ^l
36308-1 ^d	96803-16 ^d	99946-16		99097-1 ^d	g	80975-1*h	80800-16 ⁱ	28774-16* ^j 80744-16* ^k	80757-16 ¹
36308-1 ^d	96803-16 ^d	99946-16		99097-1 ^f	g	80975-1*h	80800-16 ⁱ	28774-16 ^{*j} 80744-16 ^{*k}	80757-16
36308-1 ^d	96803-16 ^d	99946-16		99097-1 ^f	g	80975-1*h	80800-16 ⁱ	28774-16 ^{*j} 80744-16* ^k	80757-16
36308-1 ^d	96803-16 ^d	99946-16		99097-1 ^f	g	80975-1*h	80800-16 ⁱ	28774-16 ^{*j} 80744-16 ^{*k}	80757-16
11310-1	99838-16	99944-16	99820-16 ^e	99097-1 ^f	g	80975-1*h	80800-16 ⁱ	28774-16 ^{*j} 80744-16 ^{*k}	80757-16
11310-1	99838-16	99944-16	99820-16°	99097-1 ^f	g	80975-1*h	80800-16 ⁱ	28774-16 ^{*j} 80744-16 ^{*k}	80757-16
11310-1	99838-16	99944-16	99820-16°	99097-1 ^f	g	80975-1*h	80800-16 ⁱ	28774-16 ^{°j} 80744-16 ^{°k}	80757-16
11310-1	99838-16	99944-16	99820-16°	99097-1 ^f	g	80975-1*h	80800-16 ⁱ	28774-16* ^j 80744-16* ^k	80757-16

- a Cam and lifter kit, includes installation lubricants and Rocker Arm Pedestal Shim Kit.
- b Refer to chart on pages 270 for correct application, may require appropriate Crane pushrods, see IMPORTANT NOTE on opposite page.
- Optional Hi Intensity hydraulic lifters, see page 292 for details. Refer to chart on page 270 for correct applications, may require appropriate Crane pushrods.
- d Standard diameter valve springs, no machining required.
- e Must machine cylinder heads.
- f Machined steel, heat treated.
- **g** Refer to chart on page 270 for correct application.
- h Performance steel billet gears and roller chain set.

- 1.6 ratio, stamped steel, with individual fulcrums and bridge straps, fits 67-79 engines.
- j Crane Classic extruded, 1.65 ratio, 7/16" stud, must machine cylinder heads and install 99157-16 rocker arm studs and aftermarket pushrod guideplates. Special heat treated pushrods are required for use with pushrod guideplates.
- k Energizer, 1.65 ratio, 3/8" stud, must machine cylinder heads and install 99156-16 rocker arm studs and aftermarket pushrod guideplates. Special heat treated pushrods are required for use with pushrod guideplates
- 1.6 ratio, 7/16" stud, must machine cylinder heads and install 99157-16 rocker arm studs and aftermarket pushrod guideplates. Special heat treated pushrods are required for use with pushrod guideplates.

					СОМ	PLETE C	AM SPE	CIFIC	ATI	ONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration	Degrees Lobe Separation	Open/0 @ .0! Cam Int/E	50" Lift	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Hydraulic Roller Camsha			LITISSIONS COUC	LITTERS	IIIt/ EXII.	III () EXII.	Scharadou	IIIC/ E	AII	LAII.	LAII.
Excellent low end torque, good idle, daily usage, towing, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	HR-214/325-25-12 IG	1400- 5600	809611*a	28532-16°	214 222	276 284	112	0 48	34 (6)	.000 .000	
Good low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3000-3600 cruise RPM, 9.5 to 10.75 compression ratio advised.	HR-222/339-25-12 IG	1800- 6000	809621" ^a	28532-16°	222 230	284 292	112	4 52		.000	
Good mid range torque and HP, fair idle, performance usage, best in 400+ cu.in., mild bracket racing, auto trans w/3000+ converter, good w/plate nitrous system, 3600-4200 cruise RPM, 10.0 to 11.5 compression ratio advised.	HR-230/352-25-14 IG	2200- 6400	809631*a	28532-16°	230 242	292 304	114	6 60	44 2	.000 .000	
Good mid range and upper RPM torque and HP, rough idle, performance usage, bracket racing, best in 455+cu.in., auto trans w/3500+ converter, good w/manifold nitrous system, 4200-5000 cruise RPM, good with aluminum heads, 10.5 to 12.0 compression ratio advised.	HR-242/372-2S-14 IG	3000- 6800	809641*a	28532-16 ^c	242 254	304 316	114	12 66	50 8	.000 .000	
Mechanical Lifter Camsh	afts										
Good low and mid range torque and HP, fair idle, moderate performance usage, bracket racing, auto trans w/2000+ converter, 3400-3800 cruise RPM, 10.0 to 11.5 compression ratio advised.	F-238/3200-2-10	2800- 6600	801181°	99250-16 ^d	238 248	300 310	110	14 58	44 9	.022 .022	
Good mid range torque and HP, rough idle, moderate performance usage, bracket racing, best in 400+ cu.in., auto trans w/2500+ converter, 3800-4200 cruise RPM, 11.0 to 12.0 compression ratio advised.	F-248/3334-2-8	3600- 7400	801231*	99250-16 ^d	248 258	310 320	108		47 16	.022 .022	
Mechanical Roller Camsh	nafts										
Good mid range torque and HP, rough idle, performance usage, good low and mid range torque and HP, bracket racing, auto trans w/race converter, 11.0 to 12.5 compression ratio advised.	R-252/420-2-8	3200- 7400	808801*b	28570-16°	252 262	284 294	108		50 19		.672 .672
Good mid to upper RPM torque and HP, rough idle, per- formance usage, bracket racing, auto trans w/race con- verter, good w/plate nitrous system, 11.5 minimum compression ratio advised.	R-262/420-2-10	3600- 7600	808811°b	28570-16°	262 272	294 304	110		57 22	.020 .020	
Good upper RPM torque and HP, competition only, good mid to upper RPM torque and HP, bracket racing, auto trans w/race converter, good w/manifold nitrous system. 12.5 minimum compression ratio advised.	R-272/420-2-10	4200- 8200	808821*b	28570-16°	272 282	304 314	110	30 75		.020 .020	
Competition only, good upper RPM HP, Super Stock, stick shift or auto w/trans brake, 12.5 minimum compression ratio advised.	R-282/450-252-8	5000- 8800	808351"b	28570-16°	282 292	322 332	108	36 77		.026 .026	

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.
IMPORTANT: Adjustable Vacuum Advance Kit available. See page

333 for details.

NOTE: Refer to the chart on page 270 to determine which bank angle engine you have.

NOTE: Camshafts for the 45° bank angle engines (79-prefix) are available on special order.

NOTE: The proper Crane pushrods should be used with Crane lifters to provide the most accurate valve adjustment. Refer to the chart on page 270 for the correct cam, lifter and pushrod applications.

NOTE: For hydraulic roller, mechanical lifter, and roller lifter camshaft applications, it is highly recommended that the $% \left(\mathbf{r}\right) =\left(\mathbf{r}\right)$ cylinder heads be machined for 99157-16 7/16" screw-in studs and pushrod guideplates, to provide a means of effecting valve adjustment. Custom length heat treated pushrods will then be required. Refer to page 305 for special pushrod ordering instructions.

NOTE: 1985-1990 307 cu.in. engines are 39° bank angle and are equipped with hydraulic roller camshafts and tappets. Tappet diameter is .921". Conventional hydraulic, hydraulic roller, mechanical, or roller camshafts and lifters can be installed in these engines if a thrust spacer is fabricated and the appropriate kit components are used. Bushing the lifter bores to .842" diameter would also be required.

> Since 1975 General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	MPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	99838-16	99953-16 99969-16 ⁹	99820-16 ^f	99097-1 ⁱ 99094-1 ^j	c	80975-1* ^k		28774-16* ¹ 80744-16* ^m	80757-16 ⁿ
	99893-16	99953-16 99969-16 ⁹	99820-16 ^f	99097-1 ⁱ 99094-1 ^j	C	80975-1*k		28774-16* ¹ 80744-16* ^m	80757-16 ⁿ
	99893-16	99953-16 99969-16 ⁹	99820-16 ^f	99097-1 ⁱ 99094-1 ^j	c	80975-1*k		28774-16* ¹ 80744-16* ^m	80757-16 ⁿ
	99893-16	99953-16 99969-16 ⁹	99820-16 ^f	99097-1 ⁱ 99094-1 ^j	C	80975-1* ^k		28774-16* ¹ 80744-16* ^m	80757-16 ⁿ
11310-1	99838-16	99944-16	99820-16 ^f	99097-1 ⁱ		80975-1* ^k		28774-16* ¹	80757-16 ⁿ
11310-1	99838-16	99944-16	99820-16 ^f	99097-1 ⁱ		80975-1*k		28774-16* ¹	80757-16 ⁿ
	99885-16 ^f	99678-16 ^h	99820-16 ^f	99097-1 ⁱ		80975-1* ^k		28774-16* ¹	80757-16 ⁿ
	99885-16 ^f	99678-16 ^h	99820-16 ^f	99097-1 ⁱ		80975-1*k		28774-16 ^{*l}	80757-16 ⁿ
	99885-16 ^f	99678-16 ^h	99820-16 ^f	99097-1 ⁱ		80975-1*k		28774-16* ¹	80757-16 ⁿ
	99885-16 ^f	99678-16 ^h	99820-16 ^f	99097-1 ⁱ	_	80975-1*k		28774-16* ¹	80757-16 ⁿ
	77003-10	770/0-10°	77020-10	33037-1		007/3-1		20//4-10	00/3/-10"

- Camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required.
- Requires 80990-1 aluminum-bronze distributor drive gear.
- Vertical locking bar hydraulic roller lifters, no machining required. Special length pushrods are required, see page 305 for special pushrod ordering instructions.
- Refer to chart on page 270 for correct application, requires appropriate Crane pushrods, see IMPOR-TANT NOTE on opposite page.
- Ultra Pro Series roller lifters.
- Must machine cylinder heads.
- Requires Crane Multi Fit valve locks.
- Must use 99097-1 valve stem locks, included with the retainers.
- Machined steel, heat treated.

- Machined steel, heat treated, Multi Fit.

 Performance steel billet gears and roller chain set.

 Crane Classic extruded, 1.65 ratio, 7/16" stud, must machine cylinder heads and install 99157-16 rocker arms studs and aftermarket pushrod guideplates. Special heat treated pushrods are required for use with pushrod guideplates.
- m Energizer, 1.65 ratio, 3/8" stud, must machine cylinder heads and install **99156-16** rocker arm studs and aftermarket pushrod guideplates. Special heat treated pushrods are required for use with pushrod guideplates.
- 1.6 ratio, 7/16" stud, must machine cylinder heads and install **99157-16** rocker arm studs and aftermarket pushrod guideplates. Special heat treated pushrods are required for use with pushrod guideplates.

					СОМ	PLETE C	AM SPE	CIFICATI	ONS		
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int. Exh.	Gross Lift Int. Exh.	
Hydraulic Lifter Camshaf		1211102			, 25		- Сфиналог				
Brute low-end torque, smooth idle, daily usage, fuel economy, 1600-2200 cruise RPM, 7.75 to 8.75 com- pression ratio advised.	H-192/2667-2S-12	800- 4200	280511*	99282-16 ^c	192 204	248 260	112	(11) 23 39 (15)	.000 .000		
Good low end torque, smooth idle, daily usage, towing, economy, also mild turbocharged, 2200-2600 cruise RPM, 8.0 to 9.5 compression ratio advised.	H-260-2	1200- 4800	283901* 283902*a	99282-16 ^c	204 216	260 272	112	(5) 29 49 (9)	.000 .000		
Replacement for factory Ram Air or H.O. 400 cu.in. "S" camshaft.	BluePrinted 9779068	1600- 5000	968781	99282-16°	212 225		115.5	(7) 39 50.5 (5.5)	.000		
Strong mid range torque, good idle, daily usage, off road, highway towing, fuel efficiency plus performance, 2600- 3000 cruise RPM, 8.75 to 10.0 compression ratio advised.	Energizer 272 H10	1800- 5200	10507* 105072*b	99282-16°	216 216	272 272	110	3 33 43 (7)	.000		
Good low and mid range torque, good idle, daily usage, towing, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised.	H-272-2	1800- 5400	283941* 283942*ª	99282-16 ^c	216 228	272 284	112	1 35 51 (3)	.000 .000	.454 .480	
Good low and mid range torque and HP, good idle, daily usage, towing, performance and fuel efficiency, 2400-3200 cruise RPM, 8.75 to 10.5 compression ratio advised.	Z-268-2	1800- 5600	283511* 283512*a	99282-16 ^c	218 224	268 274	112	2 36 49 (5)	.000		
Good mid range torque and HP, excellent for 455 SD, fair idle, moderate performance usage, mild bracket racing, 3000-3400 cruise RPM, 9.5 to 10.75 compression ratio advised.	Н-278-2	2000- 5600	283801* 283802*a	99282-16° 99382-16° ^d	222 234	278 290	114	2 40 56 (2)	.000 .000	.467 .494	
Good mid range torque and HP, fair idle, moderate per- formance usage, mild bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 9.5 to 11.0 compression ratio advised. Good w/plate nitrous system.	H-288-2	2400- 6000	283951* 283952*a	99282-16° 99382-16° ^d	226 234	288 296	114	4 42 56 (2)	.000		
Good mid range HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3400-3800 cruise RPM, 9.5 to 11.0 compression ratio advised.	Energizer 284 H12	2800- 6200	10508° 105082″ ^b	99282-16° 99382-16° ^d	228 228	284 284	112	7 41 51 (3)	.000 .000	.480 .480	
Replacement for factory Ram Air IV "T" camshaft.	BluePrinted 9794041	2600- 6000	969681	99282-16° 99382-16° ⁴	230 240		113.5	2 48 54 6	.000 .000	.469 .469	
Good mid to upper RPM torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3400-4000 cruise RPM, 9.5 to 11.0 compression ratio advised. Good w/plate nitrous system.	Z-280-2	2600- 6400	283521° 283522° ^a	99282-16° 99382-16° ^d	230 240	280 290	112	8 42 57 3	.000 .000		
Performance usage, good mid range torque and HP, bracket racing, auto trans with 3000+ converter, good with aftermarket cylinder heads, 9.5 to 11.5 compression ratio advised.	H-234/325-10	3000- 6400	280441*	99282-16° 99382-16* ^d	234 234	304 304	110	12 42 52 2	.000		

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: In order to effect valve adjustment when using mechanical lifter and roller lifter camshafts, and to provide the most accurate adjustment on hydraulic lifter camshafts, a set of positive locking nuts, such as 99768-16, must be obtained for the rocker arm studs.

NOTE: Specify if casting number 540306, 544127, or 9771980 heads with 1.65 ratio rocker arms are being used, as different valve springs will be required.

NOTE: Be sure to maintain at least .040" clearance between the underside of the rocker arm and valve spring retainer when the valve is closed.

Since 1975 General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



						_			_	
	CRANE VALV	E TRAIN CO	MPONENTS							
_	See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
	VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
	28308-1°	99840-16° 99838-16 ^f	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^j	28975-1* ^k	28800-16 ¹	28774-16*m 28747-16*n	28750-16° 28758-16*P
	28308-1 ^e	99840-16° 99838-16 ^f	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^j	28975-1*k	28800-16 ¹	28774-16* ^m 28747-16* ⁿ	28750-16° 28758-16°
	28308-1 ^e	99840-16 ^e 99838-16 ^f	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^j	28975-1*k	28800-16 ¹	28774-16*m 28747-16*n	28750-16° 28758-16°
	28308-1°	99840-16 ^e 99838-16 ^f	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^j	28975-1*k	28800-16 ¹	28774-16* ^m 28747-16* ⁿ	28750-16° 28758-16*
	28308-1 ^e	99840-16° 99838-16 ^f	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^j	28975-1* ^k	28800-16 ¹	28774-16*m 28747-16*n	28750-16° 28758-16°
	28308-1°	99840-16 ^e 99838-16 ^f	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^j	28975-1*k	28800-16 ¹	28774-16* ^m 28747-16* ⁿ	28750-16° 28758-16°
	28308-1°	99840-16° 99838-16 ^f	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^j	28975-1*k	28800-16 ¹	28774-16* ^m 28747-16* ⁿ	28750-16° 28758-16°
	28308-1 ^e	99840-16 ^e 99838-16 ^f	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^j	28975-1*k	28800-16 ¹	28774-16* ^m 28747-16* ⁿ	28750-16° 28758-16°
	28308-1°	99840-16° 99838-16 ^f	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^j	28975-1*k	28800-16 ¹	28774-16* ^m 28747-16* ⁿ	28750-16° 28758-16°
	28308-1°	99840-16° 99838-16 ^f	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^j	28975-1*k	28800-16 ¹	28774-16*m 28747-16*n	28750-16° 28758-16°
	28308-1 ^e	99840-16° 99838-16 ^f	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^j	28975-1* ^k	28800-16 ¹	28774-16*m 28747-16*n	28750-16° 28758-16*P
	11310-1 ^f	99838-16 ^f	99944-16	99820-16 ⁹	99097-1 ^h	28624-16 ^j	28975-1*k	28800-16 ¹	28774-16*m 28747-16*n	28750-16° 28758-16*p

Section Continued



- Cam and Lifter Kit, includes assembly lubricants and rocker arm adjusting nuts (not for use in 265 and 301 cu.in. engines).

 Cam and Lifter Kit, includes assembly lubricants (not for use in 265 and 301 cu.in. engines).
- 265 and 301 cu.in. engines require 99277-16 lifters.
- Optional Hi Intensity hydraulic lifters, see page 292 for details (265 and 301 cu.in. engines require 99377-16 lifters).
- Contains standard diameter valve springs, no machining required.
 Dual valve springs, no machining required.
 Must machine cylinder heads.
 Machined steel, heat treated.

- Pro Series one-piece, for non-guideplate cylinder heads. Heavy wall, heat treated, for use with pushrod guideplate cylinder heads. Performance steel billet gears and roller chain set. 1.5 ratio, for 67-79 engines with 7/16" bottleneck studs and 3/8" nuts.

- Crane Classic aluminum, 1.65 ratio, for straight 7/16" rocker arm studs. Energizer 1.65 ratio, for straight 7/16" rocker arm studs. 1.5 ratio, for 7/16" bottleneck studs and 3/8" nuts. 1.65 ratio, for straight 7/16" rocker arm studs.

					COMPLETE CAM S			SPECIFICATIONS				
	Camshaft Series/	RPM POWER		See pg. 293	Degrees Duration @ .050"	Advertised Degrees Duration	Degrees Lobe	@ .0 Cam	50" Lift	Lash Hot Int.	Lift Int.	
Application	Grind Number	RANGE	Emissions Code	LIFTERS	Int/Exh.	Int/Exh.	Separation	Int/l	xh	Exh.	Exh.	
Hydraulic Lifter Camshaf Good mid to upper RPM torgue and HP, 455+ with alu-	ts H-296-2	2800-	284281*	99282-16 ^b	224	296	112	10	4.4	.000	472	
aodo mila to upper NYM torque and NY, 455+ With aluminum heads, fair idle, performance usage, bracket rac- ng, auto trans W/3000+ converter, 3800-4200 cruise RPM, 10.0 to 11.5 compression ratio advised.	H-296-2	6600	284281	99282-16°C	234 242	304	112	10 58	44	.000		
·	U 244/2207 2 0	2400		99282-16 ^b	244	314	108	10	ΛE	000	E00	
Good upper RPM torque and HP, rough idle, bracket rac- ing, auto trans w/3500+ converter, 10.5 to 12.0 com- pression ratio advised.	H-244/3387-2-8	3400- 6800	280451*	99282-16*°	244 254	324	108		45 14	.000		
Good upper RPM HP, rough idle, performance usage,	H-308-2	3400-	284571*	99282-16 ^b	246	308	114	14	52	.000	.495	
bracket racing, auto trans w/3500+ converter, 10.5 to 12.0 compression ratio advised. Good w/manifold nitrous system.		7000	3	99382-16* ^c	254	316		66	8	.000		
Moderate competition only, good upper RPM HP, bracket	H-260/360-2S-8	3800-	280601*	99282-16 ^b	260	330	108	24	56	.000	.540	
racing, auto trans w/4000+ converter, 12.0 minimum compression ratio advised.		7200	•	99382-16* ^c	268	338		64	24	.000	.558	
Hydraulic Roller Camsha	fts — Retrofit											
Excellent low end torque, good idle, daily usage, towing, performance and fuel efficiency, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised. Also mild turbo- charged.	HR-214/325-2S-12 IG	1400- 5600	289611*a	28532-16 ^d	214 222	276 284	112		34 (6)	.000 .000	.488 .509	
Good low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, 3000-3400 cruise RPM, 9.5 to 10.75 compression ratio advised.	HR-222/339-2S-12 IG	1800- 6000	289621" ^a	28532-16 ^d	222 230	284 292	112	4 52	38 (2)	.000		
Good mid range torque and HP, fair idle, performance	HR-226/345-251-12 IG	2000-	289661*a	28532-16 ^d	226	288	112	6	40	.000	.518	
usage, mild bracket racing, auto trans w/2800+ converter, 3200-3600 cruise RPM, best in 389+ cu.in., 10.0 to 11.0 compression ratio advised.		6200	3		234	296		54	0	.000		
Good mid range torque and HP, fair idle, performance usage, mild bracket racing, auto trans w/3000+ converter, 3600-4200 cruise RPM, best in 400+ cu,in., 10.0 to 11.5 compression ratio advised.	HR-230/352-2S1-14 IG	2200- 6400	289631" ^a	28532-16 ^d	230 238	292 300	114	6 58	44 0	.000		
Good mid range and upper RPM torque and HP, fair idle,	HR-238/365-251-14 IG	2600-	289651*a	28532-16 ^d	238	300	114	10	48	.000	5/19	
performance usage, bracket racing, auto trans w/3200+ converter, 4000-4600 cruise RPM, best in 455+ cu.in., 10.0 to 11.5 compression ratio advised.	III-230/303-231-14 IQ	6600	3	20332-10	246	308	114	62	4		.558	
Good mid range and upper RPM torque and HP, rough idle, performance usage, bracket racing, auto trans w/3500 – converter, 4200–5000 cruise RPM, best in 455 – cu.in., 10.5 to 12.0 compression ratio advised.	HR-242/372-2-14 IG	3000- 6800	289641*a	28532-16 ^d	242 252	304 314	114	12 65	50 7	.000		

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: To provide the most accurate adjustment on hydraulic lifter and hydraulic roller camshafts, a set of positive locking nuts, such as 99768-16, must be obtained for the rocker arm studs.

NOTE: Specify if casting number 540306, 544127, or 9771980 heads with 1.65 ratio rocker arms are being used, as different valve springs will be required.

NOTE: Be sure to maintain at least .040" clearance between the underside of the rocker arm and valve spring retainer when the valve is closed.

Since 1975 General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM Crane Classi Energizer	
11310-1°	99838-16°	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^k	28975-1* ^m	28800-16 ⁿ	28774-16*° 28747-16*°	28750-16 28758-16
11310-1°	99838-16°	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ⁱ 28624-16 ^k	28975-1* ^m	28800-16 ⁿ	28774-16*° 28747-16*°	28750-16 28758-16
11310-1°	99838-16°	99944-16	99820-16 ⁹	99097-1 ^h	95654-16 ^j 28624-16 ^k	28975-1* ^m	28800-16 ⁿ	28774-16*° 28747-16*°	28750-16 28758-16
	99893-16°	99953-16	99820-16 ⁹	99097-1 ^h	95654-16 ^j 28624-16 ^k	28975-1* ^m	28800-16 ⁿ	28774-16*° 28747-16*°	28750-16 28758-16
	99893-16°	99953-16 99973-16 ^f	99820-16 ⁹	99097-1 ^h 99094-1 ⁱ	I	28975-1* ^m		28774-16*° 28747-16*°	28750-16 28758-16
	99893-16°	99953-16 99973-16 ^f	99820-16 ⁹	99097-1 ^h 99094-1 ⁱ	I	28975-1* ^m		28774-16*° 28747-16*°	28750-16 28758-16
	99893-16°	99953-16 99973-16 ^f	99820-16 ⁹	99097-1 ^h 99094-1 ⁱ	I	28975-1* ^m		28774-16*° 28747-16* ^p	28750-16 28758-16
	99893-16°	99953-16 99973-16 ^f	99820-16 ⁹	99097-1 ^h 99094-1 ⁱ	I	28975-1* ^m		28774-16*° 28747-16*°	28750-16 28758-16
	99893-16°	99953-16 99973-16 ^f	99820-16 ⁹	99097-1 ^h 99094-1 ⁱ	I	28975-1* ^m		28774-16*° 28747-16*°	28750-16 28758-16
	99893-16°	99953-16 99973-16 ^f	99820-16 ⁹	99097-1 ^h 99094-1 ⁱ	I	28975-1* ^m		28774-16*° 28747-16*°	28750-16 28758-16

- a Camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. Not for use in 265 and 301 engines.
- 265 and 301 cu.in. engines require 99277-16 lifters.
- Optional Hi Intensity hydraulic lifters, see page 292 for details (265 and 301 cu.in. engines require 99377-16 lifters).
- Special length pushrods are required, Refer to page 305 for special pushrod ordering instructions. Contains dual valve springs, no machining required.
- Requires Crane Multi Fit valve locks.
- Must machine cylinder heads. Machined steel, heat treated.
- Vertical locking bar hydraulic roller lifters, no machining required. Not for use in 265 and 301 engines.

- Machined steel, heat treated, Multi Fit.
- Pro Series one-piece, for non-guideplate cylinder heads.
- Heavy wall, heat treated, for use with pushrod guideplate cylinder heads.
- Special length pushrods are required. See page 305 for special pushrod ordering instructions.
- Performance steel billet gears and roller chain set.
- 1.5 ratio, for 67-79 engines with 7/16" bottleneck studs and 3/8" nuts.
- Crane Classic extruded, 1.65 ratio, for straight 7/16" rocker arm studs.
- Energizer, 1.65 ratio, for straight 7/16" rocker arm studs.
- 1.5 ratio, for 7/16" bottleneck studs and 3/8" nuts.
- 1.65 ratio, for straight 7/16" rocker arm studs.

					СОМ	PLETE C	AM SPE	CIFICA	TIONS	
Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 293	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration	Degrees Lobe Separation	Open/Clos @ .050" Cam Lift Int/Exh	Hot Int.	Lift Int.
Mechanical Lifter Camsh		KANGE	ETHISSIONS Code	LIFIERS	IIII/EXII.	IIIL/EXII.	Separation	IIIL/EXII	EXII.	EXII.
Replacement for factory 389-421 Super Duty McKellar no. 10	BluePrinted 541596	2600- 6400	280901	99255-16°	236 247	268 284	113.5	2 54 54.5 12.5		.416 .420
Good low end and mid range torque and HP, rough idle, moderate performance usage, limited oval track, bracket racing, auto trans w/2500+ converter, 10.5 to 12.0 compression ratio advised.	F-244/3454-2S-6	3000- 7000	280921*	99255-16°	244 252	280 288	106	19 45 55 17		.518 .536
Good mid range torque and HP, fair idle, moderate per- formance usage, mild bracket racing, auto trans w/2500+ converter, good w/plate nitrous, 10.0 to 11.5 compression ratio advised.	F-248/3334-2-12	3400- 7000	281241*	99255-16°	248 258	290 300	112	17 51 66 12		.500 .520
Good mid range torque and HP, rough idle, performance usage, short oval track, bracket racing, auto trans w/3000+ converter, 11.5 to 12.5 compression ratio advised.	F-252/3574-2S1-6	3600- 7400	280981*	99255-16°	252 260	288 296	106	23 49 59 21		.536 .554
Good mid range and upper RPM torque and HP, rough idle, performance usage, bracket racing, auto trans w/3500+ converter, 12.0 minimum compression ratio advised.	F-260/3694-2S-8	4000- 7600	281441*	99255-16'	260 268	296 304	108	25 55 65 23	.026 .026	.554 .572
Mechanical Roller Camsl	nafts									
Excellent low end torque and HP, good idle, daily performance usage, mild bracket racing, 3000-3400 cruise RPM, 10.0 to 11.5 compression ratio advised.	SR-228/338-2S-12 IG	2200- 6200	288541*a	28570-16 ^d	228 236	278 286	112	7 41 55 1	.020 .020	
Good low end and mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, good w/plate nitrous, 3400- 3800 cruise RPM, 10.0 to 11.5 compression ratio advised.	SR-236/350-2S-12 IG	2600- 6600	288551*a	28570-16 ^d	236 244	286 294	112	11 45 59 5	.020 .020	.525 .543
Good mid to upper RPM torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/3000+ converter, good w/plate nitrous, 3800-4200 cruise RPM, best with 421+ cu.in., 10.5 to 12.0 compression ratio advised.	SR-244/362-25-12 IG	3000- 7000	288521*a	28570-16 ^d	244 252	294 302	112	15 49 63 9	.020 .020	
Good upper RPM torque and HP, rough idle, moderate performance usage, bracket racing, auto trans w/3500+converter, good w/plate nitrous, 4000-4400 cruise RPM, best with 455+ cu.in. with aluminum heads, 11.0 minimum compression ratio advised.	SR-252/374-2S-12 IG	3400- 7200	288531°a	28570-16 ^d	252 256	302 306	112	19 53 65 11	.020 .020	.561 .561
Competition only, good mid to upper RPM torque and HP, bracket racing, auto trans w/race converter, good w/manifold nitrous, best w/455+ cu.in. with aluminum heads, 12.0 minimum compression ratio advised.	R-268/420-25-10	4200- 7800	288811°b	28570-16 ^d	268 276	300 308	110	28 60 72 24	.020 .020	

IMPORTANT: Adjustable Vacuum Advance Kit available. See page 333 for details.

NOTE: In order to effect valve adjustment when using mechanical lifter and roller lifter camshafts, a set of positive locking nuts, such as 99768-16, must be obtained for the rocker arm studs.

NOTE: Specify if casting number 540306, 544127, or 9771980 heads with 1.65 ratio rocker arms are being used.

NOTE: Be sure to maintain at least .040" clearance between the underside of the rocker arm and valve spring retainer when the valve is closed.

Since 1975 General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.



CRANE VALV	/E TRAIN CO	OMPONENTS							
See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUN Crane Classic Energizer	
11310-1	99838-16	99944-16	99820-16 ^f	99097-19	95654-16 ⁱ 28624-16 ^j 95663-16 ^k	28975-1* ¹		28774-16* ^m	28750-16 28758-16
11310-1	99838-16	99944-16	99820-16 ^f	99097-1 ⁹	95654-16 ⁱ 28624-16 ^j 95663-16 ^k	28975-1* ¹		28774-16 ^{*m}	28750-16 28758-16
11310-1	99838-16	99944-16	99820-16 ^f	99097-1 ⁹	95654-16 ⁱ 28624-16 ^j 95663-16 ^k	28975-1* ⁱ		28774-16° ^m	28750-16 28758-16
11310-1	99838-16	99944-16	99820-16 ^f	99097-1 ⁹	95654-16 ⁱ 28624-16 ^j 95663-16 ^k	28975-1* ¹		28774-16*m	28750-16 28758-16
11310-1	99838-16	99944-16	99820-16 ^f	99097-1 ⁹	95654-16 ⁱ 28624-16 ^j 95663-16 ^k	28975-1 ⁴		28774-16*m	28750-16 28758-16
	96870-16	99973-16°	99820-16 ^f	99094-1 ^h	28624-16 ^j 95663-16 ^k	28975-1" ¹		28774-16*m	28750-16 28758-16
	96870-16	99973-16°	99820-16 ^f	99094-1 ^h	28624-16 ^j 95663-16 ^k	28975-1* ¹		28774-16*m	28750-16 28758-16
	96870-16	99973-16°	99820-16 ^f	99094-1 ^h	28624-16 ^j 95663-16 ^k	28975-1° ^I		28774-16*m	28750-16 28758-16
	96870-16	99973-16°	99820-16 ^f	99094-1 ^h	28624-16 ^j 95663-16 ^k	28975-1 ⁴		28774-16*m	28750-16 28758-16
	99896-16 ^d	99974-16°	99820-16 ^f	99094-1 ^h	28624-16 ^j 95663-16 ^k	28975-1* ¹		28774-16*m	28750-16 28758-16

- a Camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. Not for use in 265 and 301 engines.
- Requires 28990-1 aluminum-bronze distributor drive gear. Not for use in 265 and 301 engines.

 Due to block casting variations, you must check that the lifter relief band is not exposed at the bottom of the lifter bore when the lifter is on the base circle of the camshaft.

 Ultra Pro Series roller lifters.

 m
- Requires Crane Multi Fit valve locks. Must machine cylinder heads. Machined steel, heat treated.

- Machined steel, heat treated, Multi Fit.

- Pro Series one-piece, for non-guideplate cylinder heads.
 Heavy wall, heat treated, for use with pushrod guideplate cylinder heads.
 Pro Series one piece for use with or without pushrod guideplate cylinder heads.
- Performance steel billet gears and roller chain set.

 Crane Classic extruded 1.65 ratio, for straight 7/16" studs.

 1.5 ratio, for 7/16" bottleneck studs and 3/8" nuts.

 1.65 ratio, for straight 7/16" studs.

					СОМ	PLETE C	AM SPE	CIFIC	CATI	ONS	
Application	Camshaft Series/ Grind Number	rpm Power Range	Camshaft PART NUMBER/ Emissions Code	See pg. 286 FOLLOWERS	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/ @ .0 Valve Int/	50" Lift	Lash Hot Int. Exh.	Gross Lift Int. Exh.
Mechanical Follower Can	nshafts										
Good idle, daily usage, performance upgrade for stock engine, aftermarket intake/exhaust advised, new valve springs recommended, 8.75 to 10.5 compression ratio advised.	T20-262-2-10	1400- 4800	704-0010°	a	214 224	262 272	110	2 47	32 (3)	.008 .010	.416 .430
Good idle, performance usage, off road, good with mild aftermarket turbo systems, intercooler advised, aftermar- ket intake/low restriction exhaust and ECM required, 9.5 to 10.75 compression ratio advised.	T20-272-2-10	1800- 5200	704-0012*	a	224 234	272 282	110	7 52	37 2	.008 .010	.430 .444
Fair idle, good mid to upper RPM torque and HP, moder- ate performance usage, autocross, road course, 9.5 to 11.5 compression ratio advised.	T20-282-2-10	2200- 5600	704-0014*	a	234 244	282 292	110	12 57	42 7	.008 .010	.444 .458
Fair idle, moderate performance usage, prepared auto- cross, bracket racing, aftermarket intake/low restriction exhaust and upgraded valve springs and retainers rec- ommended, 10.5 to 12.0 compression ratio advised.	T20-292-2-10	2600- 6000	704-0016*	a	244 254	292 302	110	17 62	47 12	.008 .010	.458 .472
Moderate competition only, good upper RPM HP, light weight closed course, bracket racing, fully prepared engine needed, 11.0 to 12.5 compression ratio advised.	T20-302-10	3000- 6400	704-0100°	a	254 254	302 302	110	22 62	52 12	.008 .010	.472 .472

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.



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	CRANE VAL	VE TRAIN CO	OMPONENTS							
	See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
	VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC/ ENERGIZER	

 $^{{\}bf a} \quad \text{We recommend the use of the 22R-22RE followers with the insert-type contact pad.}$

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Camshaft Components

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.

Cam Button Spacers

Engines without a cam thrust plate must use a cam button spacer when using a roller lifter camshaft to limit lateral movement. Our unique needle bearing buttons reduce friction and deliver extra "free" horsepower. Crane solid aluminum spacers are priced for the budget minded racer. Machining of the cam sprocket may be required for proper installation.

Solid Aluminum Button Application	Part No.	
Chevrolet 90° V-6 78-86, 200 thru 262		
	99001-1	
Chevrolet V-8 55-95, 262 thru 400		
	99001-1	
Chevrolet V-8 65-95, 396 thru 454		
	99005-1	
Chrysler-Dodge-Plymouth V-8 "B" 70-78, w/3 bolt gear		
	99163-1	
Chrysler-Dodge-Plymouth V-8 66-71, 426 Hemi w/3 bolt gear		
	99163-1	
Needle Bearing Button Application	Part No.	
Chevrolet 90° V-6 78-86, 200 thru 262		
	99164-1	
Chevrolet V-8 55-95, 262 thru 400		
	99164-1	
Chevrolet V-8 65-95, 396 thru 454		
	99165-1	





Camshaft Bolt and Locking Plate Kit

A must to prevent costly valve train damage. Simply install on cam gear, torque bolts properly, bend locking tabs over to secure bolts from loosening.

Application	Part No.
Chevrolet 90° V-6 70-86, 200 thru 262 (except factory hydraulic roller engines)	
	99168-1
Chevrolet V-8 57-87, 262 thru 400 (except factory hydraulic roller engines)	
	99168-1
Chevrolet V-8 58-65, 348-409-427 (Z-11)	
	99168-1
Chevrolet V-8 65-95, 396-402-427-454-502	
	99168-1



Cam Followers

Crane cam followers are designed and engineered for maximum performance and reliability. They are metallurgically engineered to be compatible with the cam lobe composition of Crane camshafts. We highly recommend the use of Crane Cams Assembly Lube and Crane Cams Super Lube Break-In Concentrate (see "Lubricants") when installing these followers.

Application	Part No.
Ford SOHC I-4 1974-87, 2300 c.c. (also 1983-87 2000 c.c.)	
	19800-8



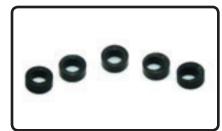
Camshaft Components



Cam Degreeing Bushings

Adjusting camshaft phasing with these bushings is one of the ways to vary the camshaft timing. These bushings are either color coded or number stamped with the degree of offset for easy identification. Included in each package are bushings in 0-2-4-6-8 degree increments. Machining of the cam sprocket may be required for proper installation.

Application	Part No.
Chevrolet 90° V-6 78-86, 200 thru 262	
	11991-1*
Chevrolet V-8 55-95, 262 thru 400	
	11991-1*
Chevrolet V-8 65-95, 396 thru 454	
	11991-1*
Chrysler-Dodge-Plymouth V-8 "B" 58-78, 350 thru 440	
	11991-1*
Chrysler-Dodge-Plymouth V-8 66-71, 426 Hemi	
	11991-1*



Cam Degreeing "Tune-A-Cam" Kit

Everything you need to quickly, easily and accurately degree-in your camshaft for maximum performance. Complete kit contains: precision dial indicator, with custom design base to mount to cylinder head, piston stop, pointer, checking springs, degree wheel and instructions — all in a hard molded plastic carrying case.

Description	Part No.
Tune-A-Cam Kit (Complete Kit)	
	99030-1



Copper Alloy (Aluminum/Bronze)

These drive gears are made from high silicon copper alloy ("aluminum-bronze") and precision machined. They are required when using an 8620 steel billet cam.

Certain special Crane roller camshafts are manufactured using an Iron Gear pressed onto the steel billet cam. These special cams **DO NOT REQUIRE** an aluminum bronze distributor drive gear. Refer to the specific camshaft application section of catalog. (Iron Gear cams' part numbers have an "IG" suffix at the end of their grind numbers)

Note: The "Shaft Diameter" dimension referred to is the portion of the distributor shaft, or intermediate shaft, that the gear registers on. It may be necessary to remove the original gear to measure the shaft diameter correctly.



Application	Part No.
Chevrolet I-4 62-71, 153	
For .491" shaft diameter	20990-1
Chevrolet I-6 62-84, 194 thru 250 & 292	
For .491" shaft diameter	20990-1
Chevrolet 90° V-6 78-86, 200 thru 262	
For .491" shaft diameter. Also fits Crane and Accel 34000, 35000, and 41000 series	11990-1
For .500" shaft diameter. Fits Crane, Accel and MSD with standard configuration gear	11979-1
Chevrolet 90° V-6 85-91, 262 (4.3 litre)	
For .427" shaft diameter GM HEI distributors with remote coil	11988-1
Chevrolet V-8 55-87, 262 thru 400	
For .491" shaft diameter. Also fits Crane and Accel 34000, 35000, and 41000 series	11990-1
For .500" shaft diameter. Fits Crane, Accel and MSD with standard configuration gear	11979-1
For .500" shaft diameter, with 5/16" hex drive	11973-1
Chevrolet V-8 85-99, 305-350	
For .427" shaft diameter GM HEI distributors with remote coil	11988-1
Chevrolet V-8 58-65, 348-409-427 (Z-11)	
For .491" shaft diameter	11990-1
Chevrolet V-8 65-90, 396 thru 502	
For .491" shaft diameter. Also fits Crane and Accel 34000, 35000, and 41000 series	11990-1
For .500" shaft diameter. Fits Crane, Accel and MSD with standard configuration gear	11979-1
For .500" shaft diameter, with 5/16" hex drive	11973-1
Chevrolet V-8 91-00, 454-502	
For .427" shaft diameter GM HEI distributors with remote coil	11988-1



Copper Alloy (Aluminum/Bronze) (continued)

Application	Part No.
Chrysler V-8 56-58, 354-392 and Donovan 417	
For .484" shaft diameter	69990-1
Chrysler-Dodge-Plymouth V-8 64-00, "LA" 273-360 and Magnum 5.2-5.9 litre	
For .484" shaft diameter	69990-1
Chrysler-Dodge-Plymouth V-8 58-78, "B" 350 thru 440	
For .484" shaft diameter	66990-1
Chrysler-Dodge-Plymouth V-8 66-71, 426 Hemi and Keith Black 426, JP-1, BA 426, Rodeck TFX-92	
For .484" shaft diameter	66990-1
Ford V-8 62-95, 221 thru 302 and Boss 302	
For .467" shaft diameter	36990-1
For .500" shaft diameter	36989-1
For .531" shaft diameter	44990-1
Ford V-8 82-95, 302 H.O. (5.0 litre)	
For .467" shaft diameter	36990-1
For .500" shaft diameter	36989-1
For .531" shaft diameter	44990-1
Ford V-8 69-00, 351W and 351 SVO	
For .467" shaft diameter	36990-1
For .500" shaft diameter	36989-1
For .531" shaft diameter	44990-1
Ford V-8 70-82, Boss 351-351C-351M-400	
For .500" shaft diameter	52990-1
For .531" shaft diameter	52989-1
Ford V-8 58-76, "FE" 332 thru 428	
For .467" shaft diameter	34990-1
For .500" shaft diameter	52990-1
For .531" shaft diameter	52989-1
Ford V-8 68-97, 370-429-460 (7.5 litre)	
For .500" shaft diameter	52990-1
For .531" shaft diameter	52989-1
Oldsmobile V-8 64-84, 260 thru 455	
For .491" shaft diameter	80990-1
Pontiac I-4 77-89, 151 and 2.5 litre S.D.	
For .491" shaft diameter, 77-78 distributor	20990-1
For .491" shaft diameter, 79-89 oil pump	20990-1
Pontiac V-8 55-81, 265 thru 455	
For .489" shaft diameter	28990-1

Coated Steel Distributor Gears

Crane Cams now offers precision machined, specially coated and processed steel distributor gears for popular engines using either cast flat faced lifter or steel roller camshafts. Since roller lifter cams are made from either induction hardened steel or carburized steel, neither of these materials are compatible with the normal stock distributor gears. In the past, "bronze" distributor gears were used. For street applications these gears can wear at a high rate and may have to be replaced on a regular basis.

By using modern heat treating and manufacturing processes, Crane Cams has developed a series of steel distributor gears that are compatible with standard cast cams and induction hardened and carburized steel roller cams. Crane Cams now makes it possible to use a steel distributor gear that provides OEM-style life-span, eliminating the need to frequently replace bronze alloy gears. These Crane steel gears are available for most popular engines for both stock and aftermarket distributors.

The use of these gears on camshafts that have been previously run with other types or materials of gears, or the unnecessary use of high volume/high pressure oil pumps, can be severely detrimental to the life of the camshaft gear.

Note: The "Shaft Diameter" dimension referred to is the portion of the distributor shaft, or intermediate shaft, that the gear registers on. It may be necessary to remove the original gear to measure the shaft diameter correctly.





Dout No

Application	Part No.
Chevrolet 90° V-6 78-86, 200 thru 262	
For .491" shaft diameter. Also fits Crane and Accel 34000, 35000, and 41000 series	11951-1
For .500" shaft diameter with standard configuration gear	11950-1
Chevrolet V-8 55-87, 262-thru 400	
For .491" shaft diameter. Also fits Crane and Accel 34000, 35000, and 41000 series	11951-1
For .500" shaft diameter with standard configuration gear	11950-1
For .500" shaft diameter, with 5/16" hex drive	11952-1
Chevrolet V-8 65-90, 396 thru 502	
For .491" shaft diameter. Also fits Crane and Accel 34000, 35000, and 41000 series	11951-1
For .500" shaft diameter with standard configuration gear	11950-1
For .500" shaft diameter, with 5/16" hex drive	11952-1
Chrysler V-8 56-58, 354-392 and Donovan 417	
For.484" shaft diameter	69970-1
Chrysler-Dodge-Plymouth V-8 64-00, "LA" 273-360 and Magnum 5.2-5.9 litre	
For.484" shaft diameter	69970-1
Chrysler-Dodge-Plymouth V-8 58-78, "B" 350 thru 440	
For.484" shaft diameter	66970-1
Chrysler-Dodge-Plymouth V-8 66-71, 426 Hemi and Keith Black 426, JP-1, BA 426, Rodeck TFX-92	
For.484" shaft diameter	66970-1



Coated Steel Distributor Gears (continued)

Application	Part No.
Ford V-8 62-95, 221 thru 302 and Boss 302	
For .467" shaft diameter	36970-1
For .500" shaft diameter	36971-1
For .531" shaft diameter	44970-1
Ford V-8 82-95, 302 H.O. (5.0 litre)	
For .467" shaft diameter	36970-1
For .500" shaft diameter	36971-1
For .531" shaft diameter	44970-1
Ford V-8 69-00, 351W and 351 SVO	
For .467" shaft diameter	36970-1
For .500" shaft diameter	36971-1
For .531" shaft diameter	44970-1
Ford V-8 70-82, Boss 351-351C-351M-400	
For .500" shaft diameter	52970-1
For .531" shaft diameter	52971-1
Ford V-8 58-76, 332 thru 428	
For .467" shaft diameter	34970-1
For .500" shaft diameter	52970-1
For .531" shaft diameter	52971-1
Ford V-8 68-97, 370-429-460 (7.5 litre)	
For .500" shaft diameter	52970-1
For .531" shaft diameter	52971-1

Fuel System Accessories

Fuel Pump Pushrods

Crane's heat treated tubular steel fuel pump pushrods for Chevrolet "small-block" and "big-block" V-8 engines are centerless ground for concentricity. They are also much lighter than solid steel O.E. type pushrods, while maintaining the strength and stiffness required for reliability in severe usage applications.

Part number **11986-1** is for hydraulic and mechanical "cast" type camshafts. Both ends of this pushrod are steel tipped for best wear characteristics for quality stock engine rebuilds!

Part number **11985-1** is specifically for use with **8620 and 9310 steel billet roller and slot hardfaced steel camshafts**. One end of the pushrod has a bronze tip to compatibly bear against the fuel pump eccentric on the camshaft, eliminating the wear problems that occur when using a standard fuel pump pushrod (especially in endurance type applications).

Application	Part No.
Chevrolet V-8 55-95, 262 thru 400	
For cast camshafts	11986-1
Chevrolet V-8 55-95, 262 thru 400	
For 8620 steel camshafts	11985-1
Chevrolet V-8 58-65, 348 thru 409	
For cast camshafts	11986-1
Chevrolet V-8 58-65, 348 thru 409	
For 8620 steel camshafts	11985-1
Chevrolet V-8 65-90, 396 thru 454	
For cast camshafts	11986-1
Chevrolet V-8 65-90, 396 thru 454	
For 8620 steel camshafts	11985-1



Lifters - Hydraulic and Mechanical

"Anti-Pump Up" Performance Hydraulic Lifters

Hydraulic lifters compensate for changes occurring within the valve train. Crane Cams' precision made "Anti-Pump Up" lifters allow the engine to reach its maximum RPM potential (with the correct cam and components). The "bleed rate" of this lifter is maintained by micro tolerances that prevent pump-up and limiting of full RPM potential. After proper preload has been set, hydraulic lifters seldom need maintenance. **Maximum RPM Potential:** 6,500 to 7,000 RPM.



Crane Cams performance hydraulic lifters offer precise oil metering and control. Our exclusive internal valving prevents hydraulic lifter "pump-up" with performance camshaft profiles, even at high RPM.

Hi Intensity Hydraulic Lifters

Crane Hi Intensity lifters produce a "variable duration effect." At lower RPM this can reduce running duration by 6° to 10° and decrease valve lift by .020" to .030". Hi Intensity lifters work best with a cam that requires more compression ratio than the engine actually has. Hi Intensity lifters restore vacuum, cylinder pressure and bottom end performance. As RPM increases, these lifters act more like a normal hydraulic lifter. At 2500 to 3000 RPM they will transmit the full duration and lift of the cam.

Use only if the engine's compression ratio is below the minimum recommended on the application page for the cam you have chosen. Hi Intensity lifters can cause "low speed detonation" if compression is too high. Slightly more noisy than standard lifters (NOT as noisy as a mechanical cam) and can trigger knock sensors.

Maximum RPM Potential: 6,500 to 7,000 RPM.



Crane Hi Intensity lifters produce maximum performance with minimal noise. They offer increased vacuum, torque and overall power with near stock valve train noise.

Mechanical ("Solid") Lifters

Mechanical "solid" lifters should be used in applications when hydraulic cams would surpass their maximum RPM potential. Mechanical lifters have no hydraulic mechanism to pump-up. Theoretically, with the correct cam and engine components, a mechanical lifter cam has an RPM potential of 8000 to 8500 RPM

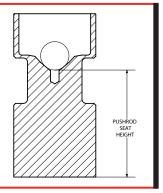
Mechanical lifters are noisier than hydraulics. The engine must have an adjustable valve train system. Valve lash must be set, periodically checked, and maintained. (Can NOT be used on a hydraulic design cam.)



Crane mechanical lifters are precision machined from finest quality alloyed materials to be metallurgically compatible with cam lobes.

Pushrod Seat Heights

The pushrod seat heights listed are measured from the bottom face of the lifter to the bottom of the pushrod seat. The hydraulic lifters are measured without any preload.



Lifters - Hydraulic and Mechanical



Application	Lifter Body Dia.	"Anti-Pump-Up" Hydraulic Lifters Part Number	Pushrod Seat Height	Hi Intensity Hydraulic Lifters Part Number	Pushrod Seat Height	Mechanical Lifters Part Number	Pushrod Seat Height
American Motors - AMC Jeep 64-05 l-6, 199 thru 258							
American Motors AMC Ioon 66 01 V 9 200 thrus 401	.904"	99278-12	1.580"			99260-12	1.485"
American Motors - AMC Jeep 66-91 V-8, 290 thru 401	.904"	99278-16	1.580"	99378-16*	1.515"	99260-16	1.485"
Buick 62-86 V-6, 196 thru 252	0.4211	00204.42	4 75511	00304.43*	1 (551)	00250.42	1.500
Buick 64-80 V-8, 300 thru 350	.842"	99284-12	1.755"	99384-12*	1.655"	99250-12	1.560"
	.842"	99284-16	1.755"	99384-16*	1.655"	99250-16	1.560"
Buick 67-76 V-8, 400 thru 455	.842"	99284-16	1.755"	99384-16*	1.655"	99250-16	1.560"
Cadillac 68-81 V-8, 368 thru 500							
Chevrolet 62-71 I-4, 153	.842"	99284-16	1.755"	99384-16*	1.655"	99250-16	1.560"
· · · · · · · · · · · · · · · · · · ·	.842"	99277-8	1.690"			99250-8	1.560"
Chevrolet 62-84 I-6, 194 thru 250 & 292	.842"	99277-12	1.690"			99250-12	1.560"
Chevrolet 80-94 60D V-6, 173(2.8L)-189(3.1L)	.042	772/1-12	1.090			77230-12	1.300
	.842"	99286-12	1.745"			99250-12	1.560"
Chevrolet 78-86 90D V-6, 200 thru 262	.842"	99277-12	1.690"			99250-12	1.560"
Chevrolet 55-95 V-8, 262 thru 400							
Chevrolet 58-65 V-8, 348-409-427(Z-11)	.842"	99277-16	1.690"	99377-16*	1.620"	99250-16	1.560"
	.842"	99277-16	1.690"	99377-16*	1.620"	99250-16	1.560"
Chevrolet 65-90 V-8, 396 thru 454 & 502	.842"	99277-16	1.690"	99377-16*	1.620"	99250-16	1.560"
Chrysler-Dodge-Plymouth 64-87 "LA" V-8, 273 thru 360	.042	772//-10	1.090	773//-10	1.020	77230-10	1.300
	.904"	99278-16	1.580"	99378-16*	1.515"	99260-16	1.485"
Chrysler-Dodge-Plymouth 58-67 "B" V-8, 350 thru 440	.904"					99259-16	1.300"
Chrysler-Dodge-Plymouth 68-78 "B" V-8, 383 thru 440							
Chrysler-Dodge-Plymouth 64-71 V-8, 426 Hemi	.904"	99278-16	1.580"	99378-16*	1.515"	99259-16	1.300"
	.904"	99278-16	1.580"	99378-16*	1.515"	99259-16	1.300"
Ford-Mercury 60-83 I-6, 144 thru 250	.874"	99281-12	1.575"				
Ford-Mercury 65-96 I-6, 240-300	.07 च	77201-12	1.373				
Frud Marrows (2) 05 W 0 224 4hrs. 202 0 254 W	.874"	99280-12	1.710"			99257-12	1.635"
Ford-Mercury 62-95 V-8, 221 thru 302 & 351W	.874"	99280-16	1.710"	99380-16*	1.635"	99257-16	1.635"
Ford-Mercury 69-82 V-8, Boss 302, Boss 351, 351C, 351M-400							
Ford-Mercury 58-76 "FE" V-8, 332 thru 428	.874"	99280-16	1.710"	99380-16*	1.635"	99257-16	1.635"
rota mercary 50 70 TE T 0,552 and 120	.874"	99281-16	1.575"	99381-16*	1.500"	99256-16*	0.150"
Ford-Mercury 68-97 V-8, 370 thru 460							
Oldsmobile 64-84 V-8, 260 thru 455	.874"	99280-16	1.710"	99380-16*	1.635"	99257-16	1.635"
olusinoone of the of 200 tinu 455	.842"	99284-16	1.755"	99384-16*	1.655"	99250-16	1.560"
Pontiac 77-89 I-4, 151(2.5L)	o .r ::						
Pontiac 55-81 V-8, 287 thru 455 (exceot 77-81 265 & 301)	.842"	99284-8	1.755"			99250-8	1.560"
	.842"	99282-16	1.760"	99382-16*	1.680"	99255-16	1.570"
Pontiac 77-81 V-8, 265 & 301	o .r ::		4 40-11		4.485		
Rover 68-00 V-8, 215(3.5L)-240(3.9L)-4.2L	.842"	99277-16	1.690"	99377-16*	1.620"	99250-16	1.560"
1101C1 00 00 1 0, 213(3.31) 270(3.31) -7.21	.842"	99284-16	1.755"	99384-16*	1.655"	99250-16	1.560"

a Shell type

^{*}This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.

Lifters - Hydraulic Roller

Hydraulic Roller

Crane hydraulic roller lifters are offered in two basic designs: Those for use with standard factory alignment bars (on engines originally equipped with hydraulic roller lifters); and vertical locking bar drop-in lifters (designed to retrofit engines not factory equipped with hydraulic roller lifters).

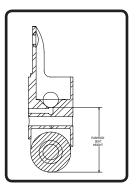
The Chevrolet standard alignment bar lifters are available in a normal dimensioned version, intended for use with standard lobe lift and standard base circle diameter cams. When lobe lifts increase, and base circle diameters decrease, our exclusive long body design lifters must be used to prevent the lifters from dropping out of the factory alignment bars when on the base circle of the camshaft. This would allow the lifters to rotate, causing severe engine damage. As these lifters are for engines originally equipped with hydraulic roller lifters, special length pushrods are not usually required.



Our retrofit vertical locking bar lifters are available for non-hydraulic roller equipped engines.. They can also be used in many applications to replace factory hydraulic roller lifters and alignment mechanisms. No machining is normally required for the drop-in installation of these lifters, however with differences in block castings and camshaft base circle diameters, care must be taken to insure that neither the locking bar, or its attaching rivets, contact the block casting throughout their normal cycles. If there is any interference, the block can usually be ground to provide the necessary clearance. This should be checked prior to final engine assembly. When used in retrofit applications, special length pushrods are required.



The retrofit vertical locking bar lifters are machined from 8620 steel billet, heat treated, and assembled at our own facilities. Precision fit plunger assemblies are used to provide proper bleed-down rates, permitting high RPM use in properly set-up engines. The additional inherent strength of the 8620 material also maintains greater stability in the lifter body, permitting more consistent operation in very high spring pressure and high RPM applications, by keeping the plunger to body clearance consistent throughout the operation range. Retrofit lifters also utilize our latest Monel pin and retaining flange assembly to attach the guidebar, providing superior long term durability.



Each lifter has its pushrod seat height listed. This is the measurement from the bottom of the pushrod seat, to the bottom face of the lifter. For hydraulic lifters, this is the measurement with no (zero) lifter preload. You can check or compare your lifters to these dimensions by placing a 5/16" diameter ball in the pushrod seat, and measuring from the bottom of the lifter to the top of the ball. Then subtract the 5/16" diameter of the ball, obtaining the seat height.

Application	Lifter Body Dia.	Follower Wheel Dia.		O.E. Replacement Part No.	Crane Classic Part No.
American Motors/Jeep V-8 66-91, 290-304-343-360 (5.9L)-390-401 cu.in.					
Vertical locking bar design. No machining required for installation. NOTE: Requires special length pushrods. See engine application pages for information.	.904"	.700"	2.320"		86532-16ª
Chevrolet V-8 55-87, 262-283-302-305-307-327-350-400 cu.in.					
Vertical locking bar design to retrofit pre-hydraulic roller blocks. No machining required for installation. NOTE: Requires special length pushrods 11628-16	.842"	.700"	2.320"		11532-16ª
Vertical locking bar design to retrofit pre-hydraulic roller blocks. For .904" diameter lifter bores (machining required). NOTE: Requires special length pushrods 11628-16	.904"	.700"	2.320"		11562-16ª
Chevrolet V-8 87-99, 305 and 350 cu.in. and LS1 5.7L					
0.E. replacement for 87–99 blocks originally equipped with hydraulic roller cam and lifters. For use with standard GM alignment bars.	.842"	.700"	2.340"	10530-16a	
Long body design for 87-99 blocks originally equipped with hydraulic roller cam and lifters. A necessity when camshafts have greater than stock lobe lift or reduced base circle diameter. For use with standard GM alignment bars.	.842"	.700"	2.320"		10535-16ª
Chevrolet V-8 2000-up, 5.7L LS1/LS6 & Vortec 4800, 5300, 6000					
O.E. replacement for 2000-up blocks originally equipped with hydraulic roller cam and lifters. For use with standard GM alignment bars.	.842"	.700"	2.340"	144530-16a	
Long body design for 2000-up blocks originally equipped with hydraulic roller cam & lifters. A necessity when camshafts have greater than stock lobe lift or reduced base circle diameter. For use with standard GM alignment bars.	.842"	.700"	2.320"		144536-16ª
Vertical locking bar, long travel design. No machining required for installation.	.842"	.700"	2.320"		144532-16a
Vertical locking bar, long travel design for Warhawk blocks. No machining required for installation.	.842"	.700"	2.320"		144533-16ª
Chevrolet V-8 58-65, 348-409-427 (Z-11) cu.in.					
Vertical locking bar design. No machining required for installation. NOTE: Requires special length pushrods. See engine application pages for information.	.842"	.700"	2.320"		11532-16ª



Lifters - Hydraulic Roller



Hydraulic Roller

And the state of	Body	Follower Wheel	Seat	Replacement	
Application Chevrolet V-8 65-95, 396-402-427-454-502 cu.in.	Dia.	Dia.	Height	Part No.	Part No.
Vertical locking bar design to retrofit pre-hydraulic roller blocks. No machining required for installation. NOTE: Requires special length pushrods 13628-16 for standard deck block, or 13629-16 for +.400" tall deck block.	.842"	700"	2.320"		13532-16ª
Vertical locking bar design to retrofit pre-hydraulic roller blocks. For .904" diameter liffter bores (machining required). NOTE: Requires special length pushrods 13628-16 for standard deck block, or 13629-16 for +.400" tall deck block.	.904"	.700"	2.320"		13562-16ª
Chevrolet V-8 96-00, 454-502 cu.in. Gen VI					
Long body design for 96-00 blocks originally equipped with hydraulic roller cam and lifters. A necessity when camshafts have greater than stock lobe lift or reduced base circle diameter. For use with standard GM alignment bars.	.842"	.700"	2.320"		26535-16ª
Chevrolet V-8 01-08, 8.1 Litre (8100)					
Long body design. A necessity when camshafts have greater than stock lobe lift or reduced base circle diameter. For use with standard GM alignment bars.	.842"	.700"	2.320"		26535-16ª
Chrysler V-8 51-58, 301-331-354-392 cu.in.					
Vertical locking bar design. No machining required for installation. NOTE: Requires special length pushrods. See engine application pages for information.	.904"	.700"	2.320"		68532-16ª
Chrysler-Dodge-Plymouth V-8 64-87, "LA" 273-318-340-360 cu.in.					
Vertical locking bar design. Machining not normally required for installation. However, some 340-360 blocks may require modification for guidebar dearance, while early 273 and some aftermarket cylinder heads may require modification for pushrod dearance. NOTE: Requires special length pushrods. See engine application pages for information.	.904"	.700"	2.320"		69532-16ª
Chrysler-Dodge-Plymouth V-8 86-91, "LA" 5.2-5.9L & 92-02 Magnum 5.2-5.9L					
O.E. replacement for 86-02 blocks originally equipped with hydraulic roller cam and lifters. For use with standard Chrysler alignment bars.	.904"	.700"	2.355"	70530-16a	
Chrysler-Dodge-Plymouth V-8 58-78, "B" 350-361-383-400-426-440 cu.in.					
Vertical locking bar design. No machining required for installation. NOTE: Requires special length pushrods. See engine application pages for information.	.904"	.700"	2.320"		68532-16ª
Chrysler-Dodge-Plymouth V-8 64-71, Hemi 426 cu.in.					
Vertical locking bar design. No machining required for lifter installation. However, due to the increased pushrod seat height of the Crane retrofit hydraulic roller lifters, the cylinder heads, and possibly the cylinder block, will have to be modified for pushrod clearance. **NOTE: Requires special length pushrods. See engine application pages for information.	.904"	.700"	2.320"		68532-16ª
Ford V-8 62-87, 221 thru 302, Boss 302, and 69-93, 351 Windsor					
Vertical locking bar design to retrofit pre-hydraulic roller blocks. No machining required for installation. Requires cylinder head removal for installation on 221 through 302 and 302 H.O. applications. NOTE: Requires special length pushrods. See engine application pages for information.	.874"	.700"	2.320"		36532-16ª
Ford V-8 85-00, 302, 302 H.O., 5.0L, and 94-97, 351 Windsor					
O.E. replacement for blocks originally equipped with hydraulic roller cam and lifters. For use with standard Ford alignment bars.	.874"	.700"	2.320"	36530-16a	
Ford V-8 70-82, Boss 351-351C-351M-400 cu. in.					
Vertical locking bar design. No machining required for installation. NOTE: Requires special length pushrods. See engine application pages for information.	.874"	.700"	2.320"		36532-16ª
Ford V-8 63-76, 352 thru 428 cu. in.					
Vertical locking bar design. No machining required for installation. NOTE: Requires special length pushrods. See engine application pages for information.	.874"	.700"	2.320"		35532-16ª
Ford V-8 68-97, 370-429-460 cu. in. (except Boss 429 Hemi)					
Vertical locking bar design. No machining required for installation. NOTE: Requires special length pushrods. See engine application pages for information.	.874"	.700"	2.320"		35532-16ª
Ford V-8 69-70, Boss 429 Hemi					
Vertical locking bar design. No machining required for installation. NOTE: Requires special length pushrods. See engine application pages for information.	.874"	.700"	2.320"		30532-16ª
Oldsmobile V-8 64-84, 260-307 (5.0L)-330-350 (5.7L)-400-403-425-455 cu.in.					
Vertical locking bar design for .842" diameter lifter bores. No machining required for installation. NOTE: Requires special length pushrods. See engine application pages for information.	.842"	.700"	2.320"		28532-16ª
Pontiac V-8 55-81, 287-316-326-347-350-370-389-400 (6.6L)-421-428-455 cu.in. Vertical locking bar design. No machining required for installation. Not for use in 265 (4.3L) or 301 (4.9L) engines. NOTE: Requires special length pushrods. See engine application pages for information.	.842"	.700"	2.320"		28532-16ª

a To order spares, you may order any of these lifters in pairs by removing the -16 from the set part number and replacing it with a -2. For example, a 11532-16 set will become a 11532-2 when ordering one pair.

Mechanical Roller Lifters

Crane roller lifters are the standard by which all others are judged. From our first horizontal locking bar version, with patented roller shield body, to our latest Ultra Pro-Series design, Crane has brought innovation and proven reliability to this critical component. For maximum reliability, pressure-fed oil is routed to the roller wheel and bearings on engines with this oiling system design. This is another Crane pioneered feature.

Another Crane innovation is our use of Bearing Focused Oiling. As many racing engines do not have pressurized oil to the lifter bores, a method is needed to supply oil to the bearing assemblies. This utilizes two passages in the lifter body adjacent to the roller wheel, conducting the oil that is pressed out from between the roller and the camshaft lobe to the roller bearings. There are no small passages that can clog, and no engine oil pressure is sacrificed to provide this lubrication and cooling to the needle bearings. Bearing, roller, and axle life is therefore extended by the benefits of a continuous oil flow over these components.

Due to the proliferation of factory and aftermarket cylinder blocks (which may have relocated camshaft locations, relocated oil galleries, changed lifter boss heights, lifter bores of varied diameters and center-to-center distances, etc.), the manufacture and se



bores of varied diameters and center-to-center distances, etc.), the manufacture and selection of the proper roller lifter has also become more exacting. This listing includes most popular applications available at the time of publication, but new items are being continuously released. We also offer custom roller lifters to suit specialized block-camshaft-cylinder head combinations. Contact Crane's Performance Consultants if you have any unique requirements.

Our Crane Classic design roller lifters are suitable for virtually all performance applications. Both the horizontal and vertical locking bar versions are used throughout motorsports today. Our Ultra Pro-Series lifters feature maximized lifter bore contact surfaces for less wear, weight removed from non-critical areas, increased body stiffness, and premium materials chosen wherever necessary.

Upgrades to the Ultra Pro-Series lifters include carburized 8620 steel bodies, upgraded materials and metal processing for the roller wheels, needle bearings, and axles. A new guidebar attachment system incorporates a retaining button in conjunction with an aerospace quality monel pin to provide superior clamping forces and resistance to wear. Extreme Spintron and track testing has confirmed this configuration to be superior to anything else on the market today.

All machining, and assembly is performed at our own facilities, insuring absolute accuracy and total quality control. The spring-loaded horizontal locking bar lifters have the unique feature of permitting cam changes without intake manifold removal (providing a rev-kit is not used). Loosening the rocker arms and removing the pushrods allows the springs to pick the lifters up away from the camshaft. The cam can then be removed and replaced in minimal time. This convenience is especially helpful during dyno and on-track testing sessions.

We do not advise the use of oil restrictors with our roller lifters. Crane roller lifters are designed for use with normal oiling systems. The needle bearings within are dependent on oil flow to provide lubrication and transfer of the heat generated by today's high valve spring pressures and increased rocker arm ratios. Particularly hard on these components are prolonged periods of idling when oil flow is at a minimum but spring pressures are still high.

Whenever possible, standard pushrod seat height is maintained from the bottom of the wheel so that normal length pushrods are used. In consideration of special geometry applications, the seat may be higher, or lower, than standard for best fitment. These instances are noted in the application description where required. The pushrod socket radius is usually stock, and any deviations are also noted in the application description.

Block machining is not normally required for the installation of these lifters (other than the lifter bore diameter options), however with differences in block castings and camshaft base circle diameters, care must be taken to ensure that the lifter, locking bar, and locking bar attaching rivets (where applicable), do not encounter any bind, or unwanted contact, throughout their normal cycles. If there is any interference, the block can usually be ground to provide the necessary clearance. This should be checked prior to final engine assembly.



Mechanical Roller Lifters (continued)

We do not advise the use of offset pushrod seat roller lifters, when the pushrod angle imparts rotational forces upon the lifter. Offset roller lifters are acceptable for use when the pushrods are angled to the front or rear of the engine (parallel to the camshaft). If the pushrods lean toward the left or right of the lifter bores (as viewed from the front or rear of the engine), this will put severe loads on the lifter guidebar and it's attaching mechanism, which can lead to decreased reliability and possible failure. When building a serious racing engine, it's advisable to avoid using offset lifters whenever possible. Offset lifters can also be responsible for accelerated wear to the lifter bores, lifter bodies, roller wheel/bearings/axles, and cam lobes. Plan ahead when choosing and preparing your cylinder block and heads, so you can use centered lifters for best reliability.



Choose The Right Crane Roller Lifters for Your Application

Crane Classic Design or Ultra-Pro™ Roller Lifters?

With the release of Crane Cams new *Ultra-Pro*™ series of roller lifters, you might be wondering just which series of lifters is right for your application. Listed below are some guidelines for making the correct choice and getting "the best performance for your dollar".

Crane Classic Design Crane roller lifters were developed when camshaft lobes were not nearly as violent as today. They are ideal for street-rollers, many bracket-race type applications and other racing uses where cam profiles aren't as aggressive. Made of carburized (heat treated) 8620 alloy steel, these rollers are capable of handling up to 240 lbs., of valve spring seat pressure in bracket race applications and up to 220 lbs., of seat pressure in endurance applications – providing the cam lobe profile is not extremely violent. Open pressures exceeding 600 lbs., are not recommended for these lifters. Crane Classic Design lifters feature high quality wheels and axles that "look alike" lifters do not have. You'll find that the materials, machining tolerances and overall quality of Crane Classic Design roller lifters far exceeds lifters being sold for a lower price. These roller lifters feature all the quality and durability you expect from a Crane Cams product yet they are very economically priced.

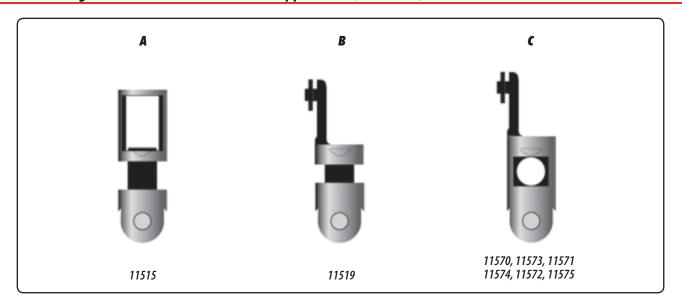
Crane *Ultra-Pro*™ roller lifters are the ultimate in state-of-the-art, drop-in design premium quality roller lifters! Empirical design and development techniques have been used to eliminate any distortion effects of residual stresses resulting from the heat treat process. *Ultra-Pro*™ roller lifters feature maximized strength; especially in the axle support struts. This insures geometrically perfect tracking of the roller wheel. Additionally, super-premium wheels, axles and bearings made from the finest grades of alloy steels are used to conquer even the most violent cam lobe profiles currently designed or anticipated for the next several years! These lifters represent the best combination of lightweight, ultimate strength and reliability. They should be used in all drag race applications with spring seat pressures in excess of 300 lbs., and open pressures over 800 lbs. In addition, they should be used in any short-track circle or endurance racing application where valve spring seat pressures exceed 250 lbs., and open pressures exceed 700 lbs. Use Crane Cams *Ultra-Pro*™ series lifters when absolute durability is necessary.





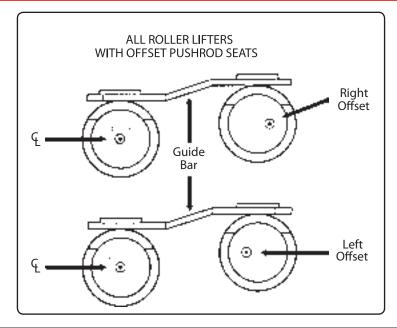
With Crane Cams *Ultra-Pro™* roller lifters, engine builders can now be sure that they're using the absolute finest available, professional quality roller lifters for high-stress race engine applications. Count on Crane Cams to give you a full selection of performance products with the best performance for the buck and peace of mind for you.

Choose The Right Crane Roller Lifters for Your Application (continued)



These drawings represent the basic styles of Crane mechanical roller lifters for Chevy 262-400 V-8 type engines and their various heights. Example **A** is the horizontal locking bar (spring-loaded) Crane Classic design. The vertical locking bar version **B** is the Crane Classic design vertical locking bar design. C represents the Ultra-Pro Series design, as required for various lifter bore diameters and heights. Refer to the specific Buyer's Guide listing for the proper engine application of each variation.

How to Identify Roller Lifter Offsets



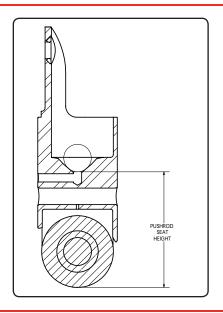
When ordering spare lifters with offset pushrod seat locations you MUST specify left or right offset. For example, a pair of lifters for set number 13571-16 would be either 13571L-2 (left) or 13571R-2 (right). See drawing to identify lifter offsets.

Section Continued





Pushrod Seat Heights



The pushrod seat heights listed are measured from the bottom of the follower wheel to the bottom of the pushrod seat

Application	Crane DOES NOT recommend the use of oil restrictors.	Lifter Body Dia.	Follower Wheel Dia.	Pushrod Seat Height	Crane Classic Part No.	Ultra Pro Series Part No.
American Motor	s V-8 66-91, 290-304-343-360 (5.9L)-390-401 cu.in.					
Vertical locking bar w	ith .200″ short pushrod seat location	.904"	.815"	1.325"		66550-16
Arias/Fontana/N	1BR V-8, 8.3L					
Vertical locking bar		.904"	.815"	1.325"		95542-16
Vertical locking bar w	ith .120" tall pushrod seat location	.904"	.815"	1.455"		95543-16
Vertical locking bar w	ill accommodate pushrod oiling	.904"	.815"	1.325"		95550-16
Brad Anderson 4	26, Rodeck TFX-92, Keith Black Aluminum 426 V-8, JP-1				•	
Vertical locking bar		.904"	.815"	1.325"		66542-16
Vertical locking bar w	ith .120" tall pushrod seat location	.904"	.815"	1.455"		66543-16
Vertical locking bar fo	r spread lifter bore blocks	.904"	.815"	1.325"		95542-16
Vertical locking bar fo	r spread lifter bore blocks, with .120" tall pushrod seat location	.904"	.815"	1.455"		95543-16
Vertical locking bar for	spread lifter bore cylinder blocks, will accommodate pushrod oiling	.904"	.815"	1.325"		95550-16
Vertical locking bar for 1.	000" diameter lifter bores, with standard to .200" spread lifter bore spacing	.998"	.920"	1.320"		66547-16
	r 1.000" diameter lifter bores, with standard to .200" spread lifter bore spacing, d seat location, will accommodate pushrod oiling.	.998"	.920"	1.515"		66555-16
Vertical locking bar fo with .200" tall pushro	r 1.062" diameter lifter bores, with standard to .200" spread lifter bore spacing, d seat location.	1.060"	.920"	1.520"		66549-16
Buick/Dart Race	Head V-8, 302-350 cu. in.					
Vertical locking bar for	.842" diameter lifter bores, with .180" offset left intake and exhaust pushrod seats	.842"	.750"	1.575"		X1057L-2
Vertical locking bar for	.875" diameter lifter bores, with .180" offset left intake and exhaust pushrod seats	.874"	.750"	1.575"		X1061L-2
Vertical locking bar for	.904" diameter lifter bores, with .210" offset left intake and exhaust pushrod seats	.904"	.815"	1.595"		X1269L-2
Chevrolet 90° V-	6 78-86, 200-229-262 (4.3L) cu. in.					
Vertical locking bar for H	D. aluminum cylinder block or iron blocks with V-8 type lifter bore oiling	.842"	.750"	1.575"	11519-2	

Application Crane DOES NOT recommend the use of oil restrictors.	Lifter Body Dia.	Follower Wheel Dia.	Pushrod Seat Height	Crane Classic Part No.	Ultra Pro Series Part No.
Chevrolet V-8 55-00, 262-400 cu. in., GM Bow Tie, Donovan, Rodeck (except	LS1 and SB2)				
Horizontal locking bar	.842"	.750"	1.575"	11515-16	
Vertical locking bar for standard or tall lifter bore Bow Tie, hydraulic roller, or aftermarket cylinder blocks	.842"	.750"	1.575"	11519-16	11570-16
Vertical locking bar for blocks with 55mm, or greater, oversize journal camshafts	.842"	.750"	1.575"		11576-16
Vertical locking bar with .180" offset left and right intake pushrod seats, for standard or tall lifter bore Bow Tie, hydraulic roller, or aftermarket cylinder blocks	.842"	.750"	1.575"		11571-16
Vertical locking bar with .180" offset left and right intake pushrod seats, for blocks with 55mm, or greater, oversize journal camshafts	.842"	.750"	1.575"		11577-16
Vertical locking bar for Chevrolet Splayed Valve cylinder heads, with .180″ offset left and right intak and exhaust pushrod seats, for standard or tall lifter bore Bow Tie, hydraulic roller, or aftermarket cylinder blocks	e .842"	.750"	1.575"		8 of X1021-2
Vertical locking bar for .875" diameter lifter bores, in standard or tall lifter bore Bow Tie, hydraulic roller, or aftermarket cylinder blocks	.874"	.750"	1.575"		11572-16
Vertical locking bar for .875″ diameter lifter bores, for standard or tall lifter bore Bow Tie, hydraulic roller, or aftermarket cylinder blocks, with .180″ offset left and right intake pushrod seats	.874"	.750"	1.575"		11573-16
Vertical locking bar for .875" diameter lifter bores, for Chevrolet Splayed Valve cylinder heads, with .180" offset left and right intake and exhaust pushrod seats, for standard or tall lifter bore Bow Tie, hydraulic roller, or aftermarket cylinder blocks	.874"	.750"	1.575"		8 of X1062-2
Vertical locking bar for .904" diameter lifter bores, for standard or tall lifter bore Bow Tie, hydraulic roller, or aftermarket cylinder blocks	.904"	.815"	1.595"		11574-16
Vertical locking bar for .904" diameter lifter bores, for blocks with 55mm, or greater, oversize journal camshafts	al .904"	.815"	1.595"		11578-16
Vertical locking bar for .904" diameter lifter bores, with .210" offset left and right intake pushrod seats, for standard or tall lifter bore Bow Tie, hydraulic roller, or aftermarket cylinder blocks	.904"	.815"	1.595"		11575-16
Vertical locking bar for .904" diameter lifter bores, for Chevrolet Splayed Valve cylinder heads with .210" offset left and right intake and exhaust pushrod seats, for standard or tall lifter bore Bow Tie, hydraulic roller, or aftermarket cylinder blocks	.904"	.815"	1.595"		8 of X1274-2
Vertical locking bar for .904" diameter lifter bores, with .210" offset left and right intake pushrod seats for blocks with 55mm, or greater, oversize journal camshafts	.904"	.815"	1.595"		11579-16
Chevrolet V-8 55-00, 262-400 cu.in. with SB2 cylinder heads					
Vertical locking bar with .180" offset left and right pushrod seats, for standard or tall lifter bore Bov Tie, hydraulic roller, or aftermarket cylinder blocks	.842"	.750"	1.575"		138571-16
Vertical locking bar for .875" diameter lifter bores, with .180" offset left and right pushrod seats, for standard or tall lifter bore Bow Tie, hydraulic roller or aftermarket cylinder blocks	.874"	.750"	1.575"		138573-16
Vertical locking bar for .904" diameter lifter bores, with .210" offset left and right pushrod seats, for standard or tall lifter bore Bow Tie, hydraulic roller, or aftermarket cylinder blocks	.904"	.815"	1.595"		138575-16
Chevrolet V-8 88-00, 305-350 cu. in., LS1 5.7L (except SB2)					
Long body design for use with standard GM alignment bars, in engines originally equipped with hydraulic roller lifters	.842"	.700"	2.310"	10510-16	

Section Continued





Application Crane DOES NOT recommend the use of oil restrictors.	Lifter Body Dia.	Follower Wheel Dia.	Pushrod Seat Height	Crane Classic Part No.	Ultra Pro Series Part No.
Chevrolet V-8 2000-up, 5.7L LS1/LS2, LS3/L92, LS6 & Vortec 4800, 5300, 6000					
Long body design for use with standard GM alignment bars, in engines originally equipped with hydraulic roller lifters	.842"	.700"	2.310"	144511-16	
Vertical locking bar, long body design, for increased lift and reduced base circle camshafts	.842"	.750"	1.575"		144570-16
Vertical locking bar, long body design, for Warhawk blocks, for increased lift and reduced base circle camshafts.	.842"	.750"	1.575"		144572-16
Chevrolet V-8 98-05, 5.7L SB2 (for canted lifter bore blocks)					
Vertical locking bar	.842"	.750'	1.575"		123570-16
Vertical locking bar with .180" offset left and right intake pushrod seats	.842"	.750'	1.575"		123571-16
Vertical locking bar for .875" diameter lifter bores	.874"	.750'	1.575"		123572-16
Vertical locking bar for .875" diameter lifter bores, with .180" offset left and right intake pushrod seats	.874"	.750'	1.575"		123573-16
Chevrolet V-8 58-65, 348-409-427 (Z-11) cu.in.					
Vertical locking bar	.842"	.750"	1.575"	15519-16	
Chevrolet V-8 65-00, 396-402-427-454-502 cu.in. (including Gen V and Gen VI), D	onovan, Ro	deck 481			
Horizontal locking bar—must use 3/8" diameter pushrods	.842"	.750"	1.575"	13515-16	
Vertical locking bar for standard or tall lifter bore cylinder blocks	.842"	.750"	1.575"	13519-16	13570-16
Vertical locking bar for blocks with 55mm, or greater, oversize journal camshafts	.842"	.750"	1.575"		13576-16
Vertical locking bar with .180" offset left and right intake pushrod seats, for standard or tall lifter bore cylinder blocks	.842"	.750"	1.575"		13571-16
Vertical locking bar with .180" offset left and right intake pushrod seats, for blocks with 55mm, or greater, oversize journal camshafts	.842"	.750"	1.575"		13577-16
Vertical locking bar for .875" diameter lifter bores, for standard or tall lifter bore cylinder blocks	.874"	.750"	1.575"		13572-16
Vertical locking bar for .875" diameter lifter bores, for standard or tall lifter bore cylinder blocks, with .180" offset left and right intake pushrod seats	.874"	.750"	1.575"		13573-16
Vertical locking bar for .904" diameter lifter bores, for standard or tall lifter bore cylinder blocks	.904"	.815"	1.595"		13574-16
Vertical locking bar for .904" diameter lifter bores, for blocks with 55mm, or greater, oversize journal camshafts	.904"	.815"	1.595"		13578-16
Vertical locking bar for .904" diameter lifter bores, with .210" offset left and right intake pushrod seats, for standard or tall lifter bore cylinder blocks	.904"	.815"	1.595"		13575-16
Vertical locking bar for .904" diameter lifter bores, with .210" offset left and right intake pushrod seats, for blocks with 55mm, or greater, oversize journal camshafts	.904"	.815"	1.595"		13579-16
Chevrolet V-8 96-00, 454 (7.4L)-502 (8.2L) cu.in. Gen VI					
Long body design for use with standard GM alignment bars in engines originally equipped with hydraulic roller lifters	.842"	.700"	2.310"	16510-16	

Application	Crane DOES NOT recommend the use of oil restrictors.	Lifter Body Dia.	Follower Wheel Dia.	Pushrod Seat Height	Crane Classic Part No.	Ultra Pro Series Part No.
Chrysler V-8 51-58,	301-331-354-392 cu.in.					
Vertical locking bar		.904"	.750'	1.460"	66515-16	
Vertical locking bar		.904"	.815"	1.325"		66542-16
Vertical locking bar with .	120" tall pushrod seat location	.904"	.815'	1.455"		66543-16
Chrysler-Dodge-Ply	mouth V-8 64-00, "LA" 273-318-340-360 cu.in. (No lifter bore	e oiling mod	ifications req	juired)		
Vertical locking bar		.904"	.750"	1.460"	69515-16	
Vertical locking bar		.904"	.815"	1.325"		69542-16
Vertical locking bar will a	commodate pushrod oiling	.904"	.815"	1.325"		69550-16
Vertical locking bar for tal	l lifter bore cylinder blocks, with .400" tall pushrod seat location	.904"	.815"	1.725"		69554-16
Chrysler-Dodge-Ply (R-blocks having 59	mouth V-8, "LA" R-block 318-360 cu.in. w/ 48° lifter bank and ° lifter bank angles are not intended for use w/ roller camsha	gle ıfts)				
Vertical locking bar will a	commodate pushrod oiling	.904"	.815"	1.325"		69552-16
Chrysler-Dodge-Ply	mouth V-8 58-78, "B" 350-361-383-400-426-440 cu.in. (No li	ifter bore oil	ing modifica	tions require	ed)	
Vertical locking bar		.904"	.750"	1.460"	66515-16	
Vertical locking bar		.904"	.815"	1.325"		66542-16
Vertical locking bar with .	120" tall pushrod seat location	.904"	.815"	1.455"		66543-16
Vertical locking bar will a	commodate pushrod oiling	.904"	.815"	1.325"		66550-16
Vertical locking bar for tal	l lifter bore cylinder blocks, with .400″ tall pushrod seat location	.904"	.815"	1.725"		66554-16
Chrysler-Dodge-Ply	mouth V-8 64-71, Hemi 426 cu.in. (also see Keith Black roller	lifter listing	s) (No lifter b	ore oiling m	odifications	required)
Vertical locking bar		.904"	.750"	1.460"	66515-16	
Vertical locking bar		.904"	.815"	1.325"		66542-16
Vertical locking bar with .	120" tall pushrod seat location	.904"	.815"	1.455"		66543-16
Vertical locking bar will a	commodate pushrod oiling	.904"	.815"	1.325"		66550-16
Vertical locking bar for tal	l lifter bore cylinder blocks with .400" tall pushrod seat location	.904"	.815"	1.725"		66554-16
Vertical locking bar for 1.0 .200" tall pushrod seat loc	100" diameter lifter bores, with standard to .200" spread lifter bore spacing, with ation, will accommodate pushrod oiling	.998"	.920"	1.515"		66555-16
Donovan V-8, 417 c	u.in.					
Vertical locking bar		.904"	.750"	1.460"	66515-16	
Vertical locking bar	Vertical locking bar			1.325"		66542-16
Vertical locking bar with .	120" tall pushrod seat location	.904"	.815"	1.455"		66543-16
	100" diameter lifter bores, with standard to .200" spread lifter bore spacing, with ation, will accommodate pushrod oiling	.998"	.920"	1.515"		66555-16



Application	ane DOES NOT recommend the use of oil restrictors.	Lifter Body Dia.	Follower Wheel Dia.	Pushrod Seat Height	Crane Classic Part No.	Ultra Pro Series Part No.
Ford V-8 62-00, 221-25	55 (4.2L)-260-289-302-5.0L, 5.0L H.O., Boss 302, 351W cu	ı.in.				
Vertical locking bar		.874"	.750"	1.720"	44518-16	
Vertical locking bar		.874"	.750"	1.720"		44570-16
Vertical locking bar with .180"	offset right intake pushrod seats	.874"	.750"	1.720"		44571-16
Vertical locking bar for .904" d	iameter lifter bores	.904"	.815"	1.720"		44574-16
Vertical locking bar for .904" d	iameter lifter bores, with .210" offset right intake pushrod seats	.904"	.815"	1.720"		44575-16
Ford V-8 70-82, Boss 3:	51-351C- 351M-400 cu.in.					
Vertical locking bar		.874"	.750"	1.720"	44518-16	
Vertical locking bar		.874"	.750"	1.720"		44570-16
Vertical locking bar with .180"	offset right intake pushrod seats	.874"	.750"	1.720"		44571-16
Vertical locking bar for .904" d	iameter lifter bores	.904"	.815"	1.720"		44574-16
Vertical locking bar for .904" d	iameter lifter bores, with .210" offset right intake pushrod seats	.904"	.815"	1.720"		44575-16
Ford V-8, SVO 302 and .	SVO 351					
Vertical locking bar		.874"	.750"	1.720"	44518-16	
Vertical locking bar		.874"	.750"	1.720"		44570-16
Vertical locking bar with .180"	offset right intake pushrod seats	.874"	.750"	1.720"		44571-16
Vertical locking bar for .904" d	iameter lifter bores	.904"	.815"	1.720"		44574-16
Vertical locking bar for .904" d	iameter lifter bores, with .210" offset right intake pushrod seats	.904"	.815"	1.720"		44575-16
Ford V-8 63-76, 352-36	60-390-406-410-427-428 cu.in.					
Vertical locking bar		.874"	.750"	1.720"	30518-16	
Vertical locking bar		.874"	.750"	1.720"		35570-16
Vertical locking bar with .180"	offset left and right intake pushrod seats	.874"	.750"	1.720"		35571-16
Vertical locking bar for .904" d	iameter lifter bores	.904"	.815"	1.720"		35574-16
Vertical locking bar for .904" d	iameter lifter bores, with .210" offset left and right intake pushrod seats	.904"	.815"	1.720"		35575-16
Ford V-8 68-97, 370-42	29-460 cu.in. (except 429 Boss Hemi)					
Vertical locking bar		.874"	.750"	1.720"	30518-16	
Vertical locking bar		.874"	.750"	1.720"		35570-16
Vertical locking bar with .180"	offset left and right intake pushrod seats	.874"	.750"	1.720"		35571-16
Vertical locking bar with .180"	offset right intake pushrod seats, for Ford Racing C460 cylinder heads	.874"	.750"	1.720"		35571R-16
Vertical locking bar for .904" d	Vertical locking bar for .904" diameter lifter bores			1.720"		35574-16
Vertical locking bar for .904" diameter lifter bores, with .210" offset left and right intake pushrod seats			.815"	1.720"		35575-16
Vertical locking bar for .904" dial C460 cylinder heads	.904"	.815"	1.720"		35575R-16	
Ford V-8 69-70, 429 Bo	ss Hemi					
Vertical locking bar		.874"	.750"	1.720"		30570-16
Vertical locking bar for .904" d	iameter lifter bores	.904"	.815"	1.720"		30574-16

Application Crane DOES NOT recommend the use of oil restrictors.	Lifter Body Dia.	Follower Wheel Dia.	Pushrod Seat Height	Crane Classic Part No.	Ultra Pro Series Part No.
Johnson/Rodeck V-8, 481X					
Vertical locking bar for .904" diameter lifter bores with pushrod oiling	.904"	.815"	1.385"		140550-16
Oldsmobile V-8 64-84, 260-307 (5.0L) -330-350 (5.7L) -400-403-425-455 cu.in.					
Vertical locking bar for .842" diameter lifter bores	.842"	.750"	1.705"		28570-16
Pontiac V-8 55-81, 287-316-326-347-350-370-389-400 (6.6L)-421-428-455 cu.i	n.				
Vertical locking bar	.842"	.750"	1.705"		28570-16
Rodeck V-8, 481 cu.in. (except 481X)					
Vertical locking bar	.842"	.750"	1.575"		13570-16
Vertical locking bar with .180″ offset left and right intake pushrod seats	.842"	.750"	1.575"		13571-16
Vertical locking bar for .904" diameter lifter bores, for standard or tall lifter bore cylinder blocks	.904"	.815"	1.595"		13574-16
Vertical locking bar for .904" diameter lifter bores, with .210" offset left and right intake pushrod seats, for standard or tall lifter bore cylinder blocks	.904"	.815"	1.595"		13575-16

Replacement Locking Bar Kits for Horizontal Bar Roller Lifters (All Kits Include Two Locking Bars and Four Hold Down Springs)

Application Part No.

Chevrolet V-8 262-400	
For Part Number: 11515-16	99557-1
Chevrolet V-8 396-502	
For Part Number: 13515-16	99559-1















Assembly Lube (Paste)

Crane Super Moly Lube is a moly-disulfide base lubricant, for use on cam lobes, lifters and distributor drive gears and should be used for all cam installations (except for roller lifter applications). Advised for cup-end pushrod installation where only splash lubricant is utilized.

Also used in many areas of transmission and driveline assembly, where high initial loading occurs, and galling should be minimized. Not recommended where normal oil flow may be impeded due to the high viscosity of this product.

Description	Part No.
Two 1-ounce packages	
	99002-1
1-pound container	
	99004-1



Crane Engine Assembly Lube is specially formulated to provide extra lubrication protection to engine components during assembly, and to provide outstanding resistance to scuffing, wear and friction during critical break-in. This lubricant is recommended for use on several different engine components, such as: rocker arm fulcrum balls, needle bearings, roller tips or rocker shafts; timing chain sprockets and gears; roller lifters and roller camshafts; engine bearing surfaces; outer surface of hydraulic or mechanical lifter bodies (use Super Moly Lube [paste] on face of these lifters).

Description	Part No.
4-ounce container	
	99008-1



Super Lube Break-In Concentrate For Cam & Lifter Installation

The original Crane Cams Super Lube Break-In Concentrate is an anti-wear additive formulated with a high concentration of special zinc dithiophosphate to provide sustained protection against cam lobe and flat-faced lifter scuffing and wear. This is especially important when using modern oils that have been compounded for use with roller-type camshafts. This oil supplement is to be added to the engine oil for the initial break-in period after the installation of a new camshaft and lifters.

Description	Part No.
8-ounce container	
	99003-1



Pushrods

The Strongest, Most Reliable Chromemoly Steel Pushrods Available!

Crane Cams precision manufactures high strength tubular steel pushrods for almost any engine. Popular length and diameter pushrods are listed here. **Custom made pushrods** are also available by using our "Special Order Pushrod" Form, page 305. These pushrods are available in any length, diameter of tubing, type of ends, with or without heat treating.

Crane performance pushrods are made from 4130 chromemoly seamless steel tubing. The ends are precision made, carburized, heat treated for strength and wear resistance and press fit into the tubing. Where indicated, Crane pushrods are also carbonitride heat treated to strengthen the tubing and



Overall

harden it for use with or without pushrod guideplates. In these instances, the ends are spot welded into the tubing for maximum strength and reliability. *Hardened pushrods must be used with steel pushrod guideplate equipped cylinder heads* (page 311) *to prevent premature wear and failure*.

Also listed in this section, where applicable, are the **Crane Pro-Series One-Piece Pushrods**. These are cold-forged, die formed, heat treated and centerless ground pushrods for both small and big block Chevrolet V-8 engines and other engine applications where pushrods with 5/16" dia. ball ends are required. For additional information, see page 309.

		Overall		<u>Ends</u>		_ '
Application	Length	Length	Tubing Dia.	Тор	Bottom	Part No.
American Motors V-8 (Includes AMC/Jeep)						
70-91, 304 thru 401 with hydraulic lifters, Pro Series One Piece, heat treated, heavy wall	Stock	7.850	5/16			95637-16
66-91, 290 thru 401 with mechanical lifters, Pro Series One Piece, heat treated, heavy wall	Stock	8.050	5/16			95641-16
66-91, 290 thru 401 with 66550-16 roller lifters, Pro Series One Piece, heat treated, heavy wall	+.200	8.250	5/16			95645-16
Cadillac V-8						
68-81, 368 thru 500 heat treated, heavy wall	Stock	10.200	5/16	B-4	B-4	102621-16
Chevrolet I-6						
62-84, 194-230-250 heat treated, heavy wall	Stock	9.718	5/16	B-4	B-4	20621-12
62-84, 194-230-250 with Crane aluminum rocker arms, heat treated, heavy wall	+.282	10.000	5/16	B-4	B-4	20622-12
Chevrolet V-6						
80-88, 60° 173 with cast iron in-line valve cylinder heads, heat treated, heavy wall	Stock	6.163	5/16	B-4	B-4	25621-12
78-86, 90° 200 thru 262 heat treated, heavy wall	Stock	7.765	5/16	B-4	B-4	11621-12
92-02, 90° 4.3L with Factory Hydraulic Roller Lifters, heat treated, heavy wall	Stock	7.178	5/16	B-4	B-4	10621-12
Chevrolet Small Block V-8						
55-87, 262 thru 400 with <i>Crane Hydraulic Roller Lifters</i> , heat treated, heavy wall	719	7.046	5/16	B-4	B-4	11628-16
55-87, 262 thru 400 heat treated	Stock	7.765	5/16	B-4	B-4	11621-16
55-87, 262 thru 400 heat treated, heavy wall	Stock	7.765	5/16	B-4	B-4	11630-16
55-87, 262 thru 400 heat treated	+.100	7.865	5/16	B-4	B-4	11622-16
55-87, 262 thru 400 heat treated, heavy wall	+.100	7.865	5/16	B-4	B-4	11632-16
55-87, 262 thru 400 heat treated	+.160	7.925	5/16	B-4	B-4	11624-16
55-87, 262 thru 400 heat treated, heavy wall	+.200	7.965	5/16	B-4	B-4	11633-16
55-87, 262 thru 400 heat treated, heavy wall	+.250	8.015	5/16	B-4	B-4	11635-16
88-99, 305-350 with <i>Factory Hydraulic Roller Lifters</i> , heat treated, heavy wall	Stock	7.178	5/16	B-4	B-4	10621-16
97-10, LS1-LS2-LS6 5.7L Pro Series One Piece, heat treated, heavy wall (.080)	Stock	7.400	5/16			144621-16
97-10, LS1-LS2-LS6 5.7L Pro Series One Piece, heat treated, heavy wall (.080) for Crane Adjustable Rocker Arm Conversion Kit	150	7.250	5/16			144622-16

Pushrods



Application	Length	Overall Length	Tubing Dia.		Ends Bottom	Part No.
Chevrolet V-8						
58-65, 348-409-427 (Z-11) with Crane Hydraulic Roller Lifters, heat treated, heavy wall	0686 0692	8.100 Int. 8.450 Exh.	5/16 5/16	B-4 B-4	B-4 B-4	15630-16
58-65, 348-409-427 (Z-11) with Crane Hydraulic Roller Lifters, heat treated, heavy wall	0686 0692	8.100 Int. 8.450 Exh.	3/8 3/8	B-2 w/h B-2 w/h	B-2 w/h B-2 w/h	15640-16
58-65, 348-409-427 (Z-11), heat treated, heavy wall	Stock Stock Stock	8.786 Int. 9.142 Exh. 8.786 Int.	5/16 5/16 3/8	B-4 B-4 B-2 w/h	B-4 B-4 B-2 w/h	15621-16
58-65, 348-409-427 (Z-11), heat treated, heavy wall	Stock	9.142 Exh.	3/8	B-2 w/II	B-2 w/h	15634-16
Chevrolet Big Block V-8						
65-90, 396 thru 454 <i>with Crane Hydraulic Roller Lifters</i> , heat treated, heavy wall	719 719	7.531 lnt. 8.531 Exh.	3/8 3/8	B-2 w/h B-2 w/h	B-2 w/h B-2 w/h	13628-16
65-90, 396 thru 454 with Crane Hydraulic Roller Lifters , Pro Series One Piece, heat treated, heavy wall	700 700	7.566 Int. 8.550 Exh.	3/8 3/8	D.2. //	D 2 //	13642-16
65-90, 396 thru 454 heat treated, heavy wall	Stock Stock	8.250 Int. 9.250 Exh.	3/8 3/8	B-2 w/h B-2 w/h	B-2 w/h B-2 w/h	13634-16
65-90, 396 thru 454 Pro Series One Piece, heat treated, heavy wall	Stock Stock	8.250 Int. 9.250 Exh. 8.250 Int.	3/8 3/8 7/16	B-14	B-14	13640-16
65-90, 396 thru 454 heat treated, heavy wall	Stock Stock 719	9.250 Int. 9.250 Exh. 7.936 Int.	7/16 7/16 3/8	B-14 B-14 B-2 w/h	B-14 B-14 B-2 w/h	13630-16
66-90, 366-427 Tall Deck (+.400") w/Crane Hyd. Roller Lifters , heat treated, heavy wall 66-90, 366-427 Tall Deck (+.400") w/Crane Hyd. Roller Lifters , Pro Series One Piece, heat	719 705	8.906 Exh. 7.950 Int.	3/8 3/8	B-2 w/h	B-2 w/h	13629-16
treated, heavy wall	675	8.950 Exh.	3/8			13643-16
66-90, 366-427 Tall Deck (+.400") heat treated, heavy wall	Stock Stock	8.655 Int. 9.625 Exh.	3/8 3/8	B-2 w/h B-2 w/h	B-2 w/h B-2 w/h	13635-16
01-08, 8.1 Litre with hydraulic lifters and adjustable rockers, Pro Series One Piece, heat treated, heavy wall	Stock Stock	8.200 Int. 9.150 Exh.	3/8 3/8			26640-16
Chrysler-Dodge-Plymouth V-8						
$64-91, 273\ thru\ 360\ "LA"\ with\ hydraulic\ lifters\ and\ adjustable\ rockers,\ heat\ treated,\ heavy\ wall$	Stock	7.330	5/16	C-4	B-3	69621-16
64-91, 273 thru 360 "LA", with Crane Hydraulic Roller Lifters and adjustable rockers, heat treated, heavy wall	750	6.580	5/16	C-4	B-3	69628-16
64-91, 273 thru 360 "LA", with mechanical lifters and adjustable rockers, heat treated, heavy wall	Stock	7.455	5/16	C-4	B-3	69622-16
92-00, 318-360 "Magnum" with Factory Hydraulic Roller Lifters and Crane adjustable rockers with 36655-16 conversion kit, heat treated, heavy wall	Stock	6.812	5/16	B-4	B-4	36621-16
58-78, 350 thru 400 "B" Low Block with hydraulic lifters and adjustable rockers, heat treated, heavy wall 58-78, 350 thru 400 "B" Low Block with Crane Hydraulic Roller Lifters and adjustable	Stock	8.250	3/8	C-2	B-2	64640-16
rockers, heat treated, heavy wall 58-78, 350 thru 400 'B' Low Block with Crane Hydraunic Roller Lifters and adjustable rockers, heat treated, heavy wall	750	7.500	3/8	C-2	B-2	64628-16
treated, heavy wall 58-78, 413 thru 440" B" <i>High Block</i> with hydraulic lifters and adjustable rockers, heat treated,	Stock	8.609	3/8	C-2	B-1	64621-16
heavy wall 58-78, 413 thru 440 "B" High Block with Crane Hydraulic Roller Lifters and adjustable rock-	Stock	9.125	3/8	C-2	B-2	64641-16
ers, heat treated, heavy wall 58-78, 413 thru 440 "B" <i>High Block</i> with mechanical lifters and adjustable rockers, heat	750	8.375	3/8	C-2	B-2	64629-16
treated, heavy wall	Stock Stock	9.250 10.656 lnt.	3/8 3/8	C-2 C-2	B-1 B-1	64622-16
64-71, 426 Hemi with hydraulic lifters, heat treated, heavy wall	Stock 750	11.594 Exh. 9.906 Int.	3/8	C-2 C-2	B-1 B-2	66621-16
64-71, 426 Hemi with Crane Hydraulic Roller Lifters, heat treated, heavy wall	750 Stock	10.843 Exh. 10.843 Int.	3/8 3/8	C-2	B-2 B-1	66628-16
64-71, 426 Hemi with mechanical lifters heat treated, heavy wall	Stock	11.781 Exh.	3/8	C-2	B-1	65689-16

Section Continued



Pushrods

Application	Length	Overall Length	Tubing Dia.		Ends Bottom	– Part No.
Ford I-6						
64-96, 240-300, heat treated, heavy wall	Stock	10.203	5/16	B-4	B-4	50621-12
Ford V-8						
63-68, 221 thru 302, heat treated, heavy wall	Stock	6.812	5/16	B-4	B-4	36621-16
69-95, 255 thru 302, heat treated, heavy wall	Stock	6.875	5/16	B-4	B-4	36622-16
68-87, 255 thru 302 with <i>Crane Retrofit Hydraulic Roller Lifters</i> and bottleneck studs or bedestal mount rocker arms, Pro Series One Piece, heat treated, heavy wall	332	6.500	5/16			95610-16
, , , , , , , , , , , , , , , , , , , ,	132	6.700	5/16			95614-16
· · · · · · · · · · · · · · · · · · ·	Stock	6.258	5/16	B-4	B-4	36631-16
, , , , , , , , , , , , , , , , , , , ,	+.117	6.375	5/16	B-4	B-4	36625-16
,,,	095	6.200	5/16			95604-16
, , , , , , , , , , , , , , , , , , , ,	Stock	8.200	5/16			95644-16
	366	7.800	5/16			95636-16
	191	8.000	5/16			95640-16
, ,	Stock	7.650	5/16			95633-16
. ,	Stock	8.406	5/16	B-4	B-4	52621-16
	625	7.781	5/16			95636-16
,	Stock	8.500	5/16			95650-16
. , ,	800	8.700	5/16			95654-16
, , , , , , , , , , , , , , , , , ,	625	8.900	5/16			95658-16
· · · · · · · · · · · · · · · · · · ·	Stock	9.234	3/8	C-1	B-1	34621-16
· · ·	Stock	10.656	3/8	C-1	B-1	34622-16
. , , , . , . , . ,	109	9.125	3/8	C-1	B-2	34641-16
	Stock	8.563	5/16	B-2 w/h	B-2 w/h	35622-16
	Stock	8.656	5/16	B-4	B-4	35621-16
MG-MGA-MGB 4 Cylinder						
	Stock	8.531	5/16	C-3	B-11	905-0003
	Stock	10.656	5/16	C-3	B-11	905-0004
Oldsmobile V-8						
	Stock	8.350	5/16			95647-16
Pontiac V-8						
	Stock	9.125	5/16	B-4	B-4	28624-16
62-67, 326-389-400-421 , Pro Series One Piece, heat treated, heavy wall	Stock	8.700	5/16			95654-16



Pro Series, One-Piece, Cold-Forged Pushrods

Crane Cams Pro Series, one-piece pushrods are *cold-forged*, with a precisely formed end that is *actually stronger* than the tubing wall itself!

Pro Series pushrods are made from aircraft quality, .080" wall, 4130 chromemoly steel tubing. Finished overall length is accurate to within ±.005" per pushrod. These are available in 5/16" and 3/8" diameter, each with 5/16" diameter ball ends, and .050" length increments (6.000" to 9.200" OAL in 5/16" diameter, and 7.050" to 11.000" OAL in 3/8" diameter), heat treated for use with or without pushrod guideplates. Each pushrod is laser etched with its overall length for quick identification.



Pro Series 5/16" Diameter One-Piece Pushrods

Overall Length	Part No.						
6.000"	95600-16	6.850"	95617-16	7.650"	95633-16	8.450"	95649-16
6.050"	95601-16	6.900"	95618-16	7.700"	95634-16	8.500"	95650-16
6.100"	95602-16	6.950"	95619-16	7.750"	95635-16	8.550"	95651-16
6.150"	95603-16	7.000"	95620-16	7.800"	95636-16	8.600"	95652-16
6.200"	95604-16	7.050"	95621-16	7.850"	95637-16	8.650"	95653-16
6.250"	95605-16	7.100"	95622-16	7.900"	95638-16	8.700"	95654-16
6.300"	95606-16	7.150"	95623-16	7.950"	95639-16	8.750"	95655-16
6.350"	95607-16	7.200"	95624-16	8.000"	95640-16	8.800"	95656-16
6.400"	95608-16	7.250"	95625-16	8.050"	95641-16	8.850"	95657-16
6.450"	95609-16	7.300"	95626-16	8.100"	95642-16	8.900"	95658-16
6.500"	95610-16	7.350"	95627-16	8.150"	95643-16	8.950"	95659-16
6.550"	95611-16	7.400"	95628-16	8.200"	95644-16	9.000"	95660-16
6.600"	95612-16	7.450"	95629-16	8.250"	95645-16	9.050"	95661-16
6.650"	95613-16	7.500"	95630-16	8.300"	95646-16	9.100"	95662-16
6.700"	95614-16	7.550"	95631-16	8.350"	95647-16	9.150"	95663-16
6.750"	95615-16	7.600"	95632-16	8.400"	95648-16	9.200"	95664-16
6.800"	95616-16						

Pro Series 3/8" Diameter One-Piece Pushrods

Overall Length	Part No.						
7.050"	95777-16	8.050"	95797-16	9.050"	95817-16	10.050"	95837-16
7.100"	95778-16	8.100"	95798-16	9.100"	95818-16	10.100"	95838-16
7.150"	95779-16	8.150"	95799-16	9.150"	95819-16	10.150"	95839-16
7.200"	95780-16	8.200"	95800-16	9.200"	95820-16	10.200"	95840-16
7.250"	95781-16	8.250"	95801-16	9.250"	95821-16	10.250"	95841-16
7.300"	95782-16	8.300"	95802-16	9.300"	95822-16	10.300"	95842-16
7.350"	95783-16	8.350"	95803-16	9.350"	95823-16	10.350"	95843-16
7.400"	95784-16	8.400"	95804-16	9.400"	95824-16	10.400"	95844-16
7.450"	95785-16	8.450"	95805-16	9.450"	95825-16	10.450"	95845-16
7.500"	95786-16	8.500"	95806-16	9.500"	95826-16	10.500"	95846-16
7.550"	95787-16	8.550"	95807-16	9.550"	95827-16	10.550"	95847-16
7.600"	95788-16	8.600"	95808-16	9.600"	95828-16	10.600"	95848-16
7.650"	95789-16	8.650"	95809-16	9.650"	95829-16	10.650"	95849-16
7.700"	95790-16	8.700"	95810-16	9.700"	95830-16	10.700"	95850-16
7.750"	95791-16	8.750"	95811-16	9.750"	95831-16	10.750"	95851-16
7.800"	95792-16	8.800"	95812-16	9.800"	95832-16	10.800"	95852-16
7.850"	95793-16	8.850"	95813-16	9.850"	95833-16	10.850"	95853-16
7.900"	95794-16	8.900"	95814-16	9.900"	95834-16	10.900"	95854-16
7.950"	95795-16	8.950"	95815-16	9.950"	95835-16	10.950"	95855-16
8.000"	95796-16	9.000"	95816-16	10.000"	95836-16	11.000"	95856-16

Pushrods - Accessories

Adjustable Checking Pushrods

These Checking Pushrods are adjustable with over 1.000" of travel, enabling you to arrive at the correct pushrod length to create the correct valve train geometry for your particular engine, or when using hydraulic lifters, to determine hydraulic lifter preload. These pushrods are not to be run in your engine. Once correct pushrod length is determined, refer to our pushrod listings on pages 306-



Part No.

308, or order special length pushrods on page 305. Checking Pushrods come two per package. Application Length Diameter American Motors V-8 290 thru 401

/			
	7.500 to 8.700"	5/16"	99726-2
Buick V-8 400 thru 455			
	8.500 to 9.800"	5/16"	99727-2
Chevrolet V-8 262 thru 400			
	7.500 to 8.700"	5/16"	99726-2
Chevrolet V-8 396 thru 454			
	7.500 to 8.700"	5/16"	
	8.500 to 9.800"	5/16"	99730-2
Chrysler "LA" V-8 273 thru 360			
	6.125 to 7.500"	5/16"	99725-2
Chrysler "B" V-8 Low Block 350, 361, 383, 400			
	7.500 to 8.700"	5/16"	99726-2
Chrysler "B" V-8 High Block 413, 426, 440			
	8.500 to 9.800"	5/16"	99727-2
Ford V-8 221 thru 302			
	6.125 to 7.500"	5/16"	99725-2
Ford V-8 Boss 302			
	6.125 to 7.500"	5/16"	99725-2
Ford V-8 351M-400			
	8.500 to 9.800"	5/16"	99727-2
Ford V-8 Boss 351, 351C, 370-429-460			
	7.500 to 8.700"	5/16"	99726-2
Oldsmobile V-8 260 thru 350 and 403			
	7.500 to 8.700"	5/16"	99726-2
Oldsmobile V-8 400, 425, 455			
	8.500 to 9.800"	5/16"	99727-2
Pontiac V-8 326, 389, 400, 421			
	8.500 to 9.800"	5/16"	99727-2



Pushrod Guideplates

Crane's pushrod guideplates feature a significant increase in strength over stock designs. Their unique design provides a more rigid guide, reduces flexing, stabilizes the pushrod and reduces rocker arm "wander." All sets include 8 guideplates.

Heat treated and carburized pushrods *must be used* with these guideplates, or *premature pushrod wear and failure* will occur. Cylinder head machining and screw-in rocker arm studs may be required to install these guideplates. Refer to the engine application and rocker arm pages for additional information.

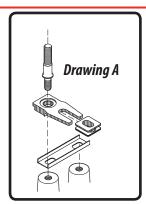


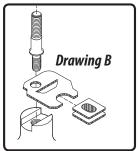
Application	Pushrod Diameter	Part No.
Chevrolet 90° V-6 78-86, 200 thru 262		
	5/16"	11650-1
Chevrolet V-8 55-95, 262 thru 400		
	5/16"	11650-1
Chevrolet V-8 97-10, LS1-LS2-LS6 5.7L Vortec 4800, 5300, 6000 (for use with Crane adjustable rocker arms)		
	5/16"	144650-1
	3/8"	144651-1
Chevrolet V-8 08-10, L92 cylinder heads (for use with Crane adjustable rocker arms)		
	5/16"	201650-1
	3/8"	201651-1
Chevrolet V-8 65-90, 396 thru 454 and 502		
	3/8"	13650-1
Ford V-8 62-92, 221 thru 302 and 351W		
	5/16"	36650-1
Ford V-8 69-82, 351C-351M-400		
	5/16"	52650-1

Rocker Arm Guideplate Conversion Kits

Converts Pedestal-Mount Dodge and Ford Cylinder Heads to Adjustable Rocker Arms
Crane Cams' rocker arm stud/pushrod guideplate conversion kits enable you to convert latemodel Dodge and Ford V-8 engines with pedestal mount rocker arms to an adjustable-type
valve train without machine work or cylinder head removal. Detailed description on page 325.

Description	Part No.
Dodge 92-02, Magnum V-8 318 (5.2L) and 360 (5.9L) engines with 5/16"-18 threaded stud bosses. Must use 11746-16 or 11759-16 aluminum rocker arms for 3/8" rocker arm studs and 5/16" dia. 36621-16 (heat treated) pushrods.	36655-16 (Drawing A)
Dodge 92-02, Magnum V-8 318 (5.2L) and 360 (5.9L) engines with 5/16″-18 threaded stud bosses. Must use 11747-16 or 11755-16 aluminum rocker arms for 7/16″ rocker arm studs and 5/16″ dia. 36621-16 (heat treated) pushrods.	36656-16 (Drawing A)
Dodge Aluminum Magnum and Crate Motor cylinder heads with 3/8"-16 threaded stud bosses. Must use 11746-16 or 11759-16 aluminum rocker arms for 3/8" rocker arm studs and 5/16" dia. 36621-16 (heat treated) pushrods.	70655-16 (Drawing A)
Ford V-8 77-00, 255-302, 302 H.O., 351W engines. Will accept 3/8" stud die-formed steel or Crane aluminum rocker arms and 5/16" diameter pushrods.	36655-16 (Drawing A)
Ford V-8 77-00, 255-302, 302 H.O., 351W engines. Will accept 7/16" stud Crane aluminum rocker arms and 5/16" diameter pushrods.	36656-16 (Drawing A)
Ford V-8 70-82, 351C, 351M, 400, and Ford V-8 72-97, 370-429-460 engines. Will accept 7/16" stud die-formed steel or Crane aluminum rocker arms and 5/16" dia. pushrods.	52655-16 (Drawing B)
Ford V-8 72-97, 370, 429, 460 Engines. Will accept 7/16" stud die-formed steel or Crane aluminum rocker arms and 3/8" diameter pushrods.	35655-16 (Drawing B)
Replacement guideplate insert for 5/16" diameter pushrods (included in kits)	52655GB-16
Replacement guideplate insert for 3/8" diameter pushrods (included in kits)	35655GB-16





Rocker Arms, Steel & Ductile Iron

Die-Formed Steel

Stock design with better material and heat treat. Many supplied with long slot or extra long slot to provide more travel for increased valve lift. Economically priced for budget engine



Ductile Iron Shaft Mounted

Creates adjustable valve train for Chrysler "LA" and "B", and Ford "FE" series engines. Ductile iron is stronger than stock cast iron material. Allows valve lash or lifter preload to be accurately set. Can correct for valve stems that vary in length. Requires new pushrods with cup on one end to fit adjusting screw.



		-	
Application	Ratio	Stud Dia.	Part No.
Chevrolet 90° V-6 78-87, 200 thru 262 Chevrolet V-8 55-87, 262 thru 400 (Not for use with valve springs over 1.520″ 0.D.)	Die-Formed St	teel, Non Self-Ali	gning
Stock ratio, factory performance replacement with long slot	1.50	3/8"	11800-16
Stock ratio, with extra long slot	1.50	3/8"	11801-16
Increased ratio, with extra long slot	1.60	3/8"	11802-16
Eight each of 1.50 and 1.60 ratio, with extra long slot, includes Kool Nuts	1.50/1.60	3/8"	11803-16
Chevrolet V-8 65-90, 396 thru 454 & 502 (Not for use with valve springs over 1.560" O.D.)	Die-Formed St	teel	
Stock ratio, performance replacement, long slot for up to .560" valve lift	1.70	7/16"	13800-16 ^a
Stock ratio, with extra long slot	1.70	7/16"	13801-16 ^a
Chrysler-Dodge-Plymouth V-8 64-91, "LA" 273-318-340-360	Ductile Iron Co	onstruction	
Stock ratio, adjustable shaft mount design for standard cylinder heads, (will NOT fit Trans-Am, W-2 or W-5 heads), must use special pushrods. See page 307 for details. New shafts available separately (69618-2).	1.50	Shaft	69770-16
Increased ratio, adjustable shaft mount design for standard cylinder heads (will NOT fit Trans-Am, W-2 or W-5 heads), must use special pushrods. See page 307 for details. New shafts available separately (69618-2).	1.60	Shaft	69771-16*
Chrysler-Dodge-Plymouth V-8 58-78, "B" 350-361-383-400-413-426-440	Ductile Iron Co	onstruction	
Stock ratio, adjustable shaft mount design for standard cylinder heads, (will NOT fit Stage IV or Stage V heads), must use special pushrods. See page 307 for details. When ordering spares, specify Left Adjuster Offset (64770L-1) or Right Adjuster Offset (64770L-1) New shafts available separately (64618-2). Increased ratio, adjustable shaft mount design for standard cylinder heads, (Will NOT fit Stage IV or Stage V heads), must use special pushrods. See page 307 for details. When ordering spares, specify Left Adjuster Offset (64771L-1) or	1.50	Shaft	64770-16
Right Adjuster Offset (64771R-1) New shafts available separately (64618-2).	1.60	Shaft	64771-16*
Ford V-8 62-00, 221-260-289-302 and 351W	Cast Construct	tion	
Stock ratio, non-rail type with standard stud diameter	1.60	3/8″	36800-16
Stock ratio, rail type (self aligning), with standard stud diameter, supplied with both 5/16"-24 and 3/8"-24 nuts.	1.60	3/8"	36801-16
TECH TIP: Ford cylinder heads with pedestal mount type rocker arms can be easily converted to use adjustable style rocker arm with Guideplates. See page 325 for details.	ms by using a Cra	ne Stud Conversio	n Kit
Ford V-8 69-82, Boss 302, Boss 351, 351C-351M-400	Die-Formed St	teel, Pedestal Mo	unt
Stock ratio, for 70-82 cylinder heads, non-adjustable, secured with 5/16" bolt. For hydraulic lifter and hydraulic roller cam applications only.	1.71	5/16" Bolt	52800-16
TECH TIP: Ford cylinder heads with pedestal mount type rocker arms can be easily converted to use adjustable style rocker arm Conversion Kit. See page 325 for details.	ms by using a Cra	ine Stud Rocker Ar	m Stud
Ford V-8 63-76, "FE" 352-360-390-406-410-427-428	Ductile Iron Co	onstruction	
Adjustable shaft mount design, stock ratio, must use special pushrods. See page 308 for details. New shafts available separately (34618-2).	1.76	Shaft	34772-16
Ford V-8 68-97, 370-429-460	Die-Formed St	teel, Pedestal Mo	unt
Stock ratio, for 72-97 cylinder heads, non-adjustable, secured with 5/16" bolt. For hydraulic lifter and hydraulic roller cam applications only.	1.71	5/16" Bolt	52800-16 ^b
TECH TIP: Ford cylinder heads with pedestal mount type rocker arms can be easily converted to use adjustable style rocker arms can be easily converted to use adjustable style rocker arms.	ms by using a Cra	ne Stud Rocker Ar	m Stud

Section Continued



Rocker Arms, Steel & Ductile Iron



Application	Ratio	Stud Dia.	Part No.
Oldsmobile V-8 67-84, 260-307-350-400-403-425-455	Die-Formed Steel		
Stock ratio, rocker arms supplied with individual fulcrums, bridge straps, and secured with bolt.	1.61	Bridge	80800-16
Pontiac V-8 67-81, 265-287-301-316-326-347-350-370-389-400-421-428-455	Die-Formed Steel		
Stock ratio, for use with bottleneck studs with 7/16" bottom and 3/8" top, includes spacer washers and 3/8" nuts.	1.50	7/16"BN	28800-16

Nitro-Carb Steel Rockers

For Race Use where Rules Require Stock Type Rockers

Crane Cams Nitro-Carb™ rockers offer 3 to 5 times greater resistance to wear, fatigue and fracture in high-stress areas. Available exclusively from Crane Cams, Nitro-Carb rockers eliminate pushrod cup and fulcrum failures with wear resistance and surface hardness properties that are similar to ceramics.

Nitro-Carb rockers deliver the most accurate ratios of any similar steel rockers. Nitro-Carb rockers are precision die-formed from heat treated steel. Most feature a long-slot design, and come complete with oil-groove pivot balls and adjusting nuts at no extra charge.

Crane Cams Nitro-Carb rockers are perfect for high valve spring pressure. Testing in-lab and on-track, (using Crane **99846-16**, XHTCS Tool Steel, stock diameter, 1.255" o.d. valve springs, 115 lb. seat, 350 lbs. open pressure) showed Crane Nitro-Carb rockers to be failure-free after enduring millions of running cycles.

Nitro-Carb rockers should be used anywhere rules require "stock type steel rockers". This includes NHRA Stock and IHRA Pure Stock Class drag racing applications plus oval track categories where stock-type rockers are required.



- •3 To 5 Times Stronger Than Stock-Type Steel Rockers
- Precision Die-Formed Steel
- Most Ratio-Accurate Available
- Small & Big-Block Chevy Applications

Application	Part No.
Chevrolet 90° V-6 78-87, 200 thru 262	
1.5 ratio, extra long slot, 3/8" stud	11801C-1 ^{c,d}
1.6 ratio, extra long slot, 3/8" stud	11802C-1 ^{c,d}
Chevrolet V-8 55-87, 262 thru 400	
1.5 ratio, extra long slot, 3/8" stud	11801C-16 °
1.6 ratio, extra long slot, 3/8" stud	11802C-16 °
Chevrolet V-8 88-99, 305 thru 350	
1.5 ratio, self aligning, 3/8" stud	10800C-16 °
Chevrolet V-8 65-90, 396 thru 454	
1.7 ratio, long slot, 7/16" stud	13801C-16 ^f

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.

- a 1991-00 454-502 Gen V and VI hydraulic cam engines require the installation of 99152-16 7/16" rocker arm studs and factory pushrod guideplates (no machining required). Mechanical camshaft equipped engines require the installation of 99157-16 7/16" rocker arm studs and 13650-1 pushrod guideplates (machining required).
- b On 68-71 engines equipped with bottleneck studs, using 99768-16 positive locking nuts will permit valve adjustment. The 72-97 engines equipped with pedestal mount rocker arms can use our 36655-16 Conversion Kit for 3/8" pushrods (no machining required) for street applications.
- Non-self aligning, must be used with pushrod guideplate cylinder heads.
- **d** Order in quantity of 12.
- For self-aligning applications only. Not for use with pushrod guideplates, or with cylinder head
 castings that guide the pushrod, as severe pushrod wear will occur. Not for LS1 series engines.
- f 1992-00 Gen V and VI 454-502 engines require the installation of **99152-16** 7/16" rocker arm studs (no machining required) and factory pushrod guideplates.

Crane Cams Aluminum Rocker Arms More Horsepower, Torque And Response In An Easy Bolt-On!

Crane Cams first introduced the racing world to aluminum rockers in 1964, and since then we've manufactured and sold more than seven million Crane aluminum rockers! From the beginning, our famous **Gold-Race™** aluminum rockers have been continually enhanced with design and engineering improvements as well as materials upgrades. Now many generations later, today's **Crane Classic, Energizer®, Gold-Race™, Pro Series** stud-mount, **Gold-Race™** shaft-mount or all-new **Quick-Lift™** rockers are absolutely the strongest, most ratio-accurate, most durable aluminum rockers made!

Crane aluminum rockers are preferred by professional racing engine builders and offer outstanding power and performance advantages for street applications. An easy "Saturday afternoon" installation project, bolting on a set of Crane aluminum rockers can add from 15 up to 30+ horsepower (with increased ratios), plus increase throttle response in a street performance engine. Crane aluminum rockers are so strong, durable and reliable that Ford Motor Company® selected our Crane Energizer® needlebearing fulcrum, full-roller rockers for their Cobra V-8 production line engines. To further demonstrate their reliability, they carried the full Ford factory warranty coverage!

Crane Cams offers aluminum rocker arms for nearly all American V-8 and V-6 engines plus many inline four and six-cylinder applications. Stock, plus optional longer-than-stock ratios, are offered for most engines. Some applications also provide offset push-rod seats for use on aftermarket cylinder heads with non-stock port locations. All Crane Cams aluminum rockers come complete with a set of our own positive locking adjusting nuts, or adjusting screws, at no extra cost to you.





The Strongest, Lightest, Most Ratio-Accurate Aluminum Rockers



Aluminum Rocker Arms, Energizer



Energizer Rocker Arms Die Formed Aluminum Body with Needle Bearing Fulcrum and Roller Tip

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.



Application	Ratio	Stud Dia.	Part No.
American Motors V-8 66-91, 290 thru 401			
Stock ratio and standard stud diameter	1.60	3/8"	11746-16a
Stock ratio with enlarged stud diameter	1.60	7/16"	11747-16 ^b
Chevrolet 90° V-6 78-87, 200 thru 262			
Stock ratio and standard stud diameter	1.50	3/8"	11744-12°
Stock ratio with enlarged stud diameter	1.50	7/16"	11745-12°
Increased ratio with standard stud diameter	1.60	3/8"	11746-12°
Increased ratio with enlarged stud diameter	1.60	7/16"	11747-12°
Chevrolet V-8 55-87, 262 thru 400			
Stock ratio and standard stud diameter	1.50	3/8"	11744-16°
Stock ratio with enlarged stud diameter	1.50	7/16"	11745-16°
Increased ratio with standard stud diameter	1.60	3/8"	11746-16°
Increased ratio with enlarged stud diameter	1.60	7/16"	11747-16°
Chevrolet V-8 65-90, 396-402-427-454-502, also 91-00 454-502 Gen V and VI and 01-08 8.1 Litre			
Stock ratio and standard stud diameter	1.70	7/16"	13744-16 ^d
Chrysler-Dodge-Plymouth 92-00, "Magnum" 318 (5.2L), 360 (5.9L) (except Magnum R/T)			
Stock ratio, must use Crane's stud conversion kit with guideplates (36655-16), and pushrods (36668-16), to convert from the stock pedestal rocker arm to this adjustable stud mount design. (Optional heat treated pushrods available, part no. 36621-16.) Stock valve covers must be modified or spaced upward approximately 3/8" to avoid interference	1.60	3/8″	11746-16
Ford V-8 62-00, 221-255-260-289-302-351W	1100	5/0	111 10 10
Stock ratio and standard stud diameter	1.60	3/8"	11746-16°
Stock ratio with enlarged stud diameter	1.60	7/16"	11747-16 ^f
Ford V-8 77-00, 255-302, 5.0L H.O. and 351W	1.00	7710	
Increased ratio, pedestal mount type for 77-00 cylinder heads, non-adjustable, secured with 5/16" bolt. For hydraulic lifter, and hydraulic roller cam applications only.	1.70	5/16"Bolt	44746-16 ⁹
Ford V-8 69-82, Boss 302, Boss 351, 351C-351M-400			
Stock ratio and standard Boss stud diameter	1.72	7/16"	27744-16 ^h
Ford V-8 68-97, 370-429-460			
Stock ratio and standard Cobra Jet stud diameter	1.72	7/16"	27744-16 ⁱ
Oldsmobile V-8 67-91, 260-307-350-400-403-425-455 cu.in.			
Increased ratio for 3/8" straight studs	1.65	3/8"	80744-16* ^j
Pontiac V-8 67-81, 265 thru 455 with Straight 7/16" Rocker Arm Studs		5,5	30
Increased ratio with enlarged stud diameter.	1.65	7/16"	28747-16*k
nacasca rado with chiargea stati didiffeter.	1.03	7/10	20/7/-10

- a Must machine 74-91 cylinder heads and install 99156-16 3/8" rocker arm studs and aftermarket pushrod guideplates. Special order heat treated pushrods are required for use with guideplates.
- b Must machine 66-91 cylinder heads and install 99157-16 7/16" rocker arm studs and aftermarket pushrod guideplates. Special order heat treated pushrods are required for use with guideplates.
- c The 1988-99 engines equipped with self-aligning rocker arms require the installation of pushrod guideplates (and 99157-16 7/16" rocker arm studs, if applicable) and appropriate heat treated pushrods in order for these rocker arms to function properly. Valve cover clearance must also be checked. Not suitable for use with center-bolt valve covers.
- d The 1991-2000 Gen V & VI engines require the installation of 99152-16 7/16" rocker arm studs (no machining required) & factory pushrod guideplates. For applications w/ over 480 pounds open valve spring pressure, the cylinder heads must be machined for the installation of 99157-16 7/16" rocker arm studs & 13650-1 pushrod guideplates. The 2001-2008 8.1L engines require the installation of 99155-16 7/16" rocker arm studs (no machining required) & factory pushrod guideplates.
 e Must machine 66-00 cylinder heads and install 99156-16 3/8" rocker arm studs and 36650-1
- Must machine 66-00 cylinder heads and install 99156-16 3/8" rocker arm studs and 36650-1 pushrod guideplates (heat treated pushrods required), or use 36655-16 Conversion Kit (no machining required) on 77-00 pedestal mount cylinder heads for street applications.
- f Must machine 66-00 cylinder heads and install 99157-167/16" rocker arm studs and 36650-1 pushrod guideplates (heat treated pushrods required).

- g Includes Rocker Arm Pedestal Shim Kit 99170-1.
- h The 351C-351M-400 engines equipped with pedestal mount rocker arms require the use of 52655-16 Conversion Kit (no machining required) for street applications.
- i On 68-71 engines equipped with bottleneck studs, install 99159-16 straight 7/16" studs to permit valve adjustment. The 72-97 engines equipped with pedestal mount rocker arms can use our 35655-16 Conversion Kit for 3/8" pushrods (no machining required) for street applications.
- j Must machine cylinder heads and install 99156-16 3/8" rocker arm studs and aftermarket pushrod quideplates (special length heat treated pushrods required).
- k On engines not equipped with 7/16" rocker arm studs, cylinder head machining is required for the installation of 99157-16 7/16" rocker arm studs.

NOTE:

Energizer rocker arms are recommended for hydraulic lifter and hydraulic roller camshaft equipped engines only. Energizer rocker arms with 11 and 44 prefix part numbers will accept a maximum valve spring dia. of 1.500" and maximum spring pressure of 500 lbs. Energizer rockers with 13, 28, and 80 prefix part numbers will accept a maximum valve spring diameter of 1.550" and 500 lbs. maximum spring pressure.

Aluminum Rocker Arms, Crane Classic

Crane Classic Rocker Arms Extruded Aluminum Body with Needle Bearing Fulcrum and Roller Tip

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.



Application	Ratio	Stud Dia.	Part No.
American Motors V-8 66-91, 290 thru 401			
Stock ratio and standard stud diameter	1.60	3/8"	36774-16 ^a
Stock ratio with enlarged stud diameter	1.60	7/16"	36775-16⁵
Chevrolet 90° V-6 78-87, 200 thru 262			
Stock ratio and standard stud diameter	1.50	3/8"	11774-12°
Stock ratio with enlarged stud diameter	1.50	7/16"	11775-12°
Increased ratio with standard stud diameter	1.60	3/8"	11776-12°
Increased ratio with enlarged stud diameter	1.60	7/16"	11777-12°
Chevrolet V-8 55-87, 262 thru 400			
Stock ratio and standard stud diameter	1.50	3/8"	11774-16°
Stock ratio with enlarged stud diameter	1.50	7/16"	11775-16°
Increased ratio with standard stud diameter	1.60	3/8"	11776-16°
Increased ratio with enlarged stud diameter	1.60	7/16"	11777-16°
Chevrolet V-8 65-90, 396-402-427-454-502, also 91-00 454-502 Gen V and VI and 01-08 8.1 Litre			
Stock ratio and standard stud diameter	1.70	7/16"	13774-16 ^d
Chrysler-Dodge-Plymouth 92-00, "Magnum" 318 (5.2L), 360 (5.9L) (except Magnum R/T)			
Stock ratio, must use Crane's stud conversion kit with guideplates (36655-16), and pushrods (36668-16), to convert from the stock pedestal rocker arm to this adjustable stud mount design. (Optional heat treated pushrods available, part no. 36621-16.) Stock valve covers must be modified or spaced upward approximately 3/8" to avoid interference	1.60	3/8″	11776-16
Ford V-8 62-00, 221-255-260-289-302-351W			73777
Stock ratio and standard stud diameter	1.60	3/8"	36774-16°
Stock ratio with enlarged stud diameter	1.60	7/16"	36775-16 ^f
Ford V-8 77-00, 255-302, 5.0L H.O. and 351W			
Stock ratio, pedestal mount type for 77-00 cylinder heads, non-adjustable, secured with 5/16" bolt. For hydraulic lifter, and hydraulic roller cam applications only.	1.60	5/16" Bolt	44774-16 ⁹
Ford V-8 69-82, Boss 302, Boss 351, 351C-351M-400			
Stock ratio and standard Boss stud diameter	1.72	7/16"	27774-16 ^h
Ford V-8 68-97, 370-429-460			
Stock ratio and standard Cobra Jet stud diameter	1.72	7/16"	27774-16 ⁱ
Oldsmobile V-8 67-91, 260-307-350-400-403-425-455 cu.in.			
Increased ratio for 7/16" studs	1.65	7/16"	28774-16 ^{* j}
Pontiac V-8 67-81, 265 thru 455 with Straight 7/16″ Rocker Arm Studs			
Increased ratio with enlarged stud diameter.	1.65	7/16"	28774-16* k

- a Must machine 74-91 cylinder heads and install 99156-16 3/8" rocker arm studs and aftermarket pushrod guideplates. Special order heat treated pushrods are required for use with guideplates.
- b Must machine 66-91 cylinder heads and install 99157-167/16" rocker arm studs and aftermarket pushrod guideplates. Special order heat treated pushrods are required for use with guideplates.
- The 1988-99 engines equipped with self-aligning rocker arms require the installation of pushrod guideplates (and 99157-16 7/16" rocker arm studs, if applicable) and appropriate heat treated pushrods in order for these rocker arms to function properly. Valve cover clearance must also be checked. Not suitable for use with center-bolt valve covers.
- d The 1991-2000 Gen V and VI engines require the installation of 99152-16 7/16" rocker arm studs (no machining required) and factory pushrod guideplates. For applications with over 480 pounds open valve spring pressure, the cylinder heads must be machined for the installation of 99157-16 7/16" rocker arm studs and 13650-1 pushrod guideplates. The 2001-2008 8.1L engines require the installation of 99155-16 7/16" rocker arm studs (no machining required) and factory pushrod guideplates.
- Must machine 66-00 cylinder heads and install 99156-16 3/8" rocker arm studs and 36650-1 pushrod guideplates (heat treated pushrods required), or use 36655-16 Conversion Kit (no machining required) on 77-00 pedestal mount cylinder heads for street applications.

- f Must machine 66-00 cylinder heads and install 99157-16 7/16" rocker arm studs and 36650-1 pushrod guideplates (heat treated pushrods required).
- Includes Rocker Arm Pedestal Shim Kit 99170-1.
- h The 351C-351M-400 engines equipped with pedestal mount rocker arms require the use of **52655-16** Conversion Kit (no machining required) for street applications.
- i On 68-71 engines equipped with bottleneck studs, install 99159-16 straight 7/16" studs to permit valve adjustment. The 72-97 engines equipped with pedestal mount rocker arms can use our 35655-16 Conversion Kit for 3/8" pushrods (no machining required) for street applications.
- j Must machine cylinder heads and install 99157-167/16" rocker arm studs and aftermarket pushrod quideplates (special length heat treated pushrods required).
- k On engines not equipped with 7/16" rocker arm studs, cylinder head machining is required for the installation of 99157-16 7/16" rocker arm studs.

NOTE

Crane Classic Rocker arms are intended for use in applications where open valve spring pressures do not exceed 600 pounds.

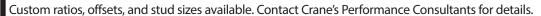
Aluminum Roller Rockers, Gold Race Extruded - Stud Mount



Gold Race Extruded Rocker Arms

Crane Cams' needle-bearing fulcrum, roller-tip, extruded aluminum rocker arms have been racing's most popular aluminum rockers since their introduction in 1964.

Now, over seven million rockers later, the nation's leading racers and engine builders know they can trust the strength, ratio accuracy, quality, and reliability of Crane's famous gold anodized, aluminum rockers.





Application	Ratio	Stud Dia.	Part No.
American Motors V-8 66-91, 290-304-343-360 (5.9L)-390-401 cu.in.			
Stock ratio and standard stud diameter	1.60	3/8"	36750-16ª
Stock ratio with enlarged stud diameter	1.60	7/16"	86757-16 ^b
Increased ratio with enlarged stud diameter	1.70	7/16"	36757-16 ^b
Chevrolet I-6 62-84, 194-230-250-292 cu.in.			
Stock ratio and standard stud diameter	1.70	3/8"	20750-12°
Stock ratio with enlarged stud diameter	1.70	7/16"	13750-12°
Chevrolet 60° V-6 80-94, 173 (2.8L) and 189 (3.1L) cu.in.	Non-Self Ali	igning, Narrow Bo	dy Rocker Arms
Stock ratio with special stud diameter	1.50	3/8"	25750-12d
Increased ratio with special stud diameter	1.60	3/8"	25759-12 ^d
Chevrolet 90° V-6 78-86, 200-229 (3.8L) and 262 (4.3L) and Chevrolet V-8 55-87, 262-267-283-302-305 (5.0L)-307-327-350 (5.0L)-400 cu.in.	Non-Self Ali	igning Rocker Arm	15
Stock ratio and standard stud diameter	1.50	3/8"	11750-16
Stock ratio with enlarged stud diameter, clears 1.630" O.D. springs	1.50	7/16"	11752-16
Stock ratio with enlarged stud diameter, clears 1.630" O.D. springs, new "Wide Body" design for severe usage applications	1.50	7/16"	11771-16
Increased ratio and standard stud diameter	1.60	3/8"	11759-16
Increased ratio with enlarged stud diameter, clears 1.630" O.D. springs	1.60	7/16"	11755-16
Increased ratio with enlarged stud diameter, clears 1.630" O.D. springs, new "Wide Body" design for severe usage applications	1.60	7/16"	11772-16
Eight each of 1.5 (11750) and 1.6 (11759) ratio, with standard stud diameter	1.5/1.6	3/8"	11748-16
Increased ratio and standard stud diameter	1.7	3/8"	70759-16*
NOTE: The following rocker arms have offset pushrod seat locations and require modification of the pushrod guideplat	es. Rockers sold i	ndividually.	
.150" Left Offset, stock ratio with enlarged stud diameter, clears 1.630" O.D. springs	1.50	7/16"	11765L-1
.150" Right Offset, stock ratio with enlarged stud diameter, clears 1.630" O.D. springs	1.50	7/16"	11765R-1
.150" Left Offset, increased ratio with enlarged stud diameter, clears 1.630" O.D. springs	1.60	7/16"	11766L-1
.150" Right Offset, increased ratio with enlarged stud diameter, clears 1.630" O.D. springs	1.60	7/16"	11766R-1
.225" Left Offset, increased ratio with enlarged stud diameter, clears 1.630" O.D. springs	1.60	7/16"	11762L-1
.225" Right Offset, increased ratio with enlarged stud diameter, clears 1.630" O.D. springs	1.60	7/16″	11762R-1
Chevrolet 90° V-6 87-91, 262 (4.3L) Chevrolet V-8 88-99, 305 (5.0L)-350 (5.7L) cu.in.		igning, Narrow Bo Bolt Valve Covers	dy Rocker Arms
Stock ratio and standard stud diameter	1.50	3/8"	10750-16°
Increased ratio and standard stud diameter	1.60	3/8"	10759-16°
	Self Alignin Center Bolt	g, Narrow Body Ro Valve Covers	ocker Arms For
Stock ratio and standard stud diameter (cannot be used with a mechanical lifter cam)	1.50	3/8"	10751-16 ^f
Increased ratio and standard stud diameter (cannot be used with a mechanical lifter cam)	1.60	3/8"	10758-16 ^f
Increased ratio and standard stud diameter with limited lift travel (.550" maximum) and certified ratio for crate motor rules applications. (Non-anodized)	1.60	3/8″	10756-16 ^f

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Section Continued



- a Must machine 74-91 cylinder heads and install 99156-16 3/8" rocker arm studs and aftermarket pushrod guideplates. Special order heat treated pushrods are required for use with guideplates.
- Must machine 66-91 cylinder heads and install 99157-16 7/16" rocker arm studs and aftermarket pushrod guideplates. Special order heat treated pushrods are required for use with guideplates.
 Requires 20622-12 pushrods for 194-230-250 engines.
- d For inline valve cylinder heads. Set includes special 10mm x 1.50 bottom x 3/8" x 24 top rocker arm studs (99148-12), no machining required. Check valve covers and intake manifold for clearance throughout the lift cycle.
- The 1988-99 engines equipped with self-aligning rocker arms require the installation of pushrod guideplates (and 99156-16 rocker arm studs, if applicable) and appropriate heat treated pushrods in order for these rocker arms to function properly. Valve cover clearance must also be checked in late model applications.
- f For use in self-aligning applications. Do not use with pushrod guideplates or with cylinder head castings that guide the pushrods, as severe pushrod wear will occur. Not for use in LS1 type engines.

Aluminum Roller Rockers, Gold Race Extruded - Stud Mount

Gold Race Extruded Rocker Arms

Application	Ratio	Stud Dia.	Part No.
Chevrolet V-8, 97-10, LS1-LS2-LS6 5.7L and Vortec 4800, 5300, 6000			
Bolt-down, non-adjustable, stock ratio (Non-anodized)	1.70	8mm	144760-16
Bolt-down, non-adjustable, increased ratio (Non-anodized)	1.80	8mm	144761-16
Adjustable, stock ratio and standard stud diameter	1.70	3/8"	144750A-16a
Adjustable, stock ratio and standard stud diameter (Complete installation kit including studs, guideplates and pushrods)	1.70	3/8"	144750-16a
Adjustable, stock ratio & standard stud diameter (Complete installation kit incl. studs, guideplates, & pushrods for Air Flow Research cylinder heads)	1.70	3/8"	144750AF-16
Adjustable, increased ratio and standard stud diameter	1.80	3/8"	144759A-16ª
Adjustable, increased ratio and standard stud diameter (Complete installation kit including studs, guideplates and pushrods)	1.80	3/8"	144759-16ª
Adjustable, increased ratio and standard stud diameter (Complete installation kit including studs, guideplates, and pushrods for Air Flow Research cylinder heads)	1.70	3/8"	144759AF-16
NOTE: We offer an optional pushrod guideplate set to install 3/8" diameter pushrods in these engines, part number 144651	-1		
Chevrolet V-8, LS-series with L92/LS3 Cylinder heads		<u> </u>	
Bolt-down, non-adjustable, stock ratio (Non-anodized)	1.70	8mm	201760-16
Bolt-down, non-adjustable, increased ratio (Non-anodized)	1.80	8mm	201761-16
Adjustable, stock ratio and standard stud diameter (Complete installation kit including studs, guideplates, and pushrods)	1.70	3/8"	201750-16
Adjustable, increased ratio and standard stud diameter (Complete installation kit including studs, guideplates, and pushrods)	1.80	3/8"	201759-16
NOTE: We offer an optional pushrod guideplate set to install 3/8" diameter pushrods in these engines, part number 201651-	1		
Chevrolet V-8, LS-series with LS7 Cylinder Heads			
Bolt-down, non-adjustable, stock ratio (Non-anodized)	1.80	8mm	203761-16
Chevrolet V-8 58-65, 348-409-427 (Z-11)			
Stock ratio and standard stud diameter	1.70	3/8"	15750-16
Stock ratio and enlarged stud diameter	1.70	7/16"	13750-16
Chevrolet V-8 65-90, 396-402-427-454-502 also 91-00, 454-502 Gen V and VI and 01-08 8.1 Litre			
Reduced ratio and standard stud diameter	1.65	7/16"	13759-16 ^b
Stock ratio and standard stud diameter	1.70	7/16"	13750-16 ^b
Stock ratio and standard stud diameter, new "Wide Body" design for severe usage applications	1.70	7/16"	13763TR-16 ^b
Increased ratio and standard stud diameter	1.80	7/16"	13755-16 ^b
Chrysler-Dodge-Plymouth V-8 92-00, "Magnum" 318 (5.2L), 360 (5.9L) cu.in. (except Magnum R/T)			
Stock ratio, must use Crane's Rocker Arm Stud Conversion Kit, part no. 36655-16 , and pushrods, part no. 36668-16 , to convert from the stock pedestal rocker arm to this adjustable stud mount design. (Optional heat treated pushrods available, part no. 36621-16 .) Stock valve covers must be modified, or spaced upward approximately 3/8" to avoid interference.	1.60	3/8″	11759-16
Increased ratio, must use Crane's Rocker Arm Stud Conversion Kit, 36655-16 and pushrods, 36668-16 to convert from the stock pedestal rocker arm to this adjustable stud mount design (Optional heat-treated pushrods available 36621-16) Stock valve covers must be modified, or spaced upward approxiamately 3/8" to avoid interference.	1.70	3/8″	70759-16
mast we mounted, or spaced approximation 570 to arous interference.	0	5/0	,0,5, 10

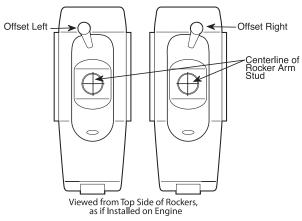


Narrow-body, selfaligning, extruded aluminum Gold Race rocker for late-model small-block Chevy, 88-99, 5.0-5.7L (except LS1 type applications), using center-bolt valve covers.



Extruded Gold Race rocker for Ford 289-302-351W-5.0L H.O., non-adjustable, 1.7 ratio. Uses stock-type 5/16" bolt. For hydraulic and hyd. roller cams only.

IDENTIFYING CRANE GOLD RACE ROCKER PUSHROD SEAT OFFSETS



Aluminum Roller Rockers, Gold Race Extruded - Stud Mount



Gold Race Extruded Rocker Arms

Application	Ratio	Stud Dia.	Part No.
Ford V-8 62-00, 221-260-289-302-351W cu.in. (And 5.0L H.O.)			
Stock ratio and standard stud diameter	1.60	3/8"	36750-16 ^d
Stock ratio pedestal mount type for 77-00 cylinder heads, non-adjustable, secured with 5/16" bolt. For hydraulic lifter and hydra			
roller cam applications only.	1.60	5/16" Bolt	36759-16°
Stock ratio with enlarged stud diameter	1.60	7/16"	86757-16 ^f
Increased ratio pedestal mount type for 77-00 cylinder heads, non-adjustable, secured w/ 5/16" bolt. For hydraulic lifter and hydroller cam applications only.	draulic 1.70	5/16" Bolt	36758-16°
Increased ratio with enlarged stud diameter	1.70	7/16"	36757-16 ^f
Ford V-8 62-00, 221-260-289-302-351W and 302 SVO/302 Boss/351SVO blocks	1.70	7710	30737 10
equipped with M-6049-N351 Sportsman cylinder heads			
Reduced ratio with enlarged diameter, .150" right offset intake	1.55	7/16"	X1436I-1
Stock ratio with enlarged stud diameter, .150" right offset intake	1.60	7/16"	X1435I-1
Increased ratio with enlarged stud diameter, .150" right offset intake	1.65	7/16"	X1437I-1
Increased ratio with enlarged stud diameter, .150" right offset intake	1.70	7/16"	X1441I-1
Reduced ratio with enlarged stud diameter, exhaust	1.55	7/16"	X1444-1
Stock ratio with enlarged stud diameter, exhaust	1.60	7/16"	86757-1
NOTE: (These rocker arms are listed and sold individually)			
Ford V-8 351W and BOSS 351 Ford Racing blocks equipped with Dart Pro 1 cylinder heads			
Reduced ratio with enlarged diameter, and certified ratio for crate motor rules applications	1.50	7/16"	44755-16
Ford V-8 351W and BOSS 351 Ford Racing blocks equipped with Ford Racing Z304 cylinder heads			
Reduced ratio with enlarged diameter, .150" right offset intake, and certified ratio for crate motor rules applications	1.50	7/16"	44756-16
Ford V-8 69-82, 351C-351M-400, Boss 302 and 351 cu.in.			
Reduced ratio and standard Boss stud diameter	1.60	7/16"	86757-1
Reduced ratio and standard Boss stud diameter	1.65	7/16"	27759-16 ⁹
Stock ratio and standard Boss stud diameter	1.73	7/16"	27750-16 ⁹
Stock ratio and standard Boss stud diameter, new "Wide Body" design for severe usage applications	1.73	7/16"	27771-16 ⁹
Ford V-8 68-97, 370-429-460 cu.in.			
Reduced ratio and standard Cobra Jet stud diameter	1.60	7/16"	27757-16 ^h
Reduced ratio and standard Cobra Jet stud diameter	1.65	7/16"	27759-16 ^h
Stock ratio and standard Cobra Jet stud diameter	1.73	7/16"	27750-16 ^h
Stock ratio and standard Cobra Jet stud diameter, new "Wide Body" design for severe usage applications	1.73	7/16"	27771-16 ^h
Oldsmobile V-8 67-91, 260-307-350-400-403-425-455 cu.in.			
Stock ratio with enlarged stud diameter	1.60	7/16"	80757-16 ⁱ
Increased ratio, with enlarged stud diameter	1.70	7/16"	36757-16
Pontiac V-8 67-81, 265-287-301-316-326-347-350-389-400-421-428-455 cu.in.			
Stock ratio for use with Bottleneck studs with 7/16" bottom and 3/8" top threads	1.50	7/16"BN	28750-16
Stock ratio for 7/16" straight studs	1.50	7/16"	28755-16°
Increased ratio for 7/16" straight studs	1.65	7/16"	28758-16*c

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- a For use with standard valve covers. No machining or spacers required.
- b The 1991-2000 Gen V and VI engines require the installation of 99152-16 7/16" rocker arm studs (no machining required) and factory pushrod guideplates. For applications with over 480 pounds open valve spring pressure, the cylinder heads must be machined for the installation of 99157-16 7/16" rocker arm studs and 13650-1 pushrod guideplates. The 2001-2008 8.1L engines require the installation of 99155-16 7/16" rocker arm studs (no machining required) and factory pushrod guideplates.
- c Must machine cylinder head and install 99157-16 7/16" rocker arm studs.
- d Must machine 66-00 cylinder heads and install 99156-16 3/8" rocker arm studs and 36650-1 pushrod guideplates (heat treated pushrods required), or use 36655-16 Conversion Kit (no machining required) on 77-00 pedestal mount cylinder heads for street applications.
- e Includes Rocker Arm Pedestal Shim Kit 99170-1.
- f Must machine 66-00 cylinder heads and install 99157-16 7/16" rocker arm studs and 36650-1 pushrod guideplates (heat treated pushrods required).
- g The 351C-351M-400 engines equipped with pedestal mount rocker arms require the use of our 52655-16 Conversion Kit (no machining required) for street applications.
- h On 68-71 engines equipped with bottleneck studs, install 99159-16 straight 7/16" studs to permit valve adjustment. The 72-97 engines equipped with pedestal mount rocker arms can use our 35655-16 Conversion Kit for 3/8" pushrods (no machining required) for street applications.
- Must machine cylinder heads and install 99157-16 7/16" rocker arm studs and aftermarket pushrod guideplates (special length heat treated pushrods required).

Aluminum Gold Race, Shaft-Mount Rocker Arms

Shaft Mount, Extruded Aluminum Rocker Arms

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		Complete Set	Complete Set Contains		
Application	Ratio	Part No.	Rocker Arms	Shafts	Lube
Chrysler-Dodge-Plymouth V-8 64-91, "LA" 273-318-340-360 cu.in.					
Designed for standard cylinder heads (will not fit trans-am or W2/W5 heads)	1.50	69790-1	16 - 69750-1	1 - 69618-2	1 - 99008-1
Designed for standard cylinder heads (will not fit trans-am or W2/W5 heads)	1.60	69791-1*	16 - 69751-1 *	1 - 69618-2	1 - 99008-1
Designed for W2 or W5 cylinder heads		Offset	Intake Part No.	Exhaust Part No.	
NOTE: These Shaft Rockers are purchased individually. A complete engine set	1.50	Left	69765L-1	69760-1	
requires: 4 Left Intakes, 4 Right Intakes, and 8 Exhausts. (Shafts	1.50	Right	69765R-1		
and stands not supplied by Crane for W2 or W5.) Exhaust rockers are not offset.	1.60	Left	69766L-1*	69761-1*	
Exilanst lockers are not offset.	1.60	Right	69766R-1*		

		Complete Set	Complete Set Contains		
Application	Ratio	Part No.	Rocker Arms	Shafts	Lube
Chrysler-Dodge-Plymouth V-8 58-78, "B" 350-361-383-400-413-426-440	Chrysler-Dodge-Plymouth V-8 58-78, "B" 350-361-383-400-413-426-440 cu.in.				
Designed for standard cylinder heads	1.50	64790-1	8 - 64750L-1 8 - 64750R-1	1 - 64618-2	1 - 99008-1
Designed for standard cylinder heads	1.60	64791-1	8 - 64751L-1* 8 - 64751R-1 *	1 - 64618-2	1 - 99008-1
Designed For Stage IV, Stage V (Except Max Wedge), Stage VI, B-1/Bs, and Indy SR Cylinder Heads (Intake Rocker Arms Have .290" Offset)	1.50	64792-1	Int.: 4 - 64765L-1 4 - 64765R-1 Exh.: 4 - 64750L-1 4 - 64750R-1	1 - 64618-2	1 - 99008-1
Designed For Stage IV, Stage V (Except Max Wedge), Stage VI, B-1/Bs, and Indy SR Cylinder Heads (Intake Rocker Arms Have .290" Offset)	1.60	64793-1	Int.: 4 - 64766L-1 * 4 - 64766R-1 * Exh.: 4 - 64751L-1 * 4 - 64751R-1 *	1 - 64618-2	1 - 99008-1



Aluminum Shaft Mount Rocker Arms

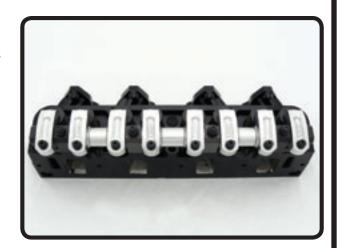


New! Shaft Mount, Extruded Aluminum Rocker Arms - Ford FE V-8, 352-428

Crane Cams upgrades their Ford FE 352-428 V8 rocker arms offerings with a new kit incorporating aluminum rocker arms designed with our Quick-Lift geometry. This will lift the valves off the seats quicker, promoting better torque and horse-power, without compromising reliability. These rocker arms have the conventional Ford adjustable 1.76:1 ratio, incorporate roller tips, and are also equipped with cup-type valve lash adjusters that permit the use of ball-and-ball configuration pushrods. The increased stiffness of modern heavy wall pushrods can now be incorporated into your FE valve train, also increasing power and durability, with better upper RPM stability.

This kit is designed for the Ford iron "Low Rise" cylinder heads, and the Edlebrock aluminum heads. They will also fit the Ford FE Tunnel Port heads, if you're fortunate enough to have a set of them. The standard oiling configuration is maintained for bolt-on installation. Each kit contains 8 intake rockers, 8 exhaust rockers, 2 steel rocker arm shafts, a set of steel billet stands that capture the ends of each shaft for added stability, all mounting hardware, a checking pushrod, plus installation lubricants and complete instructions.

- Increase horsepower, torque, rpm and throttle response
- · Roller tip for accurate valve stem tip tracking
- Machined steel valve lash adjusters included
- Rockers made from CNC machined, extruded billet, heat-treated aluminum
- Machined steel, hardened main shafts
- Each shaft end fully supported by steel billet shaft stands
- 1.76:1 ratio
- Stock oiling for maximum lubrication
- Fits FE iron "Low Rise" plus new Edelbrock® aluminum heads (Does not fit Stock Medium or High-Riser heads)
- Complete kit includes shafts and all hardware
- · Easy bolt-on installation with no machining required



Application	Ratio	Complete Set Part No.
Ford-Mercury V-8 63-76, FE 352-360-390-406-410-427-428 cu. in		
Designed For standard Low-Rise cylinder heads and Edelbrock aluminum cylinder heads This is a complete installation kit including 8 intake rocker arms, 8 exhaust rocker arms, 2 steel rocker shafts, steel billet shaft stands that support the ends of the shafts, all mounting hardware (studs, nuts, washers, shims, spacers, etc.) and complete instructions. No machining required.	1.76	34791-1
Pro-Series one piece ball-and-ball end pushrods recommended for use with these rocker arms are:		
For hydraulic lifters	(9.150" oal)	95819-16
For Crane hydraulic roller lifters	(8.450" oal)	95805-16
For mechanical lifters	(9.150" oal)	95819-16
For Crane roller lifters	(9.050" oal)	95817-16
New rocker shafts available separately		34618-2

TECH TIP: Due to various modifications to racing engines, custom length pushrods may be required. See page 305 for special pushrod ordering instructions.

Rocker Arm Adjusting Nuts, Screws

Steel Rocker Arm Adjusting Nuts, "Kool Nuts™"

Crane's locknuts for stamped steel rocker arms are available in self-locking type standard configurations, and in our patented *Kool Nut™* oil deflection design. These direct the pressure-fed oil flow to the pivot ball-rocker arm interface, resulting in superior lubrication and cooling in this critical area.





Stud Dia. &		
Thread	Description	Part No.
5/16"-24	Self locking	99772-16
3/8"-24	Self locking	99770-16
3/8"-24	Kool Nuts TM with oil deflector for improved cooling and lubrication. Counterbored on bottom to also fit bottleneck studs	99768-16
7/16"-20	Self locking	99771-16
7/16"-20	Kool Nuts TM with oil deflector for improved cooling and lubrication. Counterbored on bottom to also fit bottleneck studs	99769-16

Shaft-Type Rocker Arm Adjusting Screws

Crane shaft-type rocker arm adjusting screws are precision machined from premium steel billet material and selectively hardened to provide maximum strength. These screws are extremely lightweight and drilled for oiling when necessary.





Stud Dia. & Thread	Ball/Cup Diameter	Description	Part No.
3/8"-24	5/16" ball	Chrysler V-8 "LA", "B", and 426 Hemi, with locknut	99802-16
3/8"-24	5/16" cup	For Sportsman Series shaft mount rocker arms and Ford FE V8 332 through 428 with 34791-1 rocker arm set	99785-16
3/8"-24	5/16" cup	For Pro Series shaft mount rocker arms	99785-16
3/8"-24	3/8" ball	Chrysler V-8 "LA", "B", and 426 Hemi, with locknut (For severe duty applications, special pushrods required)	99780-16
7/16"-20	5/16" ball	Chrysler V-8 "LA", "B", and 426 Hemi, with locknut (For repair or ratio modification of rocker arms)	66770AS-16
7/16″-20	3/8" ball	Ford V-8 332 thru 428, with locknut, for 34772-16 ductile iron rocker arms	99680-16

Rocker Arm Adjusting Nuts, Screws



Rocker Arm Adjusting Nuts

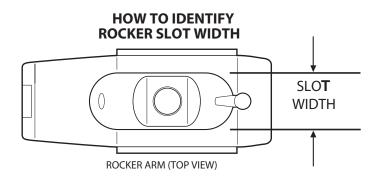
Crane locknuts for Crane's roller-tip, needle bearing aluminum rocker arms feature highest quality metal bar stock, precision machined on our own automatic screw machines and heat treated in house for maximum strength and durability. Each Crane locknut comes complete with an Allen-head set screw for positive jam nut operation.

NOTE: Since mid-1985, most Crane Gold Race stud mount extruded rocker arms (except narrow body versions) and Crane Classic rocker arms have had a .600" wide top slot. Crane Energizer stud mount rocker arms have a .570" wide top slot.





Stud Diameter & Thread	Minimum Rocker Slot Width	Aluminum Rocker Adjusting Nut Part No.	Overall Height	VTS Bar (Stud Girdle) Adjusting Nut Part No.	Overall Height
5/16"-24	.550"	99761-16	.922"		
3/8"-24	.550"	99788-16	1.063"	99803-8	2.013"
3/8"-24	.550"	99795-16	.860"		
		(For center bolt valve cover app	olications)		
3/8"-24	.600"	99764-2	.700"		
		(For Crane Chevrolet LS1 rocke	r arm kit)		
3/8"-24	.600"	99760-16	1.078"		
		(For Pontiac rocker arm part no	o. 28750 ONLY)		
3/8"-24	.600"	99793-16	1.063"		
7/16″-20	.550"	99790-16	.922"	99804-8	2.013"
7/16"-20	.550"			99805-8	2.512"
		(For Chevrolet V-8 396 thru 454 intake)			4 intake)
7/16″-20	.600"	99792-16	.969"	99810-8	2.013"
7/16"-20	.600"			99809-8	2.637"
				(For Chevrolet V-8 396 thru 45	4 intake)



Rocker Arm Shim Kits

Rocker Arm Bridge Shim Kit

Crane's Rocker Arm Bridge Shim Kit will correct for excessive hydraulic lifter preload on late model American Motors V-8's, and I-6's, and Oldsmobile V-8's with the bridge mounted rocker arm assemblies. This kit will also work on the later model Pontiac 151 I-4's with shoulder bolt mounted rocker arms. Two different thickness shims are included to decrease lifter preload by approximately .030", .060" or .090" depending on the combination of shims being used between the bridge and the cylinder head. Excessive preload may be caused by a camshaft change, valve job, head resurfacing, etc. These shims can be a quick and easy alternative to resorting to different length pushrods.

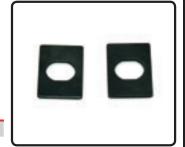
Description	Part No.
Kit of 32 Rocker Arm Bridge Shims	99179-1



Rocker Arm Pedestal Shim Kit

Crane's Rocker Arm Pedestal Shim Kit is for use on Ford engines utilizing non-adjustable pedestal mounted rocker arms. The hydraulic lifters in these engines may have excessive preload due to a camshaft change, valve job, head resurfacing, etc. To cure this problem, without resorting to different pushrods, we offer this pedestal shim kit containing two different thickness shims. These shims are placed between the rocker arm pedestal and the cylinder head, and will reduce the preload by approximately .030", .060", or .090". These will fit the Ford V-8, 255-302, 302 H.O., 351W, 351C, 351M, 400, and 370-429-460 engines.

Description	Part No.
Kit of 32 Rocker Arm Pedestal Shims	99170-1



Needle Bearing Roller Fulcrum Conversion Kit

Crane Cams' drop-in needle bearing fulcrum conversion kit for Ford pedestal-mount rocker arms enables you to retrofit standard non-adjustable rockers with fully rollerized fulcrum assemblies. This eliminates the greatest source of friction in the rocker arm, resulting in less wasted horsepower, lower oil temperatures, greater strength and load carrying abilities, greater vacuum at a given RPM, and better fuel economy. This kit is intended for use with hydraulic lifter and hydraulic roller camshaft applications only.

All hardware is included: New heat treated fulcrums; needle bearing assemblies and hardened hold-down bolts. Pedestal shim kit also included to enable you to optimize hydraulic lifter preload for best performance and reliability. No machining required.

These will fit all pedestal mount factory rocker arms for Ford V-8 engines: 77-00 255 and 302, 77-97 351W, 70-82 351C, 351M, 400, 73-97 370-429-460. Rocker arms NOT included.





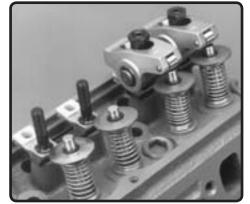
Rocker Arm Guideplate Conversion Kits



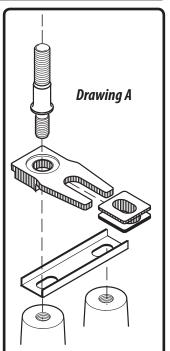
Rocker Arm Guideplate Conversion Kits

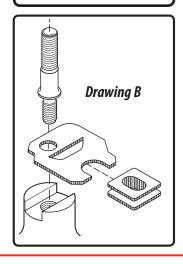
Converts Pedestal-Mount Dodge and Ford Cylinder Heads to Adjustable Rocker Arms

Crane Cams' rocker arm stud/pushrod guideplate conversion kits enable you to convert late-model Dodge and Ford V-8 engines with pedestal mount rocker arms to an adjustable-type valve train without machine work or cylinder head removal. These kits allow standard pushrods to be retained, in most instances, as the guideplate uses a special composite insert that prevents metal-to-metal contact. Each kit includes guideplates, guideplate inserts, studs, stud installation nut, and complete instructions. (Rocker arms, adjusting nuts, and pushrods are not included.) These kits are intended for mild performance applications using hydraulic lifter or hydraulic roller cams, and are not recommended for competition usage.



Description	Part No.
Dodge 92-02, Magnum V-8 318 (5.2L) and 360 (5.9L) engines with 5/16"-18 threaded stud bosses. Must use 11746-16 or 11759-16 aluminum rocker arms for 3/8" rocker arm studs and 5/16" dia. 36621-16 (heat treated) pushrods.	36655-16 (Drawing A)
Dodge 92-02, Magnum V-8 318 (5.2L) and 360 (5.9L) engines with 5/16″-18 threaded stud bosses. Must use 11747-16 or 11755-16 aluminum rocker arms for 7/16″ rocker arm studs and 5/16″ dia. 36621-16 (heat treated) pushrods.	36656-16 (Drawing A)
Dodge Aluminum Magnum and Crate Motor cylinder heads with 3/8″-16 threaded stud bosses. Must use 11746-16 or 11759-16 aluminum rocker arms for 3/8″ rocker arm studs and 5/16″ dia. 36621-16 (heat treated) pushrods.	70655-16 (Drawing A)
Ford V-8 77-00, 255-302, 302 H.O., 351W engines. Will accept 3/8" stud die-formed steel or Crane aluminum rocker arms and 5/16" diameter pushrods.	36655-16 (Drawing A)
Ford V-8 77-00, 255-302, 302 H.O., 351W engines. Will accept 7/16" stud Crane aluminum rocker arms and 5/16" diameter pushrods.	36656-16 (Drawing A)
Ford V-8 70-82, 351C, 351M, 400, and Ford V-8 72-97, 370-429-460 engines. Will accept 7/16" stud die-formed steel or Crane aluminum rocker arms and 5/16" dia. pushrods.	52655-16 (Drawing B)
Ford V-8 72-97, 370, 429, 460 Engines. Will accept 7/16" stud die-formed steel or Crane aluminum rocker arms and 3/8" diameter pushrods.	35655-16 (Drawing B)
Replacement guideplate insert for 5/16" diameter pushrods (included in kits)	52655GB-16
Replacement guideplate insert for 3/8" diameter pushrods (included in kits)	35655GB-16





Rocker Arm Stud Conversion Kits

Rocker Arm Conversion Stud Kits for Big-Block Chevy Gen V & VI V-8, 454-502 cu.in. and 8.1 Litre V-8

Converts Non-Adjustable Chevrolet Gen V & VI 454-502 and 8.1L V-8 Engines to Adjustable Rocker Arms

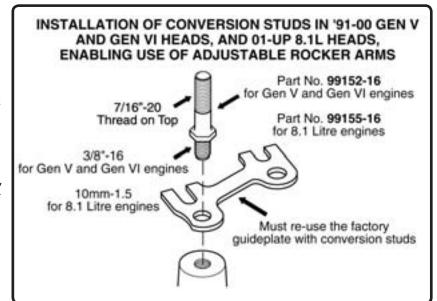
Chevrolet's 1991-00 Gen V and VI, 454-502 and 01-08 8.1 litre big-block V-8 engines offer great performance potential but are handicapped by their non-adjustable, self-aligning rocker arms and valve train. In stock form this system works great, but for performance applications or any instance where an aftermarket camshaft and valve train are called for, the answer is "no way"!

Now Crane Cams offers an ingenious, simple, easy and low-cost way to convert these non-adjustable valve train engines to the obvious performance advantages of high strength, screw-in rocker studs, pushrod guideplates, and die-formed steel rockers or roller fulcrum, aluminum rocker arms.

These are unique rocker arm studs that replace the stock studs without retapping, machining or removal of the cylinder heads.

For the Gen V and VI, rocker arm stud kit **99152-16** is made with a 3/8" diameter bottom thread that bolts directly into the stock rocker bolt location. On top is a 7/16" threaded stud end that allows you to install any adjustable Chevy big-block rocker directly onto the stud. Factory pushrod guideplates must be used to correctly align the pushrods. You can use part no. **13634-16** heat treated pushrods or 3/8" diameter stock pushrods from any big-block Chevy V-8 equipped with adjustable rockers.

The Crane **99152-16** "big-and-small" studs are not recommended for use in competition applications, or with valve spring open pressures over 480 lbs. For those applications use **99157-16** 7/16" x 7/16" studs (you must drill and re-tap new threads in the heads) and **13650-1** guideplates.





For the 2001-08 8.1 litre engines, rocker arm stud kit **99155-16** incorporates a 10mm-1.5 bottom thread that bolts into the stock rocker stand location. The 7/16"-20 top thread again allows you to use any adjustable Chevy big-block rocker. Our **26640-16** Pro Series one piece heavy wall heat treated pushrods are recommended for proper valve train geometry.

Application	Part No.
Chevrolet V-8 91-00, 454 and 502 Gen V and Gen VI Engines	99152-16
Chevrolet V-8 01-08, 8.1 Litre Engines	99155-16



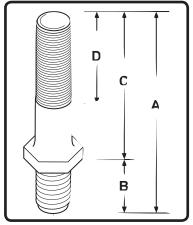
Rocker Arm Studs

Crane's screw-in rocker arm studs eliminate problems resulting from press-in studs pulling out at high RPM and in high valve spring pressure applications. Made from high quality alloy steel, Crane studs are precision machined and heat treated for reliable operation with today's valve train loading. Specially machined threads and shoulder area assures firm and positive rocker arm support with minimum movement or distortion.

The **99148** studs are used to convert Chevrolet 60° V-6 80-94, 2.8-3.1L engines with non-self aligning 10mm stud rocker arms to use adjustable narrow body 3/8″ stud rocker arms without cylinder head machining.

Top Stud Diameter	Bottom Stud Diameter					
& Thread	& Thread	Dim. A	Dim. B	Dim. C	Dim. D	Part No.
3/8"-24	5/16"-18	2.313	.813	1.500	.875	99146-16
3/8"-24	3/8"-16	2.313	.813	1.500	.875	99145-16
3/8"-24	10mm-1.5	2.384	.813	1.572	.582	99148-16
3/8"-24	7/16" -14	2.396	.700	1.750	.806	99156-16
7/16"-20	5/16" -18	2.313	.813	1.500	.875	99147-16
7/16" -20	7/16" -14	2.560	.800	1.760	.860	99157-16
7/16"-20	3/8"-16	2.650	.750	1.900	1.000	99152-16
	hevrolet Gen V and VI, n n valve spring pressure, r			not recomm	ended for applic	ations with
7/16" -20	10mm-1.5	2.650	.750	1.900	1.000	99155-16
(Conversion stud for C	hevrolet 8.1 litre V-8, m	ust use factory	guideplates, r	no machining	required.)	
7/16" -20	7/16" -14	2.670	.740	1.930	1.060	99159-16





Pro Series Rocker Arm Studs

Crane Cams professional quality, Pro-Series rocker arm studs feature an extra large radii for reduced stud flex, even with today's extreme valve spring pressures and high rpm racing engine operating levels. Our Pro-Series rocker studs are precision manufactured from 190,000 P.S.I. strength alloy steel material with rolled threads, and precise top-to-bottom concentricity. These are state-of-the-art items designed and priced for those seeking the highest quality parts available. The **99151** stud has a longer than normal unthreaded portion in the top section, providing superior support and stability for the rocker arm fulcrum.



Top Stud Diameter & Thread	Bottom Stud Diameter & Thread	Dim. A	Dim. B	Dim. C	Dim. D	Part No.
3/8"-24	8mm-1.25	2.157	.720	1.437	.625	99154-16
3/8"-24	8mm-1.25	2.360	.615	1.745	.800	99158-16
7/16" -20	7/16" -14	2.650	.750	1.900	1.000	99153-16
7/16" -20	7/16" -14	2.700	.800	1.900	.800	99151-16

Timing Chains and Components

Performance Steel Billet, CNC Machined, Roller Timing Chain SetsCrane Performance Steel Billet Gear and Roller Chain Sets offer the precision, strength and accuracy of billet steel, CNC machined camshaft and crankshaft sprockets with the strength, friction reduction and wear resistance of a double-row, roller timing chain. Most kits include a seven keyway crank sprocket for easy degreeing of your camshaft. Where applicable, most sets are machined for, and include, a thrust shim.

Note: Due to the increased width of the sprockets and chain, clearance must be checked between the timing set and the block casting. Some applications may require minor grinding of the block for clearance.



Application	Set Part No.
Chevrolet 90° V-6 78-86, 200 thru 262 cu. in. and Chevrolet V-8 55-87, 262 thru 400 cu. in.	
	11975-1
Chevrolet 90° V-6 78-86, 200 thru 262 cu. in. and Chevrolet V-8 55-87, 262 thru 400 cu. in. with thrust bearing	
	11976-1
Chevrolet V-8 87-91, 305 and 350 cu. in. with Factory Hydraulic Roller Camshaft	
	10975-1
Chevrolet V-8 65-95, 396-402-427-454-502 cu. in. (including Gen V)	
(NOTE: Does not fit Gen VI or 8.1L)	13975-1
Chrysler Hemi V-8 51—56, 301-331-354 cu. in. and 57—58 392 cu. in.	
	69975-1
Chrysler-Dodge-Plymouth "LA" V-8 64-93, 273-340-360 cu. in. and 67-91, 318 cu. in.	
	69975-1
Chrysler-Dodge Magnum V8 92-02, 5.2-5.9 litre	
	69975-1
Chrysler-Dodge-Plymouth "B" V-8 70-78, 383 thru 440 cu. in. (Three bolt), and Chrysler-Dodge-Plymouth V-8 66-71, 426 Hemi	
	68975-1
Ford V-8 73-01, 255 (4.2 L)-302-302 H.O-351W	
	44975-1
Ford V-8 69-82, 351C-351M-400 cu. in.	
	52975-1
Ford V-8 68-97, 370-429-460 cu. in.	
	35975-1
Oldsmobile V-8 64-84, 260-307-330-350-400-403-425-455 cu. in.	
	80975-1
Pontiac V-8 55-81, 265 thru 455 cu. in.	
	28975-1

Timing Chains and Components



Pro-Series Steel Billet, CNC Machined, Roller Timing Chain SetsCrane Cams' Pro-Series Steel Billet Gear and Roller Chain Sets offer the pre-

Crane Cams' Pro-Series Steel Billet Gear and Roller Chain Sets offer the precision, strength and accuracy of billet steel, nitride hardened, CNC machined camshaft and crankshaft sprockets with the strength, friction reduction and wear resistance of a premium quality, German manufactured, double-row, roller timing chain. The billet 4140 steel nitride hardened crankshaft sprocket features nine separate keyway locations, providing up to eight degrees of advance or retard.



Application Pa	art No.
American Motors V-8 66-91, 290 thru 401 cu. in.	
·	6977-1*
Chevrolet 90° V-6 78-86, 200 thru 262 cu.in. and Chevrolet V-8 55-87, 262 thru 400 cu.in.	
Complete set with multiple keyway crank sprocket and machined to fit supplied thrust washer.	1984-1*
Replacement Chain 11	1978-1
Replacement Thrust Washer (.031")	1984TW-1
Replacement Thrust Washer (.150")	1984TWT-1
Complete set with multiple keyway crank sprocket and captured needle bearing thrust washer	1977-1*
Replacement Chain 11	1978-1
Chevrolet LS1/LS6 V-8 97-13, 5.7 Litre and Vortec 4800, 5300, 6000 (will not fit LS2)	
Complete set with steel billet gears and double roller chain, plus all attaching hardware. Cam sprocket has vernier adjustment. No cam sensor triggers.	44984-1*
Chevrolet LS2 (early) V-8 6.0L	
Complete set with steel billet gears and double roller chain with thrust bearing. Cam sprocket has single trigger cam sensor feature. Crank sprocket has 9 keyways. 14	44985-1*
Chevrolet LS2 (late), LS3, LS7, and L92 V-8 6.0-6.2-7.0L Three Bolt	
Complete set with steel billet gears and double roller chain with thrust bearing. Cam sprocket has four trigger cam sensor feature. Crank sprocket has 9 keyways. 14	44986-1*
Chevrolet V-8 65-95, 396 thru 454 & 502 cu.in. (including Gen V)	
Complete set with multiple keyway crank sprocket and machined to fit supplied thrust washer. (NOTE: Does not fit Gen VI or 8.1L)	3984-1*
Replacement Chain 13	3978-1
Replacement Thrust Washer (.031")	3984TW-1
Chevrolet V-8 65-95, 396 thru 454 & 502 cu.in. (including Gen V)	
Complete set with multiple keyway crank sprocket and captured needle bearing thrust washer. (NOTE: Does not fit Gen VI or 8.1L)	3977-1*
Replacement Chain 13	3978-1
Chevrolet V-8 96-00, 454 (7.4L) - 502 (8.2L) Gen VI	
Complete set with multiple keyway crank sprocket and captured needle bearing thrust washer.	6977-1*
Chevrolet V-8 01-08, 8.1L L18 (Vortec 8100)	
Complete set with multiple keyway crank sprocket and captured needle bearing thrust washer.	6977-1*
Chrysler-Dodge-Plymouth "B" 70-78, 383 thru 440 cu. in. (Three bolt), and Chrysler-Dodge-Plymouth V-8 66-71, 426 Hemi	
Complete set with multiple keyway crank sprocket and captured needle bearing thrust washer.	8977-1*
Ford V-8 73-01, 255 (4.2L), 302, 302 H.O., 351W, 351 SVO	
	4984-1*
Replacement Chain 11	1978-1

NOTE: Due to the increased width of the sprockets and chain, clearance must be checked between the timing set and the block casting. Some applications may require minor grinding of the block for clearance.

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.

Tools

Cam Degreeing "Tune-A-Cam" Kit

Everything you need to quickly, easily and accurately degree-in your camshaft for maximum performance. Complete kit contains: precision dial indicator, with custom design base to mount to cylinder head, piston stop, pointer, checking springs, degree wheel and instructions — all in a hard molded plastic carrying case.

Description	Part No.
Tune-A-Cam Kit (Complete Kit)	99030-1

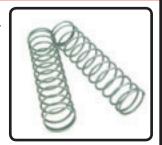


Checking Spring

(Low Tension Valve Spring)

This low tension spring can be compressed with a single finger. It is to be used when "mocking-up" a cylinder head with a pair of valves and retainers, for checking such things as: valve lift, valve to piston clearance, and degreeing a cam at the retainer.

Description	Part No.
Pair of Low Tension Valve Train Checking Springs	99881-2



Cylinder Pressurization Kit

When changing the valve springs on an assembled engine while using one of our exclusive valve spring compressors, or performing other maintenance that requires your cylinders to be pressurized, this convenient kit provides a quick and economical method to accomplish this. The kit contains a premium quality hose, having an o-ringed 14mm and 18mm threaded adaptor at one end to thread into the spark plug hole, while the other end has a female ¼" NPT threaded brass fitting to receive your choice of quick-disconnect adaptors. There's also a long 14mm threaded adaptor for aluminum heads, to provide better sealing and providing superior thread engagement.



Description	Part No.
Cylinder Pressurization Kit for cylinder heads having 14 and 18mm spark plugs	99474-1

Degree Wheel

Crane's degree wheels are made from rigid, durable stamped steel, $9\frac{1}{2}$ " in diameter, and come with adapter inserts for 7/16", 1/2", and 5/8" center holes.

Description	Part No.
Degree Wheel with Adapters	99162-1



Piston Stop

(Top Dead Center Locator)

Provide a positive stop for the piston when locating true TDC (Top Dead Center), for camshaft degreeing. Made to screw directly into the cylinder head spark plug hole. Machined from brass to prevent piston damage, and incorporating an air bleed hold to prevent compression build-up while turning the engine over.







Pushrods, Adjustable Checking - See page 310

Oil Pump Primer

Successful engine builders know that externally priming the oiling system of a new engine eliminates dangerous "dry" initial start-up! Our Chevrolet oil pump primer tool features a special bushing that seals the oil galley and completely primes and pressurizes the entire engine oil system. All models feature an upper collar that also prevents oil pump drive side-loading. Use your heavy duty 3/8" drive drill motor to build oil pressure and uniformly distribute oil throughout the engine for initial start-up..



Application	Part No.
Chevrolet V-8, 262 thru 400, 396 thru 454, and 90° V-6	99010-1
Ford V-8, 221 thru 302, Boss 302, (1/4" hex)	99012-1

Organizer Tray for Valve Train

Lightweight tray accepts a wide range of rockers, pushrods, adjusting nuts, lifters and spark plugs. Integral handholds make handling easier. Resistant to heat, oils and solvents.

Description	Part No.
Valve Train Organizer Tray	99015-1

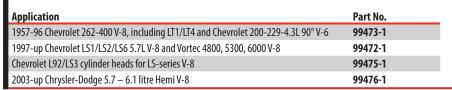


Valve Spring Compressors

For Small Block Chevrolet

Models to fit all production small block V-8 and V-6 engines – including late model LS1/LS2/LS6 & Vortec

This handy tool is designed for removing valve springs while the cylinder head is attached to the engine. This facilitates the installation of new valve springs in substantially less time than it takes using a conventional valve spring compressor. In fact, it reduces the spring removal and replacement time on F-body cars to one-quarter of the time required for other tools. Use a ratchet or impact wrench to compress the springs. The rugged heat-treated steel fixtures are precision CNC-machined to assure proper seating on the cylinder head & valve spring retainer.





Tools

Valve Spring Height Micrometer

Rotating the tool expands it to simulate installed height. The micrometer measurements make it extremely easy to read. The tool will measure from 1.600" to 2.100" installed height with an accuracy of .001".

Description	Part No.
Height Micrometer 1.600-2.100"	99019-1



Valve Spring Seat Machining Tool Bodies

These carbide-tipped tools machine the valve spring seat to the precise diameter and depth for high performance spring applications. Crane Machining Tool Arbors are required to pilot these tools in the valve stem bore.

Application	Part No.
Machines 1.320" O.D., .630" I.D.	99404-1
Machines 1.475" O.D., .630" I.D.	99403-1
Machines 1.570" O.D., .630" I.D.	99406-1
Machines 1.640" O.D., .630" I.D.	99405-1
Machines 1.760" O.D., .630" I.D.	99414-1



Valve Spring Seat Machining Tool Arbors

These arbors accurately pilot the Valve Spring Seat Machining Tools by locating in the valve stem bore.

Application	Part No.
Use with 5/16" valve stems	99026-1
Use with 11/32" valve stems	99027-1
Use with 3/8" valve stems	99028-1
Use with 8mm valve stems	99025-1



Valve Spring Tester Calibration Spring

This high quality steel valve spring includes a graph plotted from this exact calibration spring, enabling you to check the accuracy of your spring testing equipment.

Description	Part No.
Spring Tester Calibration Spring w/Data Sheet	99851-1



Vacuum Kits and Accessories



Adjustable Vacuum Advance Kits

Now you can actually tailor your ignition system to meet a wide variety of driving conditions and requirements with these unique, easy-to-install adjustable vacuum advance kits. Comes complete with adjustable vacuum canister, featuring the unique adjustable vacuum diaphragm, three sets of advance weight springs, and a 3/32" allen wrench, plus complete instructions for installation and operation.

The adjustability provided by these kits permits you to run the maximum ignition advance throughout the RPM range, without encountering detonation. Improved performance, efficiency, and dependability are the major benefits obtained. Once the kit is installed, you can also quickly compensate for changes in fuel quality and altitude.



Application	Part No.
Delco Point Type (Includes Limiter Plate)	99601-1*
Ford V-8 73-85 with Electronic Ignition (without computer controls)	99607-1*
G.M. H.E.I. (Includes Limiter Plate)	99600-1*

Vacuum Timing Limiter Plate

Here's an easy-to-install item that allows you to limit the amount of vacuum timing needed for certain engine/vehicle applications using the Crane Adjustable Vacuum Kit.

With Crane's Adjustable Vacuum Advance Kits, the adjustment made through the vacuum port of the cannister adjusts the rate of vacuum timing change as engine vacuum changes.

The Crane Vacuum Timing Limiter plate actually changes the amount of that vacuum timing. This is especially helpful with applications such as high compression ratio engines, heavy engine loads (such as very low numerical rear axle gearing) or heavy vehicle weights such as motor homes, trucks with trailers, etc..



Each plate notch will shorten the amount of vacuum timing by 2°. It will also advance the initial timing to 2° because of the change in the starting position of the breaker plate or magnetic pick up.

Application	Part No.
Vacuum Timing Limiter Plate — for GM/Delco V-8 point-type and H.E.I. ignition distributors	99619-1*

Vacuum Reserve System

Is That "Big Cam" Giving Your Vacuum Assisted Power Brakes And Other Accessories Problems? Our Original Vacuum Reserve System Delivers Needed Vacuum Storage!

This unique kit allows you to store needed vacuum to operate your vacuum assisted power brakes, even with a more radical camshaft! Crane's Vacuum Reserve System utilizes a one-way check valve that stores engine vacuum until it's needed...like when you apply the brakes and your engine can't supply the needed vacuum! Compactly sized at just 5" x 7", this unit can be installed in tight areas. Comes complete with all hardware. Power brake hose not included.

Application	Part No.
Vacuum Reserve System, Complete Kit including Fittings	99590-1



^{*}This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.

About Valve Springs

Valve Springs . . . Hardly An "Open & Shut" Subject!

Valve springs are at least as important as any other major performance component in an engine; yet, they are probably the most misunderstood and neglected. Incorrect or worn valve springs cause conditions that are often misdiagnosed as fuel or ignition problems. When all of the fuel and ignition system components have been replaced; and the "gremlins" are still in the engine, chances are the valve springs are either set up at the wrong tension, worn out, or just the wrong spring for the cam profile. This last factor is often the most puzzling, yet offers the greatest chance for significant improvements in engine performance.

Due to their highly stressed design (valve springs are coiled from specially heat-treated, super-clean, supersophisticated alloys of steel), valve springs have several critical characteristics that are generally called "resonant frequency" or "natural harmonics". These are similar to those of a lead crystal goblet. By sounding a specific frequency musical note, the goblet will shatter. An undampened valve spring run at steady speed at its natural frequency will either self-destruct or lose enough of its strength and tension that it can no longer properly control the valve action.

At Crane, we design springs to maximize the performance of Crane Cams. In doing so, we put the resonant frequency outside of the intended operating range of the spring. This is not

always the case, especially with springs produced by the OE manufacturers for production vehicles.

For years, especially before onboard computers, valve springs were used as "rev-limiters" to help the OE manufacturers in their efforts to minimize warranty problems caused by over-enthusiastic drivers. These springs usually had a resonant frequency located somewhere in the 4400-5200 RPM range. When a vehicle was accelerated, the engine would rev through the low end and mid-range perfectly until the engine speed hit somewhere in the 4400-5200 RPM range. Then it would either just stop pulling or the engine would start misfiring badly. This was typically diagnosed as a fuel or ignition problem when, in actuality, it was the factory's valve spring resonant frequency helping protect the engine.

A good set of valve springs, even on an otherwise stock engine, will usually provide a significant performance improvement throughout the RPM range as well as a marked improvement in fuel economy, smoother idle, improved cold start, and better cold weather driveability.

What is most important is selecting a valve spring with the correct seat pressure, open pressure, and spring rate for the camshaft in the engine. At Crane Cams, we constantly test and evaluate various cam lobe profiles vs. spring combinations, so that we can give you the right spring recommendations for

your cam. However, with over 80,000 profiles in our camshaft lobe library and over 60 different valve springs in our catalog, it is impossible for us (or any company) to test every possible combination. Because of this, we offer guidelines on how to select springs for custom applications (special valve stem lengths, weights, etc.). It is in this area of the unknown or untested that the greatest opportunities exist of finding your own special combination that yields a power and performance increase beyond your competitors.

What we're talking about is virtually free HP just for choosing the right springs!

If you have purchased a cam (Crane or another brand), and it doesn't seem to perform to your expectations, it is quite likely a different valve spring might be able to make an improvement (It could also be a problem with pushrod stiffness and/or rocker arm geometry.) If you are pushing the envelope in any area of motorsports competition, it is necessary to constantly evaluate various combinations of engine components. Frequently, racers ignore the effects of the valve springs on the dynamics of the valvetrain. By experimenting with various valve spring combinations you will probably find the most power for your money and/or time. In addition, you just might cure that "fuel system" or "ignition system" problem you thought you had!



Valve Train Questions



Valve Spring Rate and How to Use It

The rate of a spring is the force necessary to compress (or deflect) the spring a specified distance. For example, if we say that a spring has a rate of 250 lbs. per inch (250#/in.), it will take 250 pounds of force to compress the spring 1 inch. Fortunately, valve springs are coil springs, and coil springs are easy to understand because they have an almost linear spring rate. In other words, if it takes 400 lbs. to compress a spring 1 inch, it only takes 100 lbs. to compress the spring .250 in., 200 lbs. to compress it .500 in., and 300 lbs. to compress it .750 in. Some people refer to spring rate as "stiffness", and it is the understanding of this spring characteristic that is most important in selecting and setting up springs on an automotive cylinder head.

Frequently a taller, softer spring is a better choice for a performance application than a short, stiff spring.

Consider the following possibility:

A vehicle owner wants to use a .520" valve lift camshaft in an application and is considering different valve springs.

Spring A has an installed pressure of 125# at 1.750" installed height and has a rate of 280#/in.

Spring B has an installed pressure of 115# at 1.750" installed height with a rate of 410#/in.

At .520" lift, **Spring A** has an open pressure of 271# (this is 125# of seat pressure plus [.520" x 280#/in] = 146# from spring compression). At .520" lift, **Spring B** has an open pressure of 328# (this is 115# of seat pressure plus [.520" x 410#/in] = 213# from spring compression). Both of these springs would work on a street performance application requiring good performance and reliability. However, **Spring A** with a lower open pressure of 271# could probably be used on a cylinder head with pressed in rocker studs; while **Spring B** would definitely require screw in studs for adequate reliability. **Spring B** would probably provide better performance above 6000 RPM (especially with relatively heavy valves) because of its higher open pressure of 328#. **Spring A** would probably idle a little smoother with higher vacuum, especially if a high pressure oil pump or thicker oil is used. This is a result of **Spring A**'s higher seat pressure of 125#.

As you can see from the example above, there are often different springs that can offer different benefits on the same cam profile. **Spring A** offers good performance over a wide RPM range at a lower total valvetrain cost (this assumes that the heads were not machined for screw in studs). **Spring B** offers the possibility of somewhat improved performance beyond 6000 RPM. The vehicle owner needs to decide what he wants from his vehicle and what he wants to spend.

In all-out racing, we frequently see the need for different springs on the same lobe profile depending on the anticipated RPM range. Frequently, circle track racers will run two different tracks with the same engine but with different rear end gearing. Often there can be as much as 500-700 RPM difference in the top end engine speed between the two tracks. It is not uncommon to find that the car runs better on the track with the lower peak RPM using a spring with a lower seat pressure and softer rate. At the track where the engine runs to the higher speed, the engine needs more seat pressure and a stiffer spring rate. Every combination of engine, chassis, and track is different. Significant performance improvements can often be achieved by experimenting with valve springs. If you aren't paying attention to your springs, the guy winning most of the races probably is!

Choosing Valve Springs

How to Select a Valve Spring

With the many choices of aftermarket cylinder heads, most with longer-than-stock length valves, the recommendation of a specific spring for a specific cam is almost impossible. It is now necessary to select the spring that will best fit the cylinder head configuration. We offer the following as general guidelines only:

- 1) "FLAT FACED LIFTER" cam/lifter applications (Street & Street/Strip) seat pressures
 - a. Small Block: 105-125# Seat Pressure
 - b. Big Block: 115-130# Seat Pressure (Note: Big Block applications need higher seat pressures due to their larger, heavier valves.)
- "FLAT FACED LIFTER" Open pressures should not exceed 330# open pressure (sustained after spring break-in for accepable cam and lifter life.
 - a. Open pressures should be a minimum of 220# for applications up to 4000 RPM.
 - b. For good performance above 4000, open pressures should be at least 260# with stock weight valves. (Lightweight valves require less spring open pressure.)
 - c. Spring open pressures over 280# can cause pressed-in studs to come loose; therefore, we recommend screw-in studs for open pressures above 280#.
- 3) HYDRAULIC ROLLER CAMS require higher spring seat pressures to control the heavier roller tappets and the more aggressive opening and closing rates available to roller cam profiles.

a. Small Block applications: 120-145# seat pressure
 b. Big Block applications: 130-165# seat pressure

- 4) HYDRAULIC ROLLER CAMS use higher open pressures to control the high vertical opening inertia of the heavier roller followers.
 - a. Small Block applications need at least 260# for general driving applications up to 4000 RPM.
 - b. Moderate performance small block applications like 300-360# open.
 - c. Serious small block applications can tolerate 400-425#* open pressures and still expect reasonable valve train life when top quality springs, pushrods, and lubricants are used.
 - d. Big Block applications need at least 280# for general driving applications up to 4000 RPM.
 - e. Moderate performance big block applications like 325-375# open pressure.
 - f. Serious big block performance applications can tolerate 450#* open pressure and still expect reasonable valve train life when top quality springs, pushrods, and lubricants are used.

*Note: Open pressures in excess of 360# require the use of roller tappet bodies made of billet steel. Crane hydraulic roller and solid roller tappets are made from heat treated steel billet to withstand the stresses of high-performance use. Most stock hydraulic roller tappet bodies are made of cast iron and cannot tolerate high spring loads.

5) MECHANICAL ROLLER CAM/LIFTER

Applications are generally for serious street/strip use and full competition. Most are not used in daily-drivers where day-to-day reliability is stressed. Instead, most of these cams are intended for winning performance. These cams are designed with very aggressive opening and closing rates. High seat pressures are necessary to keep the valves from bouncing when they come back to the seat. In all cases, the valve action and spring pressures required mandate the use of high-strength, one-piece valves. However, Crane does offer the SR-Series of Street Roller camshafts intended for daily usage.

- a. **Seat Pressures** are determined by valve/retainer weight, engine RPM and life expectancy of components before replacement is required. Milder roller cams require 165# on the seat as an absolute minimum. 180-200# is common for most modest performance applications. 220-250# is common for most serious sport categories and some circle track professional categories. Pro-Stock and Blown Alcohol/Fuel drag applications use as much as 340-500# on the seat.
- b. **Open Pressures** need to be high enough to control the valvetrain as the lifter goes over the nose of the cam. Ideally, the minimum amount of open pressure to eliminate or minimize valvetrain separation is desired. Any excess open pressure only contributes to pushrod flex, which can aggravate valvetrain separation. For serious racing applications this can be determined only by experimentation and track testing. For general guidelines we offer the following
 - i. Street/Strip performance with long cam/lifter life desirable, 350-450# open.
 - ii. Circle track and moderate bracket racing 450-600@ open.
 - iii. Serious drag racing and limited distance circle track racing 600# and more.



	0.D	I.D.	Damper	Seat Press.	Open Press.	Coil Bind	Rate (lbs/in.)	Max Net Lift	Application	Part No.
Single I	Valve S _I	orings			<u> </u>					
									Ford Duratec 1.8 – 2.3 litre DOHC 4V 4 cyl.	
									included in 903-2007 valve spring and retainer	
	1.000	0.730	No	62 lbs @1.475	130 @ 1.025	0.910	151 lbs/in.	0.475	kit.	96845-16
Top: Bottom:	0.930 1.025	0.567 0.662	No	90 lbs @1.470	252 @ .970	0.900	324 lbs/in.	0.500	Ford Modular 4.6 — 5.4 litre DOHC 4V V-8 beehive, ovate wire.	40830-32
	1.065	0.725	No	60 lbs @1.535	255 lbs @ 1.063	0.987	413 lbs/in.	0.500	Chrysler/Dodge Neon DOHC I-4	180830-16
	1.065	0.725	No	85 lbs @1.535	244 lbs @ 1.135	1.014	398 lbs/in.	0.470	Chrysler/Dodge Neon SOHC I-4	158830-16
Top: Bottom:	0.967 1.096	0.636 0.765	No	85 lbs @1.640	250 @ 1.040	1.000	275 lbs/in.	0.620	Ford 4.6-5.4L 2 valve & 3 valve V-8 beehive, ovate wire.	37830-16
									Small Block Chevy Street/Strip: RV/Truck Power. Stock dia spring for 1.700" installed ht.	
	1.255	0.870	Yes	114 lbs @1.700	340 @ 1.200	1.153	432 lbs/in.	0.487	.480" max recommended valve lift.	99848-16
	1 255	0.070	No	124 lbs 01 750	274 0 1 150	1 100	400 lb a /im	0.640	Late Model LT-1 w/aluminum heads; LS1 or other alum. heads w/1.770-1.820" inst. hts.	00045 16
	1.255	0.870	No	124 lbs @1.750	374 @ 1.150	1.100	409 lbs/in.	0.640	XHTCS	99845-16
	1.255	0.870	Yes	125 lbs @ 1.800	383 @ 1.200	1.100	428 lbs/in.	0.640	SB Chevy apps. up to .600" valve lift with stock spring seats. Flat tappets install @ 1.800"; hyd rlr install @ 1.750-1.800" XHTCS	99846-16
	1.260	0.876	Yes	107 lbs @ 1.800	348 @ 1.200	1.110	395 lbs/in.	0.600	SB Chevy hyd rlr w/1.750" installed ht. SB Chevy flat tappet w/1.770-1.800" inst. ht.	96802-16
	1.265	0.775	Yes	125 lbs @ 1.750	388 @ 1.250	1.100	526 lbs/in.	0.600	SB Chevy Performance hydraulic roller cams, PAC enhanced wire	144846-16
Top: Bottom:	1.055 1.290	0.650 0.885	No	130 lbs @ 1.800	318 @ 1.200	1.140	313 lbs/in.	0.600	LS1/LS2 Performance hydraulic roller cams beehive, ovate wire.	99831-16
	1.435	1.035	Yes	107 lbs @ 1.700	317 @ 1.150	1.037	330 lbs/in.	0.600	Various Ford 302-351W V-8's, Ford 300 6cyl, Mopar 360's and Olds 350/400/455	96803-16
	1.437	1.077	Yes	104 lbs @ 1.750	229 @ 1.150	1.069	204 lbs/in.	0.620	Ford V-8 RV and mild street appls. Used w/96840, 96842, 96843 for various hyd roller and flat tappet street/strip and bracket apps.	96806-16
	1.440	1.040	No	98 lbs @ 1.700	260 @ 1.200	1.080	328 lbs/in.	0.560	AMC 6cyl; SB Ford; Olds V-8's; Street/Strip, RV/Truck Power applications.	99833-16
Bottom:		0.650 1.000	No	155 lbs @ 1.880	377 @ 1.280	1.210	370 lbs/in.	0.650	Big Block Chevy and FE Ford, beehive, nitrided ovate wire.	99832-16
Top: Bottom:		0.859 1.014	No	118 lbs @ 1.950	375 @ 1.380	1.320	457 lbs/in.	0.580	Ford 5.0/351W Street/Strip, RV/Truck Power, Beehive	99841-16
	1.460	1.060	Yes	110 lbs @ 1.550	303 @ 1.100	0.935	442 lbs/in.	0.605	Many Pontiac V-8 Street/Strip applications	99840-16
	1.460	1.060	Yes	114 lbs @ 1.800	287 @ 1.250	1.139	310 lbs/in.	0.600	Ford V-8's w/1.770-1.850" installed hts. Used w/ 96840 and 96842 for High Perf hyd rlrs and solid flat tappet cams.	96801-16
	1.500	1.086	Yes	114 lbs @ 1.600	280 @ 1.150	1.000	412 lbs/in.	0.565	SB Chrysler; Street/Strip; RV/Truck Power	99835-16
	1.500	1.086	Yes	121 lbs @ 1.800	298 @ 1.300	1.130	354 lbs/in.	0.660	AMC V-8; BB Chevy w/1.880" installed ht: Street/Strip, RV/Truck Power.	99839-16
	1.500	1.000	163	121103@1.000	270 @ 1.300	1.150	יוו נעו דעו.	0.000	BB Chevy and BB Chrysler hyd rIr and High Perf flat tappet cams. Use +.050" keepers. Used with 96843 , 96844 inners for several mech	77037 10
	1.539	1.125	Yes	129 lbs @ 1.950	358 @ 1.200	1.130	312 lbs/in.	0.700	roller cams.	96807-16
Inner V		r Springs s							'96" part number prefix single valve springs. See sp s. Sold in sets of 16.	ecific"96"
	0.937	0.697	No	29 lbs @ 1.600	90 @ 1.000	0.925	96 lbs/in.	0.615	For use with 96801, 96806, Outer Valve Springs	96842-16
	0.953	0.697	No	54 lbs @ 1.500	130 @ 1.000	0.916	132 lbs/in.	0.500	For use with 96806, 96807, Outer Valve Springs	96843-16
	0.970	0.700	No	51 lbs @ 1.750	134 @ 1.150	1.014	135 lbs/in.	0.676	For use with 96801, 96806 Outer Valve Springs	96840-16
									1 3	

0.D	I.D.1	I.D.2	Damper	Seat Press.	Open Press.	Coil Bind	Max Net Lift w /.060″ clearance	Rate (lbs/in.)	Application	Part No.
Dual V	alve Spr	inas							••	
1.212	0.900	0.674	No	93 lbs @ 1.550	266 @ .950	0.865	0.625	290 lbs/in.	Buick V-6 & Buick 350 V-8	99891-16
1.218	0.906	0.680	No	91 lbs @ 1.300	220 @ .900	0.783	0.457	337 lbs/in.	Early Ford 2.0L SOHC & VW liquid cooled	99879-8
1.297	0.667	0.917	No	148 lbs @ 1.800	413 @ 1.150	1.060	0.680	408 lbs/in.	LS Performance hydraulic roller camshafts.	144838-16
1.298	0.664	0.914	No	151 lbs @ 1.800	461 @ 1.150	1.080	.660	477 lbs/in.	LS Performance hydraulic roller camshafts, XHTCS material.	144847-16
1.304	0.980	0.754	No	96 lbs @ 1.650	230 @ 1.150	0.927	0.663	215 lbs/in.	Nissan 4 cyl; Ford 2.3L SOHC	99884-8
									Small Block Chevy 87-91 L98 and Fast Burn	
1.344	1.000	0.730	No	107 lbs @ 1.820	274 @ 1.300	1.057	0.703	334 lbs/in.	alum. heads w/hydraulic roller cams	96887-16
1.437	1.080	0.697	Yes	134 lbs @ 1.750	283 @ 1.250	1.185	0.600	296 lbs/in.	Several SB Chevy, SB Ford flat tappet and hyd rlr apps. (96806 outer/96842 inner)	96873-16
1.437	1.080	0.697	Yes	128 lbs @ 1.800	328 @ 1.200	1.115	0.625	322 lbs/in.	Various hyd rlr & flat tappet street perf. & mild bracket racing. (96806 outer/96843 inner)	96874-16
1.437	1.000	0.097	162	120 IDS @ 1.000	320 @ 1.200	1.113	0.023	322 IDS/III.	SB Chevy & SB Ford hyd rirs and flat tappet	700/4-10
1.437	1.080	0.700	Yes	131 lbs @ 1.850	345 @ 1.200	1.110	0.680	326 lbs/in.	bracket racing w/long valves or tall assy hts. (96806 outer/96840 inner)	96872-16
									Hydraulic and mechanical flat faced lifter	
1.449	1.075	0.794	No	120 lbs @ 1.875	394 @ 1.175	1.035	0.625	392 lbs/in.	camshafts, mild hydraulic roller camshafts.	99892-16
1.460	1.060	0.697	Yes	126 lbs @ 1.850	366 @ 1.250	1.175	0.615	404 lbs/in.	BB Ford and BB Chrysler hyd rlr and flat tappet street/strip use. (96801 outer/96842 inner)	96877-16
									BB Chevy, BB Ford, BB Chrysler premium RV/	
1.460	1.075	0.803	No	130 lbs @ 1.850	402 @ 1.150	1.080	0.710	391 lbs/in.	Truck Power applications. Flat tappet racing use.	99893-16
1.460	1.060	0.700	Yes		-	1.154	0.686	448 lbs/in.	High perf hydraulic rollers; Sportsman flat tap- pet racing, moderate perf solid rollers (96801 outer/96840 inner)	96870-16
1.400	1.000	0.700	162	134 lbs @ 1.900	424 @ 1.250	1.134	0.000	440 IDS/III.	·	900/0-10
1.465	1.091	0.807	No	112 lbs @ 1.650	336 @ 1.100	0.950	0.690	438 lbs/in.	AMC 6 cyl, Buick V-8's, many perf cams with short assy hts requiring high lifts and moderate spring rate	99838-16
1.500	1.050	0.726	No	300 lbs @ 2.100	1002 @ 1.200	1.130	0.900	780 lbs/in.	Small diameter, low mass, all-out race, Nano- Peened™, Pacaloy wire.	961356-16
1.500	1.050	0.726	No	420 lbs @ 2.175	1200 @ 1.175	1.130	1.000	780 lbs/in.	Small diameter, low mass, high lift drag race, Nano-Peened™, Pacaloy wire.	961355-16
1.522	1.050	0.726	No	400 lbs @ 2.250	1252 @ 1.300	1.190	0.950	895 lbs/in.	Small diameter, low mass, all-out race, Nano- Peened™, Pacaloy wire.	961360-16
1.530	1.116	0.766	Yes	131 lbs @ 1.900	410 @ 1.250	1.160	0.630	428 lbs/in.	BB Chevy hyd and solid flat tappet racing; BBC, BB Ford, & Ford 351/400 hyd rlr cams	99890-16
1.539	1.125	0.697	Yes	160 lbs @ 1.900	424 @ 1.300	1.145	0.700	444 lbs/in.	BB Chevy and BB Chrysler solid street rollers or hyd rlrs w/+.050" taller inst. ht. (96807 outer/96843 inner)	96879-16
1.539	1.125	0.731	Yes	200 lbs @ 1.900	508 @ 1.250	1.152	0.680	480 lbs/in.	Various solid rlr applications for Pro Street & bracket use (96807 outer/96844 inner)	96878-16
1.540	1.140	0.754	Yes	144 lbs @ 1.900	403 @ 1.300	1.175	0.665	434 lbs/in.	Various Big Block hyd rlr applications	99895-16
1.540	1.140	0.760	Yes	150 lbs @ 1.900	560 @ 1.150	1.135	0.755	528 lbs/in.	Various Big Block hyd rlr apps. Harmonics optimized for sustained high RPM marine use. Solid flat tappets with tall assembly hts.	99896-16
1.540	1.115	0.729	Yes	224 lbs @ 1.950	638 @ 1.200	1.130	0.760	544 lbs/in.	Professional roller cam race applications Electro-Polished	96883-16
1.550	1.100	0.706	Yes	275 lbs @ 2.000	805 @ 1.200	1.150	0.800	663 lbs/in.	Various Small and Big Block roller camshafts, drag racing	961226-16
1.550	1.100	0.788	No	250 lbs @ 2.000	765 @ 1.200	1.150	0.800	644 lbs/in.	High rate dual spring for aggressive valve train. Premium circle track, Nano-Peened™, PAC enhanced wire.	961325-16
1.550	1.100	0.706	Yes	275 lbs @ 2.000	805 @ 1.200	1.150	0.800	662 lbs/in.	High rate dual spring with damper for ag- gressive valve train. Premium circle track, Nano-Peened™, PAC enhanced wire.	961326-16
1.550	1.050	0.726	No	425 lbs @ 2.300	1440 @ 1.300	1.230	1.000	1015 lbs/in.	Small diameter, low mass, high lift drag race, Nano-Peened™, Pacaloy wire.	961354-16
1.551	1.119	0.709	Yes	226 lbs @ 2.000	717 @ 1.250	1.150	0.790	652 lbs/in.	Drag Race & Circle Track roller cams w/1.950- 2.000" installed hts	96886-16



0.D	I.D.1	I.D.2	Damner	Seat Press.	Open Press.	Coil Bind	Max Net Lift w /.060" clearance	Rate (lbs/in.)	Application	Part No.
	/alve Spr		Dumper	Jede i iessi	open i ress.	Con Dilla	ciculance	(103/1111)	приналон	Ture no.
1.555	1.130	0.743	Yes	256 lbs @ 2.000	652 @ 1.250	1.178	0.762	510 lbs/in.	Professional roller cam race applications Electro-Polished	96884-16
1.565	1.146	0.740	Yes	190 lbs @ 1.950	552 @ 1.250	1.200	0.690	504 lbs/in.	Solid street rollers/Bracket racing; Hi Perf big block hyd rlrs w/tall assy hts.	99876-16
1.565	1.129	0.749	Yes	215 lbs @ 1.950	685 @ 1.200	1.121	0.769	618 lbs/in.	Bracket Race & Circle Track Roller Cams XHTCS Spring	99885-16
1.593	1.154	0.741	Yes	254 lbs @ 2.050	687 @ 1.280	1.220	0.780	576 lbs/in.	Professional circle track endurance, ID chamfered coils, radiused damper ends, PAC enhanced wire.	96885-16
1.625	1.175	0.851	No	280 lbs @ 2.100	847 @ 2.100	1.100	0.900	629 lbs/in.	Bracket Race applications with hight lift / agressive valve train and RPM requirements, Pacaloy wire.	961228-16
1.625	1.175	0.769	Yes	244 lbs @ 2.000	801 @ 1.150	1.090	0.850	656 lbs/in.	Drag Race roller cams with approx. 2.00" inst hts. XHTCS	99880-16
1.625	1.175	0.769	Yes	250 lbs @ 2.050	673 @ 1.300	1.210	0.750	564 lbs/in.	Various Big Block roller camshafts, lower lift bracket racing, PAC enhanced wire.	961299-16
1.625	1.175	0.851	No	275 lbs @ 2.000	810 @ 1.150	1.100	0.850	625 lbs/in.	Various Big Block roller camshafts, high lift bracket racing, PAC enhanced wire.	961224-16
Triple	Valve Sp	rings								
1.645	1.195	0.635	No	250 lbs @ 2.050	801 @ 1.250	1.130	0.800	689 lbs/in.	Various Big Block roller camshafts, high lift bracket racing, PAC enhanced wire.	961246-16
1.645	1.195	0.635	No	290 lbs @ 2.070	835 @ 1.270	1.130	0.800	682 lbs/in.	Various Big Block roller camshafts, high lift bracket racing, Nano-Peened™, PAC enhanced wire.	961347-16
1.645	1.195	0.635	No	332 lbs @ 2.100	950 @ 1.200	1.130	0.900	688 lbs/in.	Various Big Block roller camshafts, high lift bracket racing, Nano-Peened™, PAC enhanced wire.	961348-16
1.667	1.195	0.635	No	300 lbs @ 2.100	963 @ 1.250	1.135	0.850	780 lbs/in.	Various Big Block roller camshafts, high lift bracket racing, PAC enhanced wire.	96888-16
1.675	1.203	0.634	No	362 lbs @ 2.100	1035 @ 1.200	1.161	0.879	684 lbs/in.	Pro Drag Racing including blown alcohol & fuel	96848-16
1.675	1.203	0.634	No	352 lbs @ 2.200	1024 @ 1.200	1.161	0.979	690 lbs/in.	Pro Drag Racing including blown alcohol & fuel	96849-16

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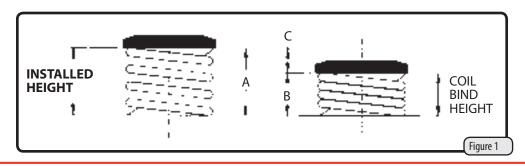
More Valve Train Questions

What is Valve Spring Coil Bind and how does it relate to Spring Travel and Valve Lift?

When the valve spring is compressed until its coils touch one another and can travel no further, it is said to be in coil bind. The catalog (pages 337 to 339) shows the approximate coil bind height for the various Crane Cams valve springs. To measure this you must install the retainer in the valve spring, then compress the spring until it coil binds. Now measure from the bottom side of the retainer to the bottom of the spring. This measurment is the coil bind height. (See Figure 1) This can be done on the cylinder head with a spring compression tool in a bench vise, or in a professional valve spring tester.

Using Figure 1, subtract the coil bind height "B" from the valve spring installed height "A". The difference "C" is the maximum spring travel. The spring travel is usually at least .060" greater than the full lift of the valve. This safety margin of .060" (or more) is necessary to avoid the dangers of coil bind and over-stressing the spring.

If coil bind occurs, the resulting mechanical interference will severely damage the camshaft and valvetrain components.



Valve Spring S _l	pec Char	t		В	BOLD Numbers are recommended closed pressures @ installed height.						
Spring Type	Single	Single	Single	Single	Single	Single	Single	Single	Single		
0.D.	1.000	1.065	1.065	1.025/0.930	1.096/0.967	1.255	1.255	1.255	1.260		
I.D.	0.730	0.725	0.725	0.662/0.567	0.765/0.636	0.870	0.870	0.870	0.876		
Damper	No	No	No	No	No	Yes	No	Yes	Yes		
Installed Height	1.475	1.535	1.535	1.470	1.640	1.700	1.750	1.800	1.800		
Coil Bind	0.910	0.987	1.014	0.900	1.000	1.153	1.100	1.100	1.110		
Spring Rate (lbs/in.)	151	413	398	324	275	432	415	428	395		
Max. Net. Lift	0.475	0.500	0.470	0.500	0.600	0.487	0.640	0.640	0.600		
Part No.	96845	180830	158830	40830	37830	99848	99845	99846	96802		
2.300											
2.250											
2.200											
2.150				,							
2.100											
2.050				,							
2.000											
1.950				,							
1.900											
1.850								104			
1.800						81	103	125	107		
1.750						100	124	147	125		
1.700					69	114	145	169	144		
1.650					82	137	165	190	162		
1.600					96	158	187	213	181		
1.550		54	79	64	110	179	208	235	199		
1.500	58	74	94	80	124	201	228	256	220		
1.450	66	95	114	96	137	222	249	278	238		
1.400	74	115	134	113	151	243	270	299	258		
1.350	81	136	154	129	165	265	290	321	280		
1.300	89	156	173	145	179	287	311	342	302		
1.250	96	177	193	161	192	313	332	363	325		
1.200	104	197	213	177	206	340	353	383	248		
1.150	111	218	233	194	220		374	405			
1.100	119	238	253	210	234						
1.050	126	259		226	247						
1.000	134			242	261						
0.950	142			258							
0.900											

Steel Retainers (see page 350)						99915 99916	99914	99915 99916	99915 99916
Titanium Retainers 7°	905-0003	158660	158660	40660	37660				
(see page 351)									
Titanium Retainers 10°									
(see page 351)									
Spring Seats									
(see page 362)									



Valve Spring Spe	c Chart			BOLD Numbers	are recommende	d closed pressures @	installed height.
Spring Type	Single	Single	Single	Single	Single	Single	Single
0.D.	1.265	1.290/0.885	1.435	1.437	1.440	1.445/1.095	1.450/1.295
I.D.	0.865	1.055/0.650	1.035	1.080	1.040	1.000/0.650	1.014/0.859
Damper	Yes	No	Yes	Yes	No	No	No
Installed Height	1.750	1.800	1.700	1.750	1.700	1.880	1.950
Coil Bind	1.100	1.140	1.037	1.069	1.080	1.210	1.139
Spring Rate (lbs/in.)	526	313	330	204	328	370	457
Max. Net. Lift	0.600	0.600	0.600	0.620	0.560	0.650	0.580
Part No.	144846	99831	96803	96806	99833	99832	99841
2.300							
2.250							
2.200							
2.150							
2.100							
2.050							
2.000							95
1.950						129	118
1.900		99				148	141
1.850	73	114		86		166	164
1.800	99	130		96		185	187
1.750	125	146	91	104	83	203	209
1.700	151	161	107	113	98	222	232
1.650	177	177	123	122	113	240	255
1.600	204	193	132	130	128	259	278
1.550	230	208	148	140	143	277	301
1.500	256	224	164	150	159	296	324
1.450	282	240	181	160	174	314	347
1.400	308	255	198	171	189	333	369
1.350	335	271	215	181	205	351	392
1.300	361	287	234	192	222	370	415
1.250	388	302	251	203	239	388	438
1.200	413	318	272	215	256		461
1.150	439		289	229	274		
1.100			317	240	293		
1.050							
1.000							
0.950							
0.900							

Steel Retainers (see page 350)	99915 99916	99976	99946 99969	99936 99944	99936 99944	99976	99942
Titanium Retainers 7° (see page 351)		99637				99637	
Titanium Retainers 10° (see page 351)					99630		
Spring Seats (see page 362)							

Valve Spring Sp	ec Chart			BOLD	Numbers are re	commended clos	sed pressures @	installed height.
Spring Type	Single	Single	Single	Single	Single	Single	Single	Single
0.D.	1.460	1.460	1.500	1.500	1.539	0.937	0.953	0.970
I.D.	1.060	1.060	1.086	1.086	1.125	0.697	0.697	0.700
Damper	Yes	Yes	Yes	Yes	Yes	No	No	No
Installed Height	1.550	1.800	1.600	1.800	1.950	1.600	1.500	1.750
Coil Bind	0.935	1.139	1.000	1.130	1.130	0.925	0.916	1.014
Spring Rate (lbs/in.)	442	310	412	354	312	96	132	135
Max. Net. Lift	0.605	0.600	0.565	0.660	0.700	0.615	0.500	0.676
Part No.	99840	96801	99835	99839	96807	*96842	*96843	*96840
2.300								
2.250								
					<u> </u>			
2.200 2.150								
2.100								
2.050								
2.000					115			
1.950		75			129			
1.900		88		86	136			
1.850		101		102	149			38
1.800		114		121	162			45
1.750		128		138	177	14		51
1.700		143		155	192	19		58
1.650		157	92	172	207	23		63
1.600	91	171	113	189	222	29	42	70
1.550	110	186	133	206	237	32	48	76
1.500	131	201	154	224	252	37	54	83
1.450	151	218	174	242	269	42	60	90
1.400	171	235	195	260	286	47	66	97
1.350	191	252	215	279	302	51	73	105
1.300	212	269	234	298	318	56	80	112
1.250	233	287	256	320	338	61	87	120
1.200	255	304	277	338	358	66	94	127
1.150	279		298	359		71	102	134
1.100	303		319			76	111	,
1.050	328		342			82	120	
1.000	352		364			90	130	,
0.950	378							
0.900								

Popular Recommended Components

Steel Retainers (see page 350)	99936 99944	99936 99944	99936 99944	99936 99944	99962 99970
Titanium Retainers 7° (see page 351)					
Titanium Retainers 10° (see page 351)	99630		99630	99630	99641
Spring Seats (see page 362)	99457		99459	99459	

* Denotes Inner Spring



Valve Spring Sp	ec Chart			BOLD	Numbers are rec	ommended clo	sed pressures @	installed height.
Spring Type	Single	Dual	Dual	Dual	Dual	Dual	Dual	Dual
0.D.	1.015	1.212	1.218	1.298	1.298	1.304	1.344	1.437
I.D.	0.731	0.674	0.680	0.667	0.664	0.754	0.730	0.697
Damper	No	No	No	No	No	No	No	Yes
Installed Height	1.800	1.550	1.300	1.800	1.800	1.650	1.800	1.750
Coil Bind	1.045	0.865	0.783	1.060	1.080	0.927	1.057	1.185
Spring Rate (lbs/in.)	155	290	337	408	477	215	334	296
Max. Net. Lift	0.650	0.625	0.457	0.680	0.660	0.663	0.710	0.600
Part No.	*96844	99891	99879	144838	144847	99884	96887	96873
2.300								
2.250								
2.200								
2.150								
2.100								
2.050								
2.000	22							
1.950	33			407	402			
1.900	41			107	103			
1.850	49			128	127		44.4	106
1.800	57			148	151		114	120
1.750	64			168	175	76	129	134
1.700	72			189	199	86	144	148
1.650	80	66		209	223	96	160	162
1.600	88	79		230	246	107	176	175
1.550	95 103	93		250	270	118	192	189
1.500	103	107		270	294	128	208	204
1.450	111	121		291	318	139	224	219
1.400	119 126	135 148	76	311 332	342 366	150 161	240 257	234 250
	134	162	91	352	390	172	257	267
1.300 1.250	134	176	106	352	413	184	274	283
1.200	151	176	122	372	413	195	310	283
1.150	160	204	137	413	437	206	330	777
1.100	100	219	152	413	401	218	350	
1.050		219	168			230	330	
1.000		250	184			230		
0.950		266	202					
0.900		284	202					
0.900		Zŏ4	220					

Popular Recommended Components

Steel Retainers (see page 350)	99912 99916	99926	144944	144944	99967	99935	99944 99969
Titanium Retainers 7° (see page 351)			99975	99975			99669
Titanium Retainers 10° (see page 351)			144661	144661			99630
Spring Seats (see page 362)			99657	99657			99465

* Denotes Inner Spring

Valve Spring Sp	ec Chart			BOLD	Numbers are red	commended clo	sed pressures @	installed height.
Spring Type	Dual	Dual	Dual	Dual	Dual	Dual	Dual	Dual
0.D.	1.437	1.437	1.449	1.460	1.460	1.460	1.465	1.500
I.D.	0.697	0.700	0.794	0.697	0.803	0.700	0.807	0.726
Damper	Yes	Yes	No	Yes	No	Yes	No	No
Installed Height	1.800	1.850	1.875	1.850	1.850	1.900	1.650	2.100
Coil Bind	1.115	1.110	1.035	1.175	1.080	1.154	0.950	1.130
Spring Rate (lbs/in.)	322	326	392	404	391	448	438	780
Max. Net. Lift	0.625	0.680	0.625	0.615	0.710	0.686	0.690	0.900
Part No.	96874	96872	99892	96877	99893	96870	99838	961356
2.300								
2.250								
2.200								222
2.150								261
2.100					,			300
2.050								339
2.000								378
1.950				88	92	113		417
1.900		115	110	107	112	134		456
1.850	112	131	130	126	130	154		495
1.800	128	146	149	144	149	174		534
1.750	142	160	169	163	167	194		573
1.700	156	175	189	183	186	215	91	612
1.650	171	189	208	203	205	236	112	651
1.600	186	205	228	222	223	256	131	690
1.550	202	221	247	242	242	278	151	729
1.500	218	238	267	261	261	300	171	768
1.450	234	255	287	282	279	323	190	807
1.400	252	272	306	304	298	348	210	846
1.350	270	291	326	324	318	373	230	885
1.300	289	309	345	346	338	398	251	924
1.250	308	327	365	366	358	424	271	963
1.200	328	345	385	389	380	447	292	1002
1.150	352	368	404		402		313	1041
1.100			424				336	
1.050							360	
1.000							383	
0.950								
0 900								

Steel Retainers (see page 350)	99944 99969	99944 99969	99953 99954	99944 99969	99953 99954	99944 99969	99944 99969	99970 99974
Titanium Retainers 7° (see page 351)	99669	99669	99639	99669	99669	99669	99669	99663
Titanium Retainers 10° (see page 351)	99630	99630		99630	99630	99630	99630	99640
Spring Seats (see page 362)	99465	99465		99465		99465		99465 99455



Valve Spring Sp	ec Chart			E	BOLD Number	s are recomme	nded closed p	ressures @ ins	talled height.
Spring Type	Dual	Dual	Dual	Dual	Dual	Dual	Dual	Dual	Dual
0.D.	1.500	1.522	1.530	1.539	1.539	1.540	1.540	1.540	1.550
I.D.	0.726	0.726	0.776	0.697	0.697	0.754	0.760	0.729	0.706
Damper	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Installed Height	2.175	2.250	1.900	1.900	1.900	1.900	1.900	1.950	2.000
Coil Bind	1.130	1.190	1.160	1.145	1.152	1.175	1.085	1.130	1.150
Spring Rate (lbs/in.)	780	895	428	444	480	434	528	544	663
Max. Net. Lift	1.000	0.950	0.630	0.700	0.680	0.665	0.755	0.760	0.800
Part No.	961355	961360	99890	96879	96878	99895	99896	96883	961226
2 200		257							
2.300	361	357							
2.250 2.200		402							
2.200	400 439	447 491							
								140	200
2.100	478	536						148	209
2.050	517	581		116	154		110	174	242
2.000	556	626	112	116	154	122	110	200	275
1.950	595	670	112	137	178	123	128	224	308
1.900	634	715	131	160	200	144	150	250	341
1.850	673	760	151	180	222	165	173	275	374
1.800	712	805	171	202	244	186	196	300	407
1.750	751	849	190	223	266	207	220	327	441
1.700	790	894	210	244	288	228	244	352	474
1.650	829	939	229	266	311	250	267	379	507
1.600	868	984	250	286	335	272	290	404	540
1.550	907	1028	271	307	354	292	316	432	573
1.500	946	1073	292	328	383	312	343	458	606
1.450	985	1118	313	350	409	334	372	484	639
1.400	1025	1163	336	375	436	357	399	512	672
1.350	1064	1207	360	401	460	380	428	541	706
1.300	1103	1252	385	424	484	403	460	572	739
1.250	1142	1297	410	448	508	430	491	604	772
1.200	1181	1342	435	471	532	457	524	638	805
1.150	1220						560		838
1.100									
1.050	1					1			
1.000									
0.950									
0.900									

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Steel Retainers (see page 350)	99970 99974	99970 99974	99962 99970	99926	99970 99974	99956 99970	99956 99970	99970 99974	99970 99974
Titanium Retainers 7° (see page 351)	99663	99663	99659		99659	99678 99681	99678 99681	99678 99681	
Titanium Retainers 10° (see page 351)	99640	99640	99641	99641	99634 99641	99631 99632	99631 99632		99631 99639
Spring Seats (see page 362)	99465 99455	99465 99455	99466		99460	99464	99466 99464	99460	99465

Valve Spring Sp	pec Chart				BOLD Numbe	rs are recomm	nended closed	pressures @ in	stalled height.
Spring Type	Dual	Dual	Dual	Dual	Dual	Dual	Dual	Dual	Dual
0.D.	1.550	1.550	1.550	1.551	1.555	1.565	1.565	1.625	1.593
I.D.	0.788	0.706	0.726	0.709	0.743	0.740	0.749	0.851	0.741
Damper	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Installed Height	2.000	2.000	2.300	2.000	2.000	1.950	1.950	2.100	2.050
Coil Bind	1.150	1.150	1.230	1.150	1.178	1.200	1.121	1.100	1.220
Spring Rate (lbs/in.)	644	662	1015	652	510	504	618	629	576
Max. Net. Lift	0.800	0.800	1.000	0.790	0.762	0.690	0.769	0.900	0.770
Part No.	961325	961326	961354	96886	96884	99876	99885	961228	96885
2.300			425						
2.250			476						
2.200		,	526					217	
2.150			577					249	
2.100	186	209	628	167	207			280	227
2.050	218	242	679	197	232		161	311	254
2.000	250	275	729	226	256	163	189	343	280
1.950	282	308	780	255	280	190	215	374	305
1.900	314	341	831	284	308	214	242	406	330
1.850	347	374	882	314	332	239	270	437	356
1.800	379	407	932	344	357	264	297	469	383
1.750	411	441	983	374	381	290	324	500	411
1.700	443	474	1034	406	407	314	352	532	440
1.650	475	507	1085	439	431	339	381	563	468
1.600	507	540	1136	473	458	364	411	595	496
1.550	540	573	1186	507	482	390	444	626	526
1.500	572	606	1237	541	508	415	475	658	556
1.450	604	639	1288	574	533	441	505	689	587
1.400	636	672	1339	610	560	466	536	721	618
1.350	668	706	1389	643	585	493	572	752	647
1.300	701	739	1440	683	612	522	606	784	676
1.250	733	772	1491	717	652	552	645	815	
1.200	765	805			692		685	846	
1.150								878	
1.100									
1.050									
1.000									
0.950									
0.900	<u> </u>								

Steel Retainers (see page 350)	99970 99974	99970 99974	99970 99974	99974 99970 99974	99956 99970	99956 99970	99956 99970		99970 99974
Titanium Retainers 7° (see page 351)	99661	99661	99663	99659	99675 99681	99678 99681	99678 99681	99660	99675
Titanium Retainers 10° (see page 351)	99639 99641	99639 99641	99640	99634 99641	99631 99632	99631 99632	99634 99641	99638	99635 99632
Spring Seats (see page 362)	99464	99465 99464	99465 99455	99465	99460	99460 99464	99460 99464	99463	99460



Valve Spring Sp	ec Chart				BOLD Numbe	rs are recomm	ended closed	pressures @ in	stalled height.
Spring Type	Dual	Dual	Dual	Triple	Triple	Triple	Triple	Triple	Triple
0.D.	1.625	1.625	1.625	1.645	1.645	1.645	1.667	1.675	1.675
I.D.	0.769	0.769	0.851	0.635	0.635	0.635	0.635	0.634	0.634
Damper	Yes	Yes	No	No	No	No	No	No	No
Installed Height	2.000	2.050	2.000	2.050	2.070	2.100	2.100	2.100	2.200
Coil Bind	1.090	1.210	1.100	1.130	1.130	1.135	1.135	1.161	1.161
Spring Rate (lbs/in.)	656	564	625	689	682	688	780	684	690
Max. Net. Lift	0.850	0.750	0.850	0.800	0.800	0.900	0.850	0.879	0.979
Part No.	99880	961299	961224	961246	961347	961348	96888	96848	96849
2.300								230	289
2.250								262	320
2.200						263		295	352
2.150		194			236	298	261	329	385
2.100	182	222	212	216	270	332	300	362	418
2.050	213	250	244	250	304	366	339	396	452
2.000	244	278	275	284	338	401	378	430	487
1.950	275	306	306	319	372	435	417	462	520
1.900	306	335	338	353	406	469	456	498	554
1.850	337	363	369	388	440	504	495	530	588
1.800	368	391	401	422	474	538	534	564	623
1.750	400	419	432	457	508	572	573	598	657
1.700	431	447	464	491	542	607	612	633	692
1.650	463	476	495	526	576	641	651	668	727
1.600	496	504	527	560	610	675	690	704	761
1.550	528	532	558	594	644	710	729	740	797
1.500	560	560	590	629	678	744	768	776	832
1.450	594	588	621	663	712	778	807	815	870
1.400	627	617	653	698	746	813	846	857	906
1.350	663	645	684	732	781	847	885	900	942
1.300	696	673	716	767	815	881	924	942	981
1.250	731	701	747	801	849	916	963	987	1024
1.200	764		779	835	883	950	1002	1035	
1.150	801		810			984			
1.100									
1.050									
1.000									
0.950									
0.900									

Popular Recommended Components

Steel Retainers (see page 350)	99962								
Titanium Retainers 7° (see page 351)	99675	99660	99660	99662	99662	99662	99678 99681	99678 99681	99678 99681
Titanium Retainers 10° (see page 351)	99633	99638	99638	99632			99632 99636	99632 99636	99632 99636
Spring Seats (see page 362)	99466 99463	99466 99463	99463	99461	99461	99461			

* Denotes Inner Spring

Valve Spring Retainers

Steel Valve Spring Retainers

STANDARD CONFIGURATION

Crane Cams' steel valve spring retainers are precision manufactured from high quality bar stock steel, heat treated for maximum strength and durability, and black oxided for corrosion resistance. Crane steel retainers are made for 8mm, 5/16", 11/32", and 3/8" valve stem diameters with 7° taper and are compatible with either Crane stamped steel or machined steel valve stem locks. Retainers for 3/8" diameter valve stems will also accommodate Crane Multi Fit steel locks (All locks sold separately. See pages 360-361). We additionally offer retainers designed for specific engine applications.



MULTI FIT STYLE STEEL RETAINERS WITH 7° TAPER

The Multi Fit style has the same basic tapered I.D. dimensions as a normal 7° steel retainer made for a 3/8" valve stem diameter, and are manufactured from premium quality bar stock material. By using the special thick Multi Fit Valve Stem Locks, these retainers can be used with either 5/16" or 11/32" valve stem diameters. By using Crane Cams' 3/8" machined steel valve locks, these same retainers will accommodate a 3/8" valve stem also. Locks are sold separately, see pages 360-361.

MULTI FIT STYLE STEEL RETAINERS WITH 10° TAPER

Our Multi Fit 10 degree retainers and locks differ from the conventional 10 degree items, as we use a smaller outside diameter lock, enabling the retainer to have a greater cross section in the critical area separating the inner spring steps from the tapered center hole. This provides superior strength and stability when compared to the competition, and these retainers are designed for use **only** with our Multi Fit locks. Compatible locks are offered for 8mm, 5/16", 11/32" and 3/8" valve stems in standard square groove and bead groove configurations. Optional assembly height locks are also offered, see pages 360-361.

Titanium Valve Spring Retainers

The lighter your valve train components, the quicker the engine will rev. Titanium retainers are **40%** *lighter* than steel. All Crane titanium retainers are machined from certified Americanmade bar stock. Beware of the recent influx of inexpensive "titanium" retainers. These are probably made of *inferior imported material*, and *will not* pass certification standards.

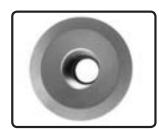


The Multi Fit style has the same basic tapered I.D. dimensions as a normal 7° steel retainer made for a 3/8" valve stem diameter, and are manufactured from premium quality bar stock material. By using the special thick Multi Fit Valve Stem Locks, these retainers can be used with either 5/16" or 11/32" valve stem diameters. By using Crane Cams' 3/8" machined steel valve locks, these





Absolutely The Strongest Titanium Retainer/Lock System Available! Proven In Competition By Nationally-Known Pro Stock, Top Fuel, Funny Car, And Short-Track Race Teams! Crane Cams' Posi-Stop titanium retainers feature the patented stepped design that reinforces the bottom of the retainer. This both significantly increases the integral strength of the retainer, and eliminates the valve lock's ability to pull through the bottom of the retainer. "Posi-Stop" retainers are made for 5/16", 11/32", or 3/8" valve stem diameters with 7° taper, and come with matching Crane machined valve stem locks.



MULTI FIT STYLE TITANIUM RETAINERS WITH 10° TAPER

Our Multi Fit 10 degree retainers and locks differ from the conventional 10 degree items, as we use a smaller outside diameter lock, enabling the retainer to have a greater cross section in the critical area separating the inner spring steps from the tapered center hole. This provides superior strength and stability when compared to the competition, and these retainers are designed for use **only** with our Multi Fit locks. Compatible locks are offered for 8mm, 5/16", 11/32" and 3/8" valve stems in standard square groove and bead groove configurations. Optional assembly height locks are also offered, see pages 360-361.

CONVENTIONAL DESIGN TITANIUM RETAINERS WITH 10° TAPER

Our conventional 10 degree titanium retainers are made from premium quality titanium alloy bar stock that is precisely machined on our own automated equipment. Each retainer is carefully quality control inspected for precision and accuracy. These retainers are available in the popular conventional 10° design, for strength and light weight. *Locks are sold separately*, see pages 360-361.

Valve Spring Retainers



How to Use the Valve Spring Retainer Dimension, Retainer Height, and Spring to Retainer Charts

The following pages supply you with specific information on the various valve spring retainers, valve stem locks, and their compatibility with the valve springs that Crane Cams offers. These parts can be used anywhere their physical size can be accommodated, and where the resulting spring tension and spring travel is compatible with the camshaft, rocker arms, and lifters. Different combinations of valve springs, retainers and/or locks can be selected to match your particular needs.

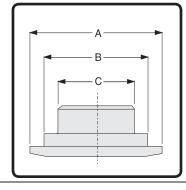
SPRING RETAINER DIMENSIONS

Spring Retainer Dimensions are provided so you can determine how the retainer fits the valve springs, see pages 350-351.

Retainer Dimension "A" fits over the outer spring;

Retainer Dimension "B" fits into the I.D. of the outer spring;

Retainer Dimension "C" fits into the I.D. of the innermost spring.

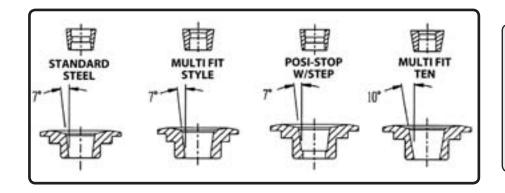


RETAINER HEIGHT CHART

Crane presents a new simplified method of matching the proper valve spring retainers and valve stem locks to your required assembly height. Simply measure your cylinder head from the spring seat to the top of the valve stem lock groove on the valve, and compare that to your needed assembly height. The chart indicates the relative heights for all of our retainer and standard height lock combinations, from the outer spring step to the top of the lock groove. No fixtures or sample parts are required, just the ability to measure! You can also take advantage of our wide range of +.050" and -.050" height locks to further refine your choices. This way you can minimize the shims required to achieve proper heights and pressures, and provide a more stable platform for your valve springs. See pages 352-354.

SPRING TO RETAINER CHART

This chart shows what retainers are available to fit a particular part number valve spring. It is based on the diameter of the spring and matching diameter of the retainers. It is further broken down by valve stem size, then the material and design of the retainer, see pages 355-357.



Crane Cams Has The Correct Valve Spring Retainers, Valve Springs And Valve Locks For Any Application... Street Or Race!

Valve Spring Retainer Dimensions - Steel

Valve Stem											
Diam.			A	В	C	Part No.					
7° Multi Fit		or 5/16", 11/32", and 3/8" Valve Stem Diameters									
	For 11/32" square groot	ove valve stems: use 99093-1 (standard), 99085-1 (+.050"), or 99086-1 (pove valve stems: use 99094-1 (standard), 99087-1 (+.050"), or 99088-1 (vevalve stems: use 99098-1 (standard), 99099-1 (+.050"), or 99089-1 (050"), or 9908-1 (050"), o	050") valve. .050") valve st	stem locks em locks							
ALL	1.275" Dual		1.250	.910	.650	99975-					
ALL	1.055/1.290" to 1.095/	1.445" Conical Single	.980	.640		99976-					
ALL	1.430" to 1.500" Dual		1.375	1.030	.675	99950-					
ALL	1.430" to 1.500" Dual o	r Triple	1.375	1.060	.675	99948-					
ALL	1.430" to 1.500" Dual o	•	1.375	1.060	.675	99957-					
ALL	1.430" to 1.500" Single	or Dual	1.425	1.060	.685	99969-					
ALL	1.430" to 1.500" Single	or Dual	1.425	1.060	.685	99973-					
ALL	1.460" Dual		1.375	1.075	.792	99954-					
ALL	1.510" to 1.625" Dual		1.500	1.100	.690	99970-					
ALL	1.510" to 1.625" Dual		1.500	1.100	.690	99974-					
ALL	1.530" Dual		1.500	1.111	.765	99962-					
ALL	1.540" Dual		1.500	1.135	.725	99964-					
ALL	1.540" Dual		1.500	1.135	.725	99961-					
ALL	1.540" to 1.630 Dual or	Triple	1.500	1.135	.635	99955-					
7° Steel Re	tainers for Specific	: Valve Stem Diameters and Applications									
8mm	1.275" Dual	Chevrolet LS1/LS2/LS6 V-8	1.250	.910	.640	144944-					
	1.225" to 1.250" Single										
11/32"		for self-aligning rocker arms	1.210	.865	.595	99914-					
11/32"	1.225" to 1.250" Single		1.203	.867	.607	99916-					
11/32"	1.225" to 1.250" Single		1.203	.867	.607	99915-					
11/32"	1.295" top / 1.450" bot	tom Conical Single Ford 302 H.O. V-8	1.250	.859		99942-					
11/32"	1.320" Dual	Ford SOHC 2.3L I-4	1.250	.985	.745	99967-					
11/32"	1.344" Dual	Chevy L98/Fast Burn alum. heads	1.275	.990	.720	99935-					
11/32"	1.430" to 1.500" Single	or Dual	1.375	1.030	.675	99946-					
11/32"	1.430" to 1.500" Single	or Dual	1.375	1.060	.675	99936-					
11/32"	1.430" to 1.500" Single	or Dual	1.375	1.060	.675	99944-					
11/32"	1.430" to 1.500" Single	or Dual	1.375	1.060	.675	99943-					
11/32"	1.460" Dual		1.375	1.075	.792	99953-					
11/32"	1.460" Dual for self-alig	gning rocker arms	1.375	1.075	.792	99951-					
11/32"	1.540" to 1.630" Dual o	r Triple	1.500	1.135	.635	99956-					
10° Multi F	it Steel Retainers										
	For 11/32" square groot	ove valve stems: use 99071-1 (standard), 99072-1 (+.050"), or 99070-1 (ove valve stems: use 99074-1 (standard), 99075-1 (+.050"), or 99073-1 ve valve stems: use 99077-1 (standard), 99078-1 (+.050"), or 99076-1 (/16", 11/32", and 3/8" valve stems with bead groove configuration also availa	050") valve) valve sto.050")	stem locks em locks							
ALL	1.430" to 1.500" Single	or Dual	1.425	1.060	.685	99971-					
ALL	1.510" to 1.625" Dual		1.500	1.100	.690	99972-					
	our Mul [.] 9° to 11 10° reta	ommended locks differ from competing conventional 10°locks and they incre ti-Fit titanium retainers by 25%. Also, many competing 10 degree locks vary -1/2°. Because of the accurate, robust design of Crane locks, they are incomp iners, and competitor's locks won't work with Crane Multi Fit 10° retainers.	in production	from							
Steel Retai	iners with Unique i	Taper for Specific Applications									
11/32"		or Dual for Buick, 11° Taper	1.200	.867	.599	99912-					
3/8"	1.430" to 1.500" Dual fo	·	1.375	1.075	.698	99910-					
		· · · · · · · · · · · · · · · · · · ·									

NOTE: The retainers are packaged in various quantities depending on the engine application. The suffix number (after the dash) in thepart number indicates the quantity. For example, part no 99944-16 would be packaged with 16 retainers. Consult the engine application pages or the numerical price list for the correct quantity suffix.

NOTE: See pages 352-354 for our new Retainer Height Chart.

Valve Spring Retainer Dimensions - Titanium



-----Retainer Dimensions-----Spring O.D., Type and Special Applications Part No. Diam. Α В C 7° Multi Fit Titanium Retainers for 5/16", 11/32", and 3/8" Valve Stem Diameters For 5/16" square groove valve stems: use 99093-1 (standard), 99085-1 (+.050"), or 99086-1 (-.050") valve stem locks For 11/32" square groove valve stems: use 99094-1 (standard), 99087-1 (+.050"), or 99088-1 (-.050") valve stem locks For 3/8" square groove valve stems: use 99098-1 (standard), 99099-1 (+.050"), or 99089-1 (-.050") valve stem locks Valve stem locks for 5/16", 11/32", and 3/8" valve stems with bead groove configuration also available, see pages 360-361. ALL .640 99657-ALL 1.500" to 1.550" Dual 1.040 .715 99663 ALL 1.530" to 1.550" Dual 1.440 .687 1.105 99659-AII 1.540" to 1.595" Dual 1.500 1.150 .720 99655 ALL 1.550" Dual 1.440 1.090 .695 99661-ALL 1.625" Dual 1.165 .760 99660 AII 1.625" to 1.675" Triple 1.180/.860 .620 99656-1 500 1.645" Triple 1.530 1.185 99662-7° Titanium Retainers for Specific Valve Stem Diameters and Applications Ford Duratec 1.8 - 2.3L DOHC 4 Valve I-4 .945 .710 903-0503 5.5mm .999" top/1.095" bottom Beehive Single Ford 4.6 - 5.4L 3 Valve V-8 .885 .615 39660-1.065" Single Chrysler/Dodge SOHC/DOHC 4 Valve I-4 .995 .715 158660-6mm .930" top/1.025" bottom Beehive Single Ford 4.6 - 5.4L 4 Valve V-8 .850 .560 40660-7mm .967" top/1.096" bottom Beehive Single Ford 4.6 - 5.4L 2 Valve V-8 .885 .615 .503 37660-7_{mm} 8mm 1.055" top/1.290" bottom Beehive Single Chevrolet LS1/LS2/LS6 V-8 .974 .620 99637-1.255" Single 1.180 .856 99658-8mm Chevrolet LS1/LS2/LS6 V-8 8mm 1.275" Dual 1.250 .910 .640 144661-7° Posi-Stop Titanium Retainers for Specific Valve Stem Diameters 1.045 99669-11/32" 1.430" to 1.500" Dual 1.375 .703 11/32" 1.540" Dual .740 99675-1.500 1.135 11/32" 1.560" to 1.630" Triple 1.500 1.135 .635 99678-11/32" 1.560" to 1.630" Triple 1.500 .635 99681-1.135 3/8" 1.540" Dual 1.500 1.135 .740 99676-3/8" 1.500 99679-1.560" to 1.630" Triple 1.135 .635 All "Posi-Stop" Titanium Retainers are packaged with appropriate Crane Cams machined valve stem locks. 10° Crane Multi Fit Titanium Retainers For 5/16" square groove valve stems: use 99071-1 (standard), 99072-1 (+.050"), or 99070-1 (-.050") valve stem locks For 11/32" square groove valve stems: use 99074-1 (standard), 99075-1 (+.050"), or 99073-1 (-.050") valve stem locks For 3/8" square groove valve stems: use 99077-1 (standard), 99078-1 (+.050"), or 99076-1 (-.050") valve stem locks Valve stem locks for 5/16", 11/32", and 3/8" valve stems with bead groove configuration also available, see pages 360-361. ALL 1.540" to 1.595" Dual 1.500 1.150 .720 99635-ALL 1.625" to 1.675" Triple 1.500 1.180/.860 99636-These recommended locks differ from competing conventional 10°locks and they increase the breakage strength of our Multi-Fit titanium retainers by 25%. Also, many competing 10 degree locks vary in production from 9° to 11-1/2°. Because of the accurate, robust design of Crane locks, they are incompatible with most competitors 10° retainers, and competitor's locks won't work with Crane Multi Fit 10° retainers. 10° Conventional Titanium Retainers .675 ALL 1.430" to 1.500" Dual or Triple 1.375 99630-1.060 1.500" to 1.550" Dual 1.400 1.040 .715 99640-ALL ALL 1.510" to 1.625" Dual 1.500 99641-1.100 .690 ALL 1.550" Dual 1.440 1.090 .695 99639-ALL 1.540" to 1.560" Dual 1.500 1.120 .735 99631-All 1.550" to 1.560" Dual 1.500 1.095 .700 99634-ALL 1.560" to 1.630" Triple 1.500 1.135 .635 99632-ALL 1.625" Dual 99633-1.500 1.170 .764 ALL 1.625" Dual 1.510 1.165 99638-These retainers can be used with 11/32" or 3/8" valve stems with single keeper grooves provided that the appropriate conventional 10 degree valve stem locks are used: **99080-1** for 5/16"; **99081-1** for 11/32"; **99082-1** for 3/8". See page 361 for +.050" and -.050" optional locks.

NOTE: The retainers are packaged in various quantities depending on the engine application. The suffix number (after the dash) in the part number indicates the quantity. For example, part no 99944-16 would be packaged with 16 retainers. Consult the engine application pages or the numerical price list for the correct quantity suffix.

NOTE: See pages 352-354 for our new Retainer Height Chart.

Valve Spring Retainer Height Chart

Retainer Height Chart

To be able to achieve the proper valve spring height, while using the minimum amount of valve spring shims, can be challenging when working with applications that use other than stock components. There has never been an industry standard to compare the relationship of retainer heights with each other, although we have previously listed our retainer heights by comparing them with each other. This has been somewhat helpful if you have at least one of our retainers on hand for comparison purposes, but doesn't properly address the variations of valve stem diameters, valve stem lock thicknesses, and taper angles.

With this new listing, we are providing a measurable dimension that can be easily checked for the cylinder head and valve combination you're working with. No sample retainers or fixtures are needed. The Retainer Height dimensions listed indicate the relationship of the outer step of the retainer that the outer valve spring sets against, with the top of the valve stem lock groove in the valve stem.

If the dimension on the chart is .000", the outer retainer step, and the top of the lock groove are at the same height. If the dimension is positive, such as .060", then the outer retainer step is .060" above the top of the lock groove. If the dimension is negative, such as -.040", then the outer spring step is .040" below the top of the lock groove. Check the accompanying drawings for a visual explanation.

This will enable you to measure from the valve spring seat on the cylinder head, to the top of the lock groove in the valve, then compare that dimension to your desired valve spring assembly height (see the Valve Spring Retainer Dimension pages 350-351, and the Valve Spring to Retainer Cross Reference pages 355-357 for additional information). If you need an assembly height that's .060" higher than your measured dimension, check the listings for the applicable retainers for your valve springs, and look for a height figure close to .060".

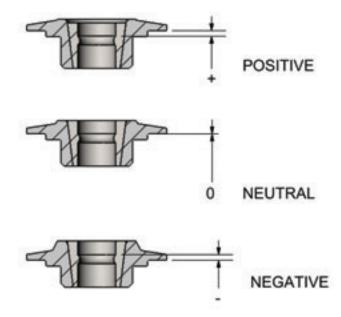
The standard height Crane Cams valve stem lock part numbers are listed with each diameter valve stem (where applicable) to achieve these figures. Remember, most of our valve stem locks are also available in +.050" and -.050" heights (see pages 360-361), to extend the available height combinations that can be created.

The retainers are listed by material, then by lock configuration.

The valve stems are listed by diameter and lock groove configuration.

Certain unique specific retainers are listed using their usual valve locks, such as the Buick 11 degree, and the Ford Modular items.

We hope this will make choosing your components easier, and provide a more reliable valve spring retainer/valve stem lock combination for your application.



Valve Spring Retainer Height Chart



Steel Retainers

Retainer Part No.	Valve Stem Dia (Valve Stem Loc	meter ck Part No.)					
7° Crane Multi Fi							
	5/16 sq.	5/16 bead	11/32 sq.	11/32 bead	3/8 sq.	7mm bead	8mm bead
	99093	99101	99094	99104	99098	99106	99107
99948	055	055	050	050	080	055	055
99950	.045	.045	.050	.050	.020	.045	.045
99954	.040	.040	.045	.045	.015	.040	.040
99955	.055	.055	.060	.060	.030	.055	.055
99957	.045	.045	.050	.050	.020	.045	.045
99961	.125	.125	.130	.130	.100	.125	.125
99962	.125	.125	.130	.130	.100	.125	.125
99964	.040	.040	.045	.045	.015	.040	.040
99969	.045	.045	.050	.050	.020	.045	.045
99970	.045	.045	050	.050	.020	.045	.045
99973	.110	.110	.115	.115	.085	.110	.110
99974	.110	.110	.115	.115	.085	.110	.110
99975	005	005	.000	.000	030	005	005
99976	.010	.010	.015	.015	015	.010	.010
7° Specific							
, specific	11/32 sq.	8mm bead					
	99097	99108					
99914	.035	77100					
99915	.020						
99916	055						
99935	.075						
99936	.005						
99942	.285						
99943	.135						
99944	.075						
99946	.075						
99951	.135						
99953	.135						
99956	.125						
99966	.135						
99967	.215						
144944	.213	030					
	Ei+	030					
10° Crane Multi I		11/22	2/0 c~				
99971	5/16 sq.	11/32 sq. .055	3/8 sq. .045				
	.030						
99972	.030	.055	.045				
11° Specific	11/22 5 1	060					
99912	11/32 Buick	060					
99910	3/8 Buick	085					

Section Continued



Valve Spring Retainer Height Chart

Titanium Retainers

<u>Titanium Reta</u>	iners						
Retainer Part No.	Valve Stem Diam (Valve Stem Lock						
7° Crane Multi Fit	t and 3/8″						
	5/16 sq. 99093	5/16 bead 99101	11/32 sq. 99094	11/32 bead 99104	3/8 sq. 99098	7mm bead 99106	8mm bead 99107
99655	.045	.045	.050	.050	.020	.045	.045
99656	.045	.045	.050	.050	.020	.045	.045
99657	005	005	.000	.000	030	005	005
99659	.115	.115	.115	.115	.085	.115	.115
99660	.115	.115	.115	.115	.085	.115	.115
99661	.115	.115	.115	.115	.085	.115	.115
99662	.115	.115	.115	.115	.085	.115	.115
99663	.115	.115	.115	.115	.085	.115	.115
7° Specific	.113		5	.113	.003	5	.113
37660	7mm 3-groove	070					
39660	6mm	.050					
158660	6mm	.025					
40660	7mm 3-groove	.000					
99637	8mm	140					
99658	8mm	055					
144661	8mm	030					
903-0503	5.5mm	.020					
		.020					
7° "Posi-Stop" Sp		2.00					
	11/32 sq.	3/8 sq.					
20442	99097	99098					
99669	.075						
99675	.150	0.00					
99676	075	.060					
99678	.075	020					
99679	165	.030					
99681	.165						
10° Crane Multi F							
	5/16 sq.	11/32 sq.	3/8 sq.				
	99071	99074	99077				
99635	.030	.055	.045				
99636	.030	.055	.045				
10° Conventiona	l						
	5/16 sq.	5/16 bead	11/32 sq.	11/32 bead	3/8 sq.	3/8 bead	
	99080	99115	99081	99116	99082	99117	
99630	.110	.110	.110	.110	.080	.080	
99631	.150	.150	.150	.150	.120	.120	
99632	.095	.095	.095	.095	.065	.065	
99633	.095	.095	.095	.095	.065	.065	
99634	.045	.045	.045	.045	.015	.015	
99638	.115	.115	.115	.115	.115	.115	
99639	.115	.115	.115	.115	.115	.115	
99640	.115	.115	.115	.115	.115	.115	
99641	.155	.155	.155	.155	.155	.155	

Valve Spring to Retainer Cross Reference



Single Springs

	7°	Steel Retain	er	10° Steel Retainer	Titaniur	n Retainer	Spring Seat
Valve Spring Part No.	5/16"	11/32"	3/8″		7°	10°	(I.D.)
37830	None	None	None	None	37660	None	None
40830	None	None	None	None	40660	None	None
96801	99969	99936	99948	99971	None	None	None
		99943	99957				
		99944	99969				
		99969					
96802	None	99914	None	None	None	None	None
		99915					
		99916					
96803	99969	99946	99950	99971	None	None	None
		99969	99969				
96806	99969	99936	99948	99971	None	None	None
		99943	99954				
		99944	99957				
		99951	99969				
		99953	22202				
		99969					
96807	99962	99962	99962	99972	None		None
70007	99970	99970	99970))))[L	NOTIC	99641	None
96845	None	None	None	None	903-0503	None	None
99831	99976	99976	99976	None	99637	None	99468 (.637")
99832	99976	99976	99976	None	99637	None	99456 (.500")
77032	33370	77770	33370	Notic	77037	NOTIC	99457 (.570")
							99458 (.637")
99833	00050	00026	00049	None	None	00620	
79833	99950	99936	99948	None	None	99630	99457 (.570")
		99943	99950				
		99944	99957				
		99946					
		99950		00000	N1		20.480 / (2.711)
99835	99950	99936	99948	99971	None	99630	99459 (.637")
	99969	99943	99950				
		99944	99957				
		99950	99969				
		99969					
99839	99950	99936	99948	99971	None	99630	99459 (.637")
	99969	99943	99950				
		99944	99957				
		99950	99969				
		99969					
99840	99950	99936	99948	99971	None	99630	99457 (.570")
	99969	99943	99950				
		99944	99957				
		99950	99969				
		99969					
99841	None	99942	None	None	None	None	None
99842	None	None	None	None	None	None	None
99846	None	99914	None	None	None	None	None
		99915					
		99916					
99848	None	99914	None	None	None	None	None
		99915					

Valve Spring to Retainer Cross Reference

Single Springs

Valve Spring Part No.	7° Steel Retainer 5/16″ 11/32″ 3/8″			10° Steel Retainer	Titaniu 7°	m Retainer 10°	Spring Seat (I.D.)
144846	None	99914 99915 99916	None	None	99658	None	None
158830	None	None	None	None	158660	None	None
180830	None	None	None	None	158660	None	None

Dual Springs

Valve Spring Part No.	7° 5/16″	Steel Retair 11/32"	ner 3/8″	10° Steel Retainer	7° Tita 5/16″	nium Pos 11/32"	i-Stop 3/8"	Titaniu 7°	m Retainer 10°	8mm	Spring Seat (I.D.)
96870	99969	99936 99943 99944	99957 99969	99971	None	99669	None	None	99630	None	99465 (.570")
96872	99969	99969 99936 99943 99944 99969	99948 99957 99969	99971	None	99669	None	None	99630	None	99465 (.570")
96873	99969	99936 99943 99944 99969	99948 99957 99969	99971	None	99669	None	None	99630	None	99465 (.570")
96874	99969	99936 99943 99944 99969	99948 99957 99969	99971	None	99669	None	None	99630	None	99465 (.570")
96877	99969	99936 99943 99944 99969	99948 99957 99969	99971	None	99669	None	None	99630	None	99465 (.570")
96878	99970 99974	99970 99974	99970 99974	99972	None	None	None	99659	99634 99641	None	99460 (.570")
96879	99970 99974	99970 99974	99970 99974	99972	None	None	None	99659	99634 99641	None	99465 (.570")
96883	99970 99974	99970 99974	99970 99974	99972	None	99678 99681	99679	99659	99641	None	99460 (.570")
96884	99961 99964 99970 99974	99956 99961 99964 99970 99974	99955 99961 99964 99970 99974	99972	None	99675 99678 99681	99676 99679	None	99631 99632 99641	None	99460 (.570")
96885	99970 99974	99970 99974	99970 99974	99972	None	99675	None	None	99631 99632 99663	None	99460 (.570")
96886	99970 99974	99970 99974	99970 9997 4	99972	None	None	None	99659	99634 99641	None	99465 (.570")
96887	None	99935	None	None	None	None	None	None	None	None	None
99838	99969	99936 99943 99944 99969	99948 99957 99969	99971	None	99669	None	None	99630	None	None

Valve Spring to Retainer Cross Reference



Dual Springs

Valve Spring Part No.	7° : 5/16″	Steel Retair 11/32"	ner 3/8"	10° Steel Retainer	7° Tita 5/16"	nium Posi 11/32"	i-Stop 3/8"	Titaniu 7°	m Retainer 10°	8mm	Spring Seat (I.D.)
99876	99970 99974	99956 99970 99974	99955 99970 99974	99972	None	99678 99681	99676	None	99631 99632	None	99460 (.570") 99464 (.637")
99879	None	None	None	None	None	None	None	None	None	99926	None
99880	99962	99962	99962	99972	None	99675	99676	99655	99633	None	99466 (.570") 99463 (.637")
99884	None	99967	None	None	None	None	None	None	None	None	None
99885	99961 99964 99970 99974	99956 99961 99964 99970 99974	99955 99961 99964 99970 99974	99972	None	99678 99681	99676	None	99634 99641	None	99460 (.570") 99464 (637")
99890	99962 99970 99974	99962 99970 99974	99962 99970 99974	99972	None	None	None	99659	99641	None	99466 (.570")
99891	None	99912 99914 99915 99916	None	None	None	None	None	None	None	None	None
99892	99954	99951 99953 99954	99954	99971	None	None	None	None	None	99639	None
99893	99952 99969	99951 99953 99969	99954 99969	99971	None	99669	None	None	99630	None	None
99895 99896	99961 99964 99970 99974	99956 99961 99964 99970 99974	99955 99961 99964 99970 99974	99972	None	99675 99678 99681	99676 99679	None	99631 99632 99641	None	99466 (.570") 99464 (.637")
144838	99975	99975	99975	None	None	None	None	99657	None	144661	None
144847	99975	99975	99975	None	None	None	None	None	None	144661	None
961224	None	None	None	None	None	None	None	99660	99638	None	99463 (.637")
961226	None	None	99970 99974	99972	None	None	None	99661	99639	None	99465 (.570")
961228	None	None	None	None	None	None	None	99660	99638	None	99463 (.637")
961299	None	None	None	None	None	None	None	99660	99638	None	99466 (.570") 99463 (.637")
961325	None	None	99970 99974	99972	None	None	None	99661	99639 99641	None	99464 (.637")
961326	None	None	99970 99974	99972	None	None	None	99661	99639 99641	None	99465 (.570") 99464 (.637")
961354	None	None	99970 99974	99972	None	None	None	99663	99640	None	99465 (.570") 99455 (.637")
961355	None	None	99970 99974	99972	None	None	None	99663	99640	None	99465 (.570") 99455 (.637")
961356	None	None	99970 99974	99972	None	None	None	99663	99640	None	99465 (.570") 99455 (.637")
961360	None	None	99970 99974	99972	None	None	None	99663	99640	None	99465 (.570") 99455 (.637")

Triple Springs

96848	None	None	None	None	None	99678	99679	99656	99632	None	None
						99681			99636		
96849	None	None	None	None	None	99678	99679	99656	99632	None	None
						99681			99636		
96888	None	None	None	None	None	99678	99679	99656	99632	None	None
						99681			99636		
961246	None	None	None	None	None	None	None	99662	None	None	99461 (.637")
961347	None	None	None	None	None	None	None	99662	None	None	99461 (.637")
961348	None	None	None	None	None	None	None	99662	None	None	99461 (.637")

Valve Spring and Retainer Kits

Valve Spring and Retainer Kits

Crane Cams Valve Spring and Retainer Kits offer an easy, costsaving method of insuring that your performance camshaft installation has the correct, matched valve springs and retainers needed to deliver maximum performance. These springs are designed to allow the increased RPM and more aggressive valve train operation that allows a Crane performance cam installation to "wake up" even stock engines. Crane steel and titanium valve spring retainers are designed to correctly fit the supplied Crane springs. The steel retainers are made from premium quality steel, precisely machined and heat treat hardened for strength, durability and wear resistance. The titanium retainers are manufactured from certified American made bar stock. Best of all, most of these Crane Valve Spring and Retainer Kits can be easily installed with no cylinder head machining necessary.

Applications are available for popular I-4 and V-8 engines. Consult the engine applications pages for correct usage.

		Contents			
Application	Part No.	Valve Springs	Retainers		
American Motors V-8 66-91, 290 thru 401					
	64308-1	99839-16	99957-16		
Chevrolet V-8 67-87, 262 thru 400					
·	11308-1	99848-16	99915-16		
XHTCS material, Saturday Night Special	11309-1 ª (Includes Locks 99095-1	99846-16	99915-16		
Chevrolet V-8 57-99, 262-400					
Requires cylinder head machining	11310-1 ^b	99838-16	99944-16		
Chevrolet V-8 92-99, 350 LT1					
With aluminum cylinder heads	10308-1 (Includes Locks 99097-1	99893-16 & Shims 99050-1)	99951-16		
Chevrolet V-8 94-99, 350 LT1					
With iron cylinder heads	10309-1	99845-16	99914-16		
Chevrolet V-8 95-96, Vortech 350					
	10309-1	99845-16	99914-16		
Chevrolet V-8 97-Up, LS-series 4.8-5.3-5.7-6.0-6.2 litre					
For up to .680" gross valve lift	144317-1 (includes spring seats 14	144838-16 4460-16, seals 99818-1	144944-16 6, & locks 99108-1)		
For up to .680" gross valve lift	144316-1 (includes spring seats 14	144838-16 4460-16, seals 99818-1	144661-16 6, & locks 99108-1)		
For up to .660" gross valve lift, XHTCS material	144313-1 (includes spring seats 14	144847-16 4460-16, seals 99818-1	144944-16 6 , & locks 99108-1)		
For up to .660" gross valve lift, XHTCS material	144314-1 (includes spring seats 14	144847-16 4460-16, seals <mark>99818-1</mark>	144661-16 6 , & locks 99108-1)		
Chevrolet V-8 65-98, 396 thru 502					
	13308-1	99839-16	99948-16		
Chevrolet V-8 80-95, Truck 366 thru 454					
With short valve spring assembly height	13309-1	96801-16	99957-16		
Chrysler-Dodge Neon I-4 95-05, SOHC 4V 2.0L					
	903-2003	158830-16	158660-16		
Chrysler-Dodge Neon, PT Cruiser I-4 95-09, DOHC 4V 2.0-2.4L					
	903-2002	180830-16	158660-16		
Chrysler-Dodge-Plymouth V-8 64-91, "LA" 273 thru 360 and 67-91, 318					
	69308-1	99835-16	99948-16		
Chrysler-Dodge-Plymouth V-8 58-78, "B" 350 thru 440					
	64308-1	99839-16	99957-16		

Section Continued



Valve Spring and Retainer Kits



Valve Spring and Retainer Kits

		Conte	Contents	
Application	Part No.	Valve Springs	Retainers	
Ford Duratec I-4 02-05, DOHC 4V 1.8-2.0-2.3L				
	903-2007	99845-16	903-0503	
Ford V-8 62-87, 221-302 and 69-97, 351W				
	36308-1	96803-16	99946-16	
Requires Cylinder Head Machining	11310-1 ^b	99838-16	99944-16	
Ford V-8 85-00, 302 and 302 H.O. w/Hydraulic Roller Camshafts				
Conical design, for stock cylinder head	44308-1°	99841-16	99942-16	
	(Includes Locks 990	94 and 99097)		
Ford V-8 70-77, 351C-351M-400				
	52308-1	96801-16	99948-16	
Ford V-8 71-72, Boss 351 and 79-82, 351M-400				
	35308-1	96801-16	99944-16	
Ford V-8 63-76, FE 352 thru 428				
,	13309-1	96801-16	99957-16	
Ford V-8 68-97, 370 thru 460				
	35308-1	96801-16	99944-16	
Oldsmobile V-8 67-84, 260 thru 455 39° Bank Angle and 64-67, 330 thru 425 45° Bank Angle				
	36308-1	96803-16	99946-16	
Requires Cylinder Head Machining	11310-1 ^b	99838-16	99944-16	
Pontiac V-8 55-81, 265 thru 455				
	28308-1	99840-16	99944-16	
Requires Cylinder Head Machining	11310-1 ^b	99838-16	99944-16	

a Standard diameter valve springs for 1967-87 cylinder heads with 1.700" assembly height. Check valve guide to lock/retainer clearance at maximum valve lift, valve guide machining may be required.

b Must machine cylinder heads. Check valve guide to lock/retainer clearance at maximum valve lift, valve guide machining may be required.

Optional kit for 79-00 302, 302 H.O., and 351W engines to provide increased valve spring travel
when using stock cylinder heads.

Valve Stem Locks

Machined Steel Locks 7°

Single Groove Design

The ultimate in strength and wear resistance. These locks are machined from highest quality alloy steel billet material using the finest automatic screw machines and then carefully heat treated. Engineered specifically for today's high engine speeds and high-tension valve springs. These machined steel locks are the only locks to be used with our "Posi Lock" valve spring retainers. Oxide finished for corrosion protection, and color coded for assembly height identification.



Description	Part No.
For 5/16" diameter Valve Stems (Black)	99091-1
For 11/32" diameter Valve Stems +.050" installed height (Yellow)	99095-1
For 11/32" diameter Valve Stems standard height (Black)	99097-1
For 11/32" diameter Valve Stems050" installed height (Silver)	99096-1
For 3/8" diameter Valve Stems +.050" installed height (Yellow)	99099-1
For 3/8" diameter Valve Stems standard height (Black)	99098-1
For 3/8" diameter Valve Stems050" installed height (Silver)	99089-1

NOTE: This design lock is packaged with all Crane "Posi-Stop"
Titanium Retainers.

Machined Steel Locks 7°

Single Bead Design

These machined steel locks are precision machined and heat treated in our own facility for the latest generation of engine technology. Although primarily designed for the Chevrolet LS1/LS2/LS6 families, they are also applicable to most valve stems that require a bead-style valve lock.



Description	Part No.
For 8 mm Valve Stems (standard OEM dimension)	99108-1
For 8 mm Valve Stems increased 0.D. (Multi Fit)	99107-1

Multi-Fit Valve Stem Locks 7°

Single Groove Design

Our steel billet heat treated Multi-Fit locks feature an increased outside diameter for additional strength, durability and fatigue resistance. These Multi-Fit locks are highly recommended for any high RPM, high valve spring tension, or heavy valve application prone to lock distortion and retainer pull-through. The 7° taper actually provides more clamping force than wider 10° taper locks and are the preferred choice of professional engine builders and racers. (Use only with Crane Multi-Fit retainers).



Description	Part No.
For 5/16" diameter Valve Stems +.050" installed height (Yellow)	99085-1
For 5/16" diameter Valve Stems standard height (Green)	99093-1
For 5/16" diameter Valve Stems050" installed height (Silver)	99086-1
For 11/32" diameter Valve Stems +.050" installed height (Yellow)	99087-1
For 11/32" diameter Valve Stems standard height (Green)	99094-1
For 11/32" diameter Valve Stems050" installed height (Silver)	99088-1
For 3/8" diameter Valve Stems +.050" installed height (Yellow)	99099-1
For 3/8" diameter Valve Stems standard height (Black)	99098-1
For 3/8" diameter Valve Stems050" installed height (Silver)	99089-1

NOTE: Crane Locks are color coded for easier identification.

Section Continued





Multi-Fit Valve Stem Locks 7°

Single Bead Design

Our steel billet heat treated Single Bead Multi-Fit locks provide all of the strength and durability advantages of our single square groove design, and are compatible with most of the aftermarket bead lock valves currently available. Also available in +.050" and -.050" assembly height versions for 5/16" and 11/32" valve stems, these are designed specifically for use with only our Multi-Fit retainers.

Description	Part No.
For 5/16" diameter Valve Stems +.050" installed height (Yellow)	99102-1
For 5/16" diameter Valve Stems standard height (Black)	99101-1
For 5/16" diameter Valve Stems050" installed height (Silver)	99100-1
For 11/32" diameter Valve Stems +.050" installed height (Yellow)	99105-1
For 11/32" diameter Valve Stems standard height (Black)	99104-1
For 11/32" diameter Valve Stems050" installed height (Silver)	99103-1
For 7 mm Valve Stems standard height (Black)	99106-1
For 8 mm diameter Valve Stems standard height (Black)	99107-1



Multi-Fit Valve Stem Locks 10°

Single Groove Design

Crane 10 degree heat treated, fully machined steel billet, Multi-Fit locks were designed to allow the retainer to have an increased cross-section in the critical area between the tapered hole for the locks and the valve spring steps. Having greater retainer integrity will now provide a more stable platform for the valve springs, reducing retainer breakage and the possibility of the locks separating from the valve stem under adverse operating conditions. Many competing 10 degree locks vary in production from 9 deg to 11-1/2 degree. Because of the accurate, robust design of Crane locks, they are incompatible with most competitors 10 degree retainers, and competitor's locks won't work with Crane Multi-Fit 10 degree retainers.

Description	Part No.
For 5/16" diameter Valve Stems +.050" installed height (Silver)	99072-1
For 5/16" diameter Valve Stems standard height (Green)	99071-1
For 5/16" diameter Valve Stems050" installed height (Yellow)	99070-1
For 11/32" diameter Valve Stems +.050" installed height (Silver)	99075-1
For 11/32" diameter Valve Stems standard height (Green)	99074-1
For 11/32" diameter Valve Stems050" installed height (Yellow)	99073-1
For 3/8" diameter Valve Stems +.050" installed height (Silver)	99078-1
For 3/8" diameter Valve Stems standard height (Green)	99077-1
For 3/8" diameter Valve Stems050" installed height (Yellow)	99076-1



Machined Steel Locks 10° Conventional

Single Groove Design

Many engine builders are used to a conventional 10° taper, and these machined steel locks are perfect for any racing application where the conventional 10° design is specified. (Use only w/ 99630, 99631, 99632, 99633, 99634, 99638, 99639, or 99640 Crane retainers or competitors' conventional 10° retainers). Locks are recessed for lash cap clearance.

Description	Part No.
For 5/16" diameter Valve Stems +.050" installed height (Yellow)	99109-1
For 5/16" diameter Valve Stems standard height (Black)	99080-1
For 5/16" diameter Valve Stems050" installed height (Silver)	99112-1
For 11/32" diameter Valve Stems +.050" installed height (Yellow)	99110-1
For 11/32" diameter Valve Stems standard height (Black)	99081-1
For 11/32" diameter Valve Stems050" installed height (Silver)	99113-1
For 3/8" diameter Valve Stems +.050" installed height (Yellow)	99111-1
For 3/8" diameter Valve Stems standard height (Black)	99082-1
For 3/8" diameter Valve Stems050" installed height (Silver)	99114-1



Machined Steel Locks 10° Conventional

Single Bead Design

Description	Part No.
For 5/16" diameter Valve Stems +.050" installed height (Yellow)	99118-1
For 5/16" diameter Valve Stems standard height (Black)	99115-1
For 5/16" diameter Valve Stems050" installed height (Silver)	99121-1
For 11/32" diameter Valve Stems +.050" installed height (Yellow)	99119-1
For 11/32" diameter Valve Stems standard height (Black)	99116-1
For 11/32" diameter Valve Stems050" installed height (Silver)	99122-1
For 3/8" diameter Valve Stems +.050" installed height (Yellow)	99120-1
For 3/8" diameter Valve Stems standard height (Black)	99117-1
For 3/8" diameter Valve Stems050" installed height (Silver)	99123-1



Valve Seals, Valve Train Accessories

Hi-Performance Seals

(Machining Required)

Crane Cams valve stem seals provide maximum valve stem oil control. These seals wipe excess oil from the valve stem by means of a unique spring loaded wiper assembly, thus preventing unwanted oil from reaching and contaminating the cylinder. Machining usually required.

Valve Stem Diameter	Guide O.D.	Seal O.D.	Part No.
5/16"	.500	.600	99825-16
5/16"	.531	.620	99824-16
11/32"	.500	.600	99826-16
11/32"	.531	.620	99820-16
8mm	.500	.600	99818-16
3/8" 3/8"	.500	.600	99828-16
3/8"	.531	.620	99822-16



Valve Lash Caps

Precision machined from 8620 steel alloy, heat treated and black oxided. Provides a better wear surface and lengthens valve for correct geometry. (Maintain .030" clearance from bottom of lash cap to top of the valve locks)

Application	Part No.
5/16" diameter valve stems (.162" tall, .060" thick)	99420-16
11/32" diameter valve stems (.162" tall, .060" thick)	99421-16
11/32" diameter valve stems, for Ford 2300 c.c. SOHC (.210" tall, .100" thick)	99423-8
3/8" diameter valve stems (.162" tall, .060" thick)	99422-16
7mm diameter valve stems, for Ford 4.6-5.4L SOHC V-8 & 4.6L DOHC V-8(.200" tall, .080" thick)	99424-16
8mm diameter valve stems (.162" tall, .060" thick)	99425-16
8mm diameter valve stems, for Ford 2000 c.c. SOHC (.204" tall, .050" thick)	99045-8



Valve Spring Locators and Cups

Crane shatters the myth that "all spring seats are the same". Our new spring cups (those that contain the O.D. of the valve springs) and locators (that locate the I.D. of the valve springs) incorporate tapered vertical surfaces to eliminate the spring chafing that can quickly deteriorate and lead to premature failure and breakage of the most expensive valve springs. And when valve springs break, the damage is usually catastrophic. These heat-treated steel billet items are advised for applications ranging from street performance to professional racing. Available for specific applications, and most popular dimensioned valve springs. Don't chance your engine to an ordinary "spring seat".



	• •	•	,	3	, , ,
0.D.	I.D.	Spring O.D.	Spring I.D.	Base Thickness	Part No.
Locators					
1.240	.505	_	.650 (for LS1/LS2/LS6 applications)	.050	144460-16
1.290	.512	_	.990	.062	99456-16
1.290	.578	_	.990	.062	99457-16
1.290	.640	_	.870	.062	99468-16
1.290	.640	_	.990	.062	99458-16
1.295	.570	_	.718 (for L98/Fast Burn alum. head a	.050 pplications)	99467-16
1.480	.640	_	.716	.062	99455-16
1.500	.570	_	.695	.055	99465-16
1.500	.570	_	.730	.055	99460-16
1.558	.570	_	.760	.055	99466-16
Cups					
1.685	.637	1.570	_	.062	99464-16
1.730	.630	1.520	_	.300	99459-8
	(for eliminating rotators on Ch	evrolet 396-454-502 and 8.1L c	ylinder heads)		
1.745	.637	1.630	_	.062	99463-16
1.745	.637	1.650	_	.062	99461-16



Valve Spring Shims

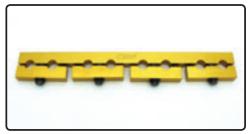
Durable steel shim stock, zinc plated for wear resistance.

Description	Set Part No.
.015 x 1.480 x .703 (Hardened, set of 16)	99050-1
.015 x 1.640 x .635 (Hardened, set of 16)	99046-1
.030 x 1.480 x .703 (Set of 32)	99051-1
.060 x 1.480 x .703 (Set of 32)	99052-1



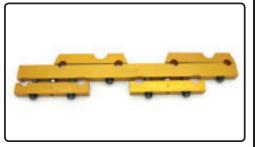
Valve Train Stabilizers... Quick-Lock™ Stud Girdles

Crane Cams' Quick Lock Valve Train stabilizers are a unique approach to the now common use of stud girdles for racing engine applications. Most importantly, the Crane Quick-Lock unit slashes the time required for removal and replacement of the stabilizer unit to a fraction of the time other units require. Crane VTS bars are made from finest quality aluminum bar stock, machined to precise blueprint specifications and attractively gold anodized for corrosion resistance. Each Crane VTS comes complete with all necessary hardware including heat treated steel rocker arm adjusting nuts. They are easily installed and require no cylinder head machining or modifications for installation



(CAUTION: Added height of the Crane VTS requires the use of aftermarket tall valve covers)

Application	Part No.	
Chevrolet V-8 262 thru 400 cu.in. & Pontiac-Brodix w/ standard rocker arm stud spacing		
For 3/8" rocker arm studs (99803 nuts included)	11600-1	
For .600" wide top slot rocker arms and 7/16" rocker arm studs (99810 nuts included)	11604-1	
Chevrolet V-8 396 thru 454 (will not fit casting 14044861)		
For .600" wide top slot rocker arms (99809 intake and 99810 exhaust nuts included)	13602-1	
Ford V-8 370-429-460 cu.in.		
For .600" wide top slot rocker arms and 7/16" rocker arm studs (99810 nuts included)	35602-1	



Promotional Items

Promotional Items

Description	Part No.
Catalogs	
Crane Cams Master Catalog	99193-10
Crane Cams Master Catalog on Disc	PP0112B
Crane Cams Lobe Master Listing	PP0307A
Crane Cams Ignition Catalog	106-5890
Crane Cams Ignition Catalog on Disc	PP1010A
Crane Cams Motorcycle Catalog	PP0410B
Crane Cams Motorcycle Catalog on Disc	510-0018
Decals - Contingency	
Crane Cams 11"	99174-1
Crane Ignition 11"	99186-1
Decals and Patches	
Crane Cams 6" Decal	99189-1
Crane Ignition 6" Decal	99181-1
Crane Cams 5" Patch	99209-1
Key Tags	
Crane Cams White Tag with Red Logo	PP0612B
Banners and Clings	
36" x 60" Crane Cams Red on White Banner	99213-1
36" x 60" Crane Cams Ignition Red on White Banner	99214-1
"Crane Cams Available Here" Cling	99188-1
Caps	
Crane Cams Black with White Logo	PP1010B
T-Shirts	
Crane Cams Red Ringer—White with Red Logo—Small	
	PP1300S
Crane Cams Red Ringer—White with Red Logo—Medium	PP1300S PP1301M
Crane Cams Red Ringer—White with Red Logo—Medium Crane Cams Red Ringer—White with Red Logo—Large	PP1301M
Crane Cams Red Ringer—White with Red Logo—Large	
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—X Large	PP1301M PP1302L PP1303XL
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—X Large Crane Cams Red Ringer—White with Red Logo—XX Large	PP1301M PP1302L
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—X Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XXX Large	PP1301M PP1302L PP1303XL PP1304XXL PP1305XXXL
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—X Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Black with White Logo—Small	PP1301M PP1302L PP1303XL PP1304XXL PP1305XXXL PP1310S
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—X Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Black with White Logo—Small Crane Cams Black with White Logo—Medium	PP1301M PP1302L PP1303XL PP1304XXL PP1305XXXL PP1310S PP1311M
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—X Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Black with White Logo—Small Crane Cams Black with White Logo—Medium Crane Cams Black with White Logo—Large	PP1301M PP1302L PP1303XL PP1304XXL PP1305XXXL PP1310S PP1311M PP1312L
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—X Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Black with White Logo—Small Crane Cams Black with White Logo—Medium Crane Cams Black with White Logo—Large Crane Cams Black with White Logo—X Large	PP1301M PP1302L PP1303XL PP1304XXL PP1305XXXL PP1310S PP1311M PP1312L PP1313XL
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Black with White Logo—Small Crane Cams Black with White Logo—Medium Crane Cams Black with White Logo—Large Crane Cams Black with White Logo—X Large Crane Cams Black with White Logo—XX Large Crane Cams Black with White Logo—XX Large	PP1301M PP1302L PP1303XL PP1304XXL PP1305XXXL PP1310S PP1311M PP1312L PP1313XL PP1313XL
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Black with White Logo—Small Crane Cams Black with White Logo—Medium Crane Cams Black with White Logo—Large Crane Cams Black with White Logo—X Large Crane Cams Black with White Logo—XX Large Crane Cams Black with White Logo—XX Large Crane Cams Black with White Logo—XXX Large	PP1301M PP1302L PP1303XL PP1304XXL PP1305XXXL PP1310S PP1311M PP1312L PP1313XL PP1314XXL PP1315XXXL
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Black with White Logo—Small Crane Cams Black with White Logo—Medium Crane Cams Black with White Logo—Large Crane Cams Black with White Logo—X Large Crane Cams Black with White Logo—XX Large Crane Cams Black with White Logo—XXX Large Crane Cams Black with White Logo—XXX Large Crane Cams White with Black Logo—Small	PP1301M PP1302L PP1303XL PP1304XXL PP1305XXXL PP1310S PP1311M PP1312L PP1313XL PP1314XXL PP1315XXXL
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Black with White Logo—Small Crane Cams Black with White Logo—Medium Crane Cams Black with White Logo—Large Crane Cams Black with White Logo—X Large Crane Cams Black with White Logo—XX Large Crane Cams Black with White Logo—XXX Large Crane Cams Black with White Logo—XXX Large Crane Cams White with Black Logo—Small Crane Cams White with Black Logo—Medium	PP1301M PP1302L PP1303XL PP1304XXL PP1305XXXL PP1310S PP1311M PP1312L PP1313XL PP1314XXL PP1315XXXL PP1315XXXL PP1350S PP1351M
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Black with White Logo—Small Crane Cams Black with White Logo—Medium Crane Cams Black with White Logo—Large Crane Cams Black with White Logo—X Large Crane Cams Black with White Logo—XXX Large Crane Cams Black with White Logo—XXX Large Crane Cams White with Black Logo—Small Crane Cams White with Black Logo—Medium Crane Cams White with Black Logo—Large	PP1301M PP1302L PP1303XL PP1304XXL PP1305XXXL PP1310S PP1311M PP1312L PP1313XL PP1314XXL PP1315XXXL PP1315XXXL PP1350S PP1351M PP1352L
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Black with White Logo—Small Crane Cams Black with White Logo—Medium Crane Cams Black with White Logo—Large Crane Cams Black with White Logo—X Large Crane Cams Black with White Logo—XXX Large Crane Cams Black with White Logo—XXX Large Crane Cams White with Black Logo—Small Crane Cams White with Black Logo—Medium Crane Cams White with Black Logo—Large	PP1301M PP1302L PP1303XL PP1304XXL PP1305XXXL PP1310S PP1311M PP1312L PP1313XL PP1314XXL PP1315XXXL PP1350S PP1351M PP1352L PP1353XL
Crane Cams Red Ringer—White with Red Logo—Large Crane Cams Red Ringer—White with Red Logo—XX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Red Ringer—White with Red Logo—XXX Large Crane Cams Black with White Logo—Small Crane Cams Black with White Logo—Medium Crane Cams Black with White Logo—Large Crane Cams Black with White Logo—X Large Crane Cams Black with White Logo—XXX Large Crane Cams Black with White Logo—XXX Large Crane Cams White with Black Logo—Small Crane Cams White with Black Logo—Medium Crane Cams White with Black Logo—Large	PP1301M PP1302L PP1303XL PP1304XXL PP1305XXXL PP1310S PP1311M PP1312L PP1313XL PP1314XXL PP1315XXXL PP1315XXXL PP1350S PP1351M PP1352L









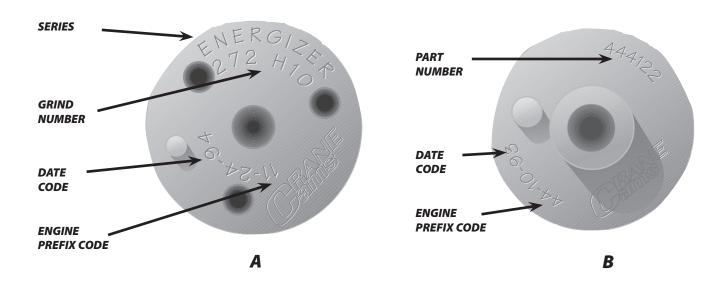












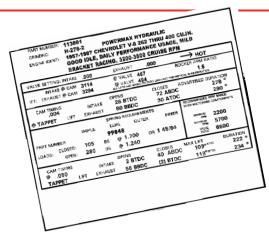
The above illustrates an easy method for identifying some of the most popular Crane camshafts. To use this, you must first view the end of the camshaft. (Some Crane and Cam Dynamics cams for thrustplate equipped engines are marked on the opposite end of that shown here.) Make note of the two digit engine prefix code number, the series name, and the grind number.

For example, the two cams listed above would be:

A Engine Code – 11 Series – Energizer Grind Number – 272 H10 (Part Number – 10005)

B Engine Code – 44 Part Number – 444122 Grind Number – 2030

NOTE: There are many more camshafts made by Crane Cams than are shown in this catalog. If you cannot find your particular cam, write down all the information (on "both" ends of the camshaft) and contact one of our Performance Consultants. Fax or write us, Crane Cams, 1640 Mason Ave., Daytona Beach, FL 32117, Fax 386-236-9983.



Need Cam Spec Card Info?

Find it FAST at: cranecams.com

For information on reading and understanding Cam Spec Cards, see page 385.

Custom Ground Cams

Custom Ground Cams

Crane Cams offers custom designed and ground cams sold outright, when cam cores are available, or reground, with the customer providing the cam core. We have hundreds of different cam cores, cast (for flat face hydraulic and mechanical lifter applications) and steel roller (hydraulic roller and mechanical roller) cores for various cylinder blocks, heads, journal diameters, firing orders, etc. New cores are also constantly being added.

Each outright Crane custom-ground cam has its own unique part number. This includes your being able to reorder the exact same cam any time you wish to reorder. You won't need to restate the lobe profile, centerline, or other option specs. Just refer to the

Part Number shown in the upper left corner of your Crane Cam Timing Specs Card, or from your invoice. This nine or ten digit part number indicates the Crane engine prefix, basic type of cam and a numerical sequence per each type.

You can select lobes from our Cam Lobe Profile Catalog (Pt. No. **PP0307A**), or cranecams.com. The online listings are updated frequently, and are the most up-to-date listing available. Shown are only the most popular lobes, and there are tens of thousands of additional lobe profiles available. We also design and produce exclusive, proprietary lobe masters for our customers. Lobe separations can then be selected along with any other features

you desire. These include cam journal diameters, journal bearing types, rear accessory drives, distributor gear material, additional dowel pins, gun drilling, journal grooving, etc. Our Tech Services staff can provide guidance on any custom cam issues.

There are tens of thousands of existing part numbers for custom grinds that may already include your own choice of profiles. If so, we can supply the grind part number for ordering. On new orders, once the order has been submitted the part number will be assigned and the order processed. Pricing information is available directly from Crane Cams.

Easy-Order Check List:

- 1. Choose the lobe profile you wish to have ground and the lifter type: *Hydraulic; hydraulic roller; mechanical ("solid"); or mechanical roller.* (See Lobe Master Catalog, Part No. **PP0307A** or cranecams.com, or call for a copy) For street performance cam applications use the recommendation form on Page 367.
- **2.** Call Crane at: **866-388-5120 (FAX 386-236-9983)** Mon-Thur, 8:00-7:00, Fri 8:00-5:00). On regrind orders *call first* before sending us your cam core!
- **3.** Give us your engine make, year and C.I.D., lobe profile info (intake and exhaust), lobe separation and particulars (small base circle, special drive, etc.).
- **4.** Tell us your preferred return shipping method and **requested delivery date** (We normally ship UPS or FedEx).
- 5. If you're a Crane Cams Engine Builder or WD, give us your P.O. Number and Account Number plus any additional info you wish to provide.

Here's Why Crane Should Be Your Custom-Grind Cam Source!

- Order outright when new cam cores are available, or "regrind" (customer provides suitable core).
- Hundreds of different cam cores available.
 80,000+ grinds available and new profiles being constantly added.
- Cast (hydraulic and "solid" lifter cams); and Billet Steel (hydraulic roller and mechanical "solid" roller) cores available for most popular applications.
- New cores constantly added for new blocks, heads, journal diameters, firing orders, etc.
- Each Crane custom cam has its own unique part number, for easy reorder. Just specify the part number or your invoice number.
- Choose profiles (lobe shapes) from the Crane Cam Lobe Profile Listing (part number PP0307A), from the website www.cranecams.com, or modify Crane catalog grinds.

- All Crane Cams are designed using the latest generation computer software, tooled and manufactured using the industry's most accurate equipment!
- All custom Crane cams feature that world famous Crane "Lobe-To-Lobe, Cam-To-Cam" accuracy!
- We also design and produce exclusive, proprietary lobe designs (Confidential to you alone!).
- Additional special services include: Different journal diameters, firing orders, rear accessory drives, distributor gear material, additional dowel pins, gun drilling, journal grooving, etc.
- Shipping Methods: UPS, FedEx. 24 Hour turnaround available with Next-Day shipping.

To Order: 866-388-5120 FAX: 386-236-9983 Mon-Fri. 8:00-5:00, EDT

Street/Strip, Off Road, Marine Camshaft Recommendation Form



Personal Information:

Name			_ Home Phone
		_ State Zip	
			Email
Which type cam a	re you interested in?	O Hydraulic	O Hydraulic Roller
		O Mechanical	O Mechanical Roller
Vehicle Informa	ntion:		
	O Computer Controlled (v	v/Emissions Controls)	
	O Emissions Controlled w	ithout Computer	
	O Non-Emissions Control	led	
Make:		Year:Model:	_ Weight:
Vehicle Use:	O Street	O Street/Strip O Off Road	O Towing
For Marine Use:	Hull Type:	Length:	Weight:
Tor marine osc.	71	O Prop Explain:	_
		rand	
		O Above Water Line O Below Wate	
	DOES EXTIGUST EXIT.	O Above water line O below water	ELLINE
Options:	RPM Power Range Desired	O 1000-4000 O 1500-4500 O	O 2000-5000 O 2500-5500
opo	in mir over nange besnear		O 4000-7000
	Fnaine Idle Characteristics		O Rough
	•	ed Vehicles Must Use Smooth Idle Camsh	•
	,		
Engine Informa	Ition: Make:	Year:	No. of Cylinders:
		n Ratio: Cylinder F	
Ported: O Ye	es O No Valv	ve Size: Int	Exh
Rocker Arm Type:	O Stock O Roller	Rocker Ratio: Int	Exh
Intake Manifold Ty	/pe:	Carburetor:	
Nitrous Oxide Syst	em:	Supercharger Type:	Drive Ratio:
Turbocharger Type	e:	P.S.I. Boost:	
Cranking Compre.	ssion P.S.I.:		
Transmission Mod	lel:	O Standard O Automo	atic O Automatic with Overdrive
Converter Stall Sp	eed:	Rear Gear Ratio:	
Cruise RPM @ 60 N	ЛРН: <u></u>	Tire Diameter/Size:	
Cam Now Used:		Part No.: O Hydrau	lic O Hydraulic Roller
		O Mechar	nical O Mechanical Roller
Lift: Int	Exh	Duration @ .050: Int	Exh
Lobe Separation:_		Improvement Needed: O Low	End Torque O Upper RPM Power

Camshaft Regrinding and Special Camshaft Services

Most any combination of intake and exhaust profiles and lobe separation may be ordered. We suggest you consult with our technical staff for recommendations on the latest and best combinations. You may occur an additional \$100.00 net engineering charge for domestic pushrod engines, or an additional \$150.00 net engineering charge for other (foreign OHC, industrial, restoration, etc.) new "one off" cam grinds. Refer to our latest Cam Lobe Profile Catalog, or our website for lobe profile listings. Be certain to send a completely filled out Cam Profile Recommendation Form to insure prompt attention.

All prices include normal straightening, regrinding, and Parko lubrite treating (to retard wear) when applicable. Additional charges will apply for any special machining work that is required to regrind a customer's camshaft, such as removing gears, oil pump drives, end plugs, etc. or drilling, tapping, centering, etc. Each camshaft ground using normal Crane Cams tooling (or tooling available at the time of your order).

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.

Regrinding Your Camshaft

Engine Description	Labor Part No.
Most single cylinder	98006*
Most two cylinder - iron	98008*
Most V2 SOHC - per pair	98009*
Most 4 cylinder - iron	98007*
Most 4 cylinder SOHC - iron	98003*
Most 4 cylinder SOHC - steel	98004*
Most 4 cylinder - 8620 steel (we cannot re-heat treat)	98002*
Most 4 cylinder - 9310 steel (we cannot re-heat treat)	98002*
Most 4 cylinder - 8620 steel - IR / HIR (we cannot re-heat treat)	98078*
Most 4 cylinder - 9310 steel - IR / HIR (we cannot re-heat treat)	98078*
Most 4 cylinder DOHC - 4 lobes per cam - per pair	98083*
Most 4 cylinder DOHC - 8 lobes per cam - per pair	98082*
Most 6 cylinder - iron	98057*
Most 6 cylinder SOHC - iron	98079*
Most 6 cylinder - 8620 steel (we cannot re-heat treat)	98059*
Most 6 cylinder - 9310 steel (we cannot re-heat treat)	98059*
Most 6 cylinder - 8620 steel - IR / HIR (we cannot re-heat treat)	98063*
Most 6 cylinder - 9310 steel - IR / HIR (we cannot re-heat treat)	98603*
Most V6 SOHC - per pair	98080*
Most V6 DOHC - per set of 4	98081*
Most V8 - iron	98001*
Most V8 - 8620 steel (we cannot re-heat treat)	98060*
Most V8 - 9310 steel (we cannot re-heat treat)	98060*
Most V8 - 9310 large journal (we cannot re-heat treat)	98060*
Most V8 - tool steel (we cannot re-heat treat)	98084*
Most V8 - 8620 steel - IR / HIR (we cannot re-heat treat)	98084*
Most V8 - 9310 steel - IR / HIR (we cannot re-heat treat)	98084*
Most V8 - slot hardface	98058*
Most V8 - semi finished - iron	98090*
Most V8 - semi finished - steel	98090*
Most V8 SOHC - per pair	98012*
Most V8 DOHC - per set of 4	98013*
Most straight-8	98077*
Most V10 - steel	98060*
Most V12	98050*
Most V12 SOHC - per pair	98065*
Most V12 DOHC - per set of 4	98055*
Most industrial/diesel	98053*



Finish Grind Crane Round Lobe Outright Steel Billet Camshaft (Round lobe spool supplied by Crane Cams)

Engine Description	Labor Part No.
Most 4 cylinder - 8620 steel	98062*
Most 6 cylinder - 8620 steel	98086*
Most V8 - 8620 steel	98061*
Most V8 - 9310 steel	98067*

Finish Grind Customer's Round Lobe Steel Billet Camshaft

(Copper plate, rough grind, heat treat and finish grind) (Round lobe spool supplied by customer)

Engine Description	Labor Part No.
Most 1 cylinder - 8620 steel	98070*
Most 4 cylinder - 8620 steel	98071*
Most 6 cylinder - 8620 steel	98072*
Most 6 cylinder industrial/diesel - 8620 steel	98048*
Most 6 cylinder - 8620 steel, copper plate, rough grind, heat treat only	98085*
Most V8 - 8620 steel	98068*
Most V8 - 9310 steel	98064*
Most V8 - 8620 steel, copper plate, rough grind, heat treat only	98069*
Most V8 - 9310 steel, copper plate, rough grind, heat treat only	

Special Services

Engine Description	Labor Part No.
Copper plate customer's steel round lobe camshaft	98098
Drill and tap rear of cam for Sander drive	98089
Grind cam bearing journals	98076
Groove cam bearing journal for oiling	98088
Install 5/16" diameter dowel pin	98087
Gun Drill camshaft	98096
Grind gearfit step on front journal	98073
Miscellaneous labor - per hour	98111
Ultra Pro Micro-finish camshaft	98113

Cam Inspection Service

Engine Description	Labor Part No.
Crane Cams offers a cam inspection service for customer's new, used or damaged camshafts. Cams are straightened and checked for conformance to original	
specifications and lobe-to-lobe variation using the same high accuracy inspection equipment used to check and verify our own precision camshafts. A computer	
generated report giving the results of the check is furnished and returned with the cam. Our large file of measured data and specifications of engine manufacturers	
and other cam manufacturers will permit us to verify original specifications on almost any profile.	98014

NOTE: There will be an additional net charge of \$40.00 for grinding roller lifter camshafts WITHOUT base circle undercutting.

There will be an additional net charge of \$20.00 to straighten abnormally bent camshafts.

There will be an additional charge to crate camshafts in a wooden box for additional protection during shipment.

Procedure for Sending Camshafts for Regrinding

Before shipping your camshaft, please directly contact Crane Cams for the assignment of a Return Goods Authorization (RGA) number. This is necessary for tracking your camshaft throughout our procedures. While in contact with our technical staff, have as much information as possible about your combination readily available, to assist in making the proper new grind choice, or to facilitate repairs. When shipping the camshaft to us, you must include your name, address, E-mail address and daytime phone number, along with your RGA number on the outside of the package. After receiving and inspecting your camshaft, we will contact you to verify the operations that will be performed, along with your method of payment.

Other Engine Applications

Although the following engines are not listed in the Applications Section of this catalog, we can regrind your camshaft and provide most kit components. Some new camshaft cores are available. For specific information, contact Crane Cams at 866-388-5120.

American Motors/J	leep	
155 cu.in (2.5 Litre)	I-4	84-92
4.0 Litre	I-6	99-05
Arias/Fontana/MB	'R	
2.5 Litre	I-4	84-09
8.3 Litre	V-8	85-09
10.0 Litre	V-8	85-05
Buick		
198-225	V-6	62-67
231	V-6	75-77
196-231-252	V-6	78-86
3.3-3.8 Litre	V-6	87-94
248-263-320	I-8	39-53
264-322	V-8	53-56
364-401-425	V-8	57-66
215	V-8	61-63
300-340	V-8	64-67
350	V-8	68-80
Cadillac		
331-365-390	V-8	49-62
390-429	V-8	63-67
250 (4.1 L)-4.5-4.9	V-8	82-94
Chevrolet		
153	I-4	62-71
2300cc SOHC	I-4	71-75
2000cc DOHC	Cosworth I-4	75-76
1800-2000сс	I-4	82-93
216-235	I-6	37-53
235-261	I-6	54-62
292	I-6	63-84
140-145	Corvair 6 cyl.	60-63
164	Corvair 6 cyl.	64-69
200-229	V-6	78-84
262 (4.3 Litre)	V-6	85-91
3.4-3.5 Litre	V-6	ALL

Chrysler, DeSoto, L	Dodge, Plymouth	
1700cc	I-4	78-83
2.2-2.5L OHC	I-4	81-94
235-250-265	Flathead I-6	37-54
218-230	Flathead I-6	42-59
170-198-225	I-6	60-85
3.9L	V-6	88-94
3.3L	60° V-6	90-94
301-331-354	V-8	51-56
276-291	V-8	52-55
241-259-270	V-8	53-56
330-341-345	V-8	56-57
315-325	V-8	56-58
392	V-8	57-58
277-301-303-318-326	V-8	56-66
350-440 Single Bolt B	V-8	58-78
5.7 Litre R5P7	V-8	ALL
Hemi 99 500	V-8	ALL
Crosley		
44 cu.in.	I-4	46-55
Dart		
500 5" bore spacing	V-8	ALL
Donovan		
417	V-8	ALL

Section Continued

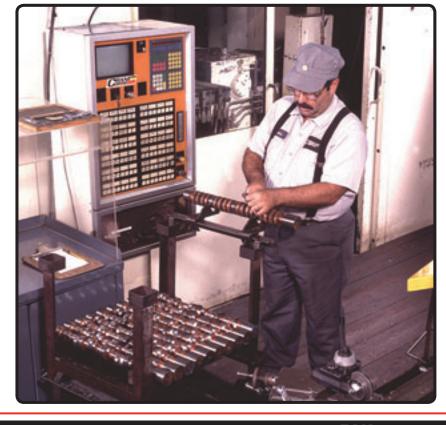


Other Engine Applications



Ford, Lincoln, Mercury			
1600cc	I-4	71-80	
1.6-1.9 Litre	CVH I-4	81-93	
2000cc SOHC	I-4	71-74	
2300-2500cc	HSC I-4	85-93	
215-223	I-6	52-53	
223	I-6	54-64	
262	I-6	62-64	
144-170-200-250	I-6	60-83	
2600-2800cc	V-6	72-82	
2800сс	V-6	83-85	
232	V-6	82-84	
3.0L	V-6	86-94	
4.5L SV0	V-6	88-98	
221	Flathead V-8	32-41	
239	Flathead V-8	42-53	
279-317-341-368	V-8	52-57	
256-272-292-312	V-8	55-62	
332-352-390	V-8	58-62	
383-410-430-462	V-8	58-68	
302 Boss	V-8	69-70	
427 SOHC	V-8	63	
429 Boss Hemi	V-8	69-70	
GMC			
224-248-270-302	I-6	39-63	
MG Midget - Sprit	e - Mini BMCA		
848-1275cc	I-4	57-84	

Oldsmobile		
2.3 L DOHC Quad 4	I-4	88-96
2.3 SOHC Quad 4	I-4	92-96
303-324	V-8	49-55
324-371	V-8	56-58
371-394	V-8	59-64
215	V-8	61-63
307	V-8	85-90
330-400-425 45°	V-8	64-67
500 DRCE2	V-8	ALL
500 DRCE3	V-8	ALL
Pontiac		
195	I-4	60-63
151	I-4	77-78
151 (2.5 Litre)	I-4	79-89
151 (2.5 Litre)	I-4	90-91
230-250 SOHC	I-6	66-69
215	V-8	61-63
Rambler		
250-287-327	V-8	56-66
Rodeck		
481x	V-8	ALL
481x2	V-8	ALL
Rover		
215-3.5-3.9-4.2 Litre	V-8	68-00
Studebaker		
224-232-259-289	V-8	51-64



Flat Tappet Camshaft Break-in Procedure

Flat Tappet Camshaft Break-in Procedure

WARNING: NEW LIFTERS MUST BE INSTALLED WITH YOUR NEW CAMSHAFT

Prior to installation:

- Check the compatibility of the camshaft with the remainder of the valve train components (valve springs, rockers, etc.)
- On race type, high spring load applications, use lighter load springs or remove the inner spring (dual spring application) just for break-in.

CRANE FLAT TAPPET CAMSHAFT RECOMMENDED BREAK-IN PROCEDURE

Due to the EPA's mandate for zinc removal from most motor oils, proper flat tappet camshaft break-in procedure is more critical than ever before. This is true for both hydraulic and mechanical flat tappet camshafts. As a point of interest, the most critical time in the life of a flat tappet camshaft is the first 20 minutes of break-in during which the bottoms of the lifters "mate-in" with the cam lobes.

There are some oils with additive packages that are better for camshaft break-in. These include, but are not limited to: **Brad Penn or Joe Gibbs racing** or a "race only" petroleum-based oil, and include Crane Cams Part # 99003-1 Super Lube" additive. **Do not use API rated SL, SM, or SN oil.**

CAUTION: We do not recommend the use of synthetic oils for break-in. Prior to installing the camshaft and lifters, it is recommended that the crankcase be drained and filled with new, clean oil, as listed above. The oil filter should also be changed at this time. Proper flat tappet camshaft break-in starts with the cam installation and includes the following steps:

- 1. Before installing the camshaft and lifters, wash them thoroughly in clean mineral spirits to remove the rust preventative that is placed on the cam before shipping. NOTE: As a rule of thumb, always thoroughly clean any part before installing it in an engine. Never assume that the parts are cleaned before packaging. During shipping, packaging material can rub into the component surface and must be removed.
- 2. DO NOT "pump-up" hydraulic lifters before use. This can cause the lifters to hold a valve open during engine cranking, which will cause low compression. The low compression will delay engine start-up and is very detrimental to proper camshaft break-in.

- 3. With the supplied moly paste lube, coat the bottom of the lifters, cam lobes and distributor gear. Use Crane Cams assembly lube Part # **99008-1** on all other surfaces and components.
- 4. Set your valve lash or lifter preload. Try to minimize the number of times that you rotate the engine, as this can displace the moly paste from the lobes and lifters.
- 5. If possible, prime the oiling system. When priming, rotate the engine at least two complete revolutions to assure oil gets to all valve train components. Valve covers should be off to assure that all rockers are oiling.
- 6. Preset the ignition timing to start the engine at a fast idle. It is important that the static ignition timing is set as close as possible and if the engine has a carburetor, it should be filled with fuel. The engine needs to start quickly without excessive cranking to insure immediate lubrication to the cam lobes.
- 7. Start the engine and immediately bring to 3,000 rpm. Timing should be adjusted, as guickly as possible, to reduce excessive heat or load during break-in. Get the engine running fairly smooth and vary the engine speed from 1500-3000 RPM in a slow, to moderate, acceleration/deceleration cycle. During this time, be sure to check for any leaks and check out any unusual noises. If something doesn't sound right, shut the engine off and check out the source of the noise. Upon restart, resume the high idle speed cycling. Continue the varying break-in speed for 20 - 30 minutes. This is necessary to provide proper lifter rotation to properly mate each lifter to its lobe. Should the engine need to be shut down for any reason, upon re-start it should be immediately brought back to 3000 rpm and the break-in continued for a total run time of 20 - 30 minutes.
- 8. Let the engine cool, and then drain the crankcase and properly dispose of the oil and oil filter. Refill the crankcase with a premium petroleum-based oil, not a synthetic oil. At this point the initial break-in is complete. You can drive the vehicle in your normal manner. We recommend changing the oil and filter after 500 miles. You might want to put another 5000 miles on the cam before switching to a synthetic, if that is your preference.

Section Continued



Flat Tappet Camshaft Break-in Procedure



Flat Tappet Camshaft Break-in Procedure (continued)

ADDITIONAL INFORMATION

Spring Pressures: For extended camshaft life, flattappet cams should not be run with more than the recommended open valve spring pressure. Racing applications will often need to run more spring pressure at the expense of reduced camshaft life. In order to break-in a camshaft with high open pressures, the inner springs should be removed to reduce break-in load. The inner springs can then be reinstalled after initial break-in is complete.

Lifter Rotation: Flat tappet cams (both hydraulic and mechanical) have the lobes ground on a slight taper and the lifters appear to sit offset from the lobe centerline. This will induce a rotation of the lifter on the lobe. This rotation draws oil to the mating surface between the lifter and the lobe. If it is possible to view the pushrods during break-in, they should be spinning as an indication that the lifter is spinning. If you don't see a pushrod spinning, immediately stop the engine and find the cause.

Never use old flat tappet lifters on a new cam. On flat tappet cams, the lobes and lifter bottoms mate together. If the lifters are removed from the engine, they must go back on the same lobe from which they were removed. Crane Cams recommends the use of high quality lifters to prevent premature cam or lifter wear. Crane lifters are of the highest quality.

Big Block Chevrolets have an oil-priming idiosyncrasy. When priming a Big Block Chevy with a drill motor and priming tool, it is often necessary to prime for as long as 20 minutes (while rotating the engine) to get oil to all of the lifters and rockers. It is advisable to prime these engines with the valve covers removed so you can check to see oil coming out of all of the rocker arms before firing the engine. This last step is advisable on all engines, but particularly on Big Block Chevrolets.

Adjusting the Valve Train

Hydraulic Lifters

Hydraulic lifters have been the choice of the automotive industry for many years for several good reasons. When compared to a mechanical lifter, the hydraulics are:

- 1. Quieter.
- 2. Low maintenance.
- 3. Able to adjust for thermal expansion of the engine.
- 4. Considered as a built in shock absorber, eases stress on valve train.
- 5. Capable of having a "Bleed Rate" that can be designed to accommodate different engine RPM ranges.

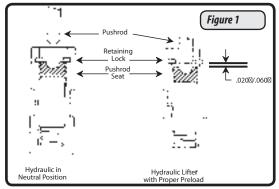
Most engines use either the standard design hydraulic lifter or the low friction, high performance hydraulic roller design. Hydraulic lifters are the best for street applications, high performance, and mild racing applications where low maintenance and low cost is a primary concern.

What is the difference in the design of a Hydraulic and Mechanical Lifter?

Basically, the hydraulic lifter pushrod seat is moveable, the mechanical lifter seat is not. Both lifter types can look the same from the outside, with both usually having pushrod seats held in by a retaining lock. The pushrod seat in a mechanical lifter usually registers upon an internal step inside the lifter body preventing it from moving (thus it gets the nickname "Solid Lifter"). What's below the pushrod seat in the hydraulic lifter is a different story. Its pushrod seat is not restricted by a step, but instead sits on top of a moveable hydraulic mechanism which acts like a tiny hydraulic pump. Below this mechanism is valving, and a spring to produce an upward force, moving the pushrod seat upward against the retaining lock.

What is Hydraulic Lifter Preload?

Mechanical cam designs require a running clearance or valve lash, while hydraulic lifters are just the opposite. When the rocker arm assembly is properly torqued down into position, the pushrod must take up all the clearance and descend into the hydraulic lifter, causing the pushrod seat to move down by .020" to .060". The distance that the pushrod seat moves down away from the retaining lock is the "Lifter Preload". The hydraulic mechanism requires this precise amount of "preload" for it to do its job properly. (See Figure 1.)



What happens if the amount of Hydraulic Lifter Preload is wrong?

If clearance exists between the pushrod and the seat in the hydraulic lifter, after the rocker arm assembly has been torqued down, you will have no lifter preload. In this case the valve train will be noisy when the engine is running. All of the hydraulic force produced by the lifter will be exerted

against the lifter's retaining lock, and this could cause the lock to fail.

If the opposite occurs, and the pushrod descends too far (more than .060") with the lifter on the base circle, then you may have excessive lifter preload. In theory, a hydraulic lifter will only pump up to whatever preload it is set to. With excessive preload, as the engine RPM and oil pressure increases, the hydraulic mechanism could pump-up the pushrod seat if the valve spring cannot control the proper motion of the valve. This could cause the valve to stay off its seat during most of, or all, its entire cycle. This reduces the cylinder pressure, lowering the performance of the engine. Backfiring may also occur. The following sections will offer suggestions on how to correct this.

When rebuilding an engine, what can cause Lifter Preload to change?

Almost anything can affect lifter preload. If you do a valve job, surface the block or heads, change the head gasket thickness, or buy a new camshaft, the amount of preload can be affected. Sometimes these changes cancel one another out and your preload stays the same; this is more by luck than design. This is why you must always inspect the amount of preload the lifter has when reassembling the engine and be sure that it is correct.

A Fast and Easy Way to Check Hydraulic Lifter Preload when using Non-Adjustable Rocker Arms

With the cam, hydraulic lifters and pushrods in place, install your rocker arm assembly. Use the prescribed method in your repair manual and torque down all the valve train bolts in the proper sequence. Pick a cylinder that you are going to check. Hand rotate the engine in its normal direction of rotation until both valves are closed. You are on the compression cycle for that cylinder. (At this position the valve springs are at their least amount of tension making the job a little easier to do.) Wait a few minutes, allowing the lifters to bleed down. Now, lay a rigid straightedge across the cylinder head, supporting it on the surface of the head where the valve cover gasket would go. Using a metal scribe and the straightedge, carefully scribe a line on both pushrods. Now carefully remove the torque from all valve train bolts, removing any pressure from the pushrods. Wait a few minutes for the pushrod seat in the hydraulic lifter to move back to the neutral position. Carefully scribe a new line on both pushrods. Measure the distance between the two scribe marks, it represents the amount of lifter preload. If the lines are .020" to .060" apart you have proper lifter preload. If the lines are the same or less than .020" apart you have no, or insufficient, preload. If the lines are further apart than .060", you have excessive lifter preload. To bring your preload into tolerance, use one of the methods described in the next section if necessary, or call the Crane Tech Line for assistance (866-388-5120).

Methods to Adjust for Proper Hydraulic Lifter Preload

There are several different methods for increasing or decreasing the amount of lifter preload, depending on valve train design and how the rocker arm is held onto the cylinder head. Keep in mind that the automotive manufacturers have made changes to the valve train over the years. What may work on one year's engine may not work for another, even though they are basically the same engine. There is one method that universally works on all these engines, change the pushrod length! Use a longer pushrod to

Adjusting the Valve Train



Hydraulic Lifters (continued)

increase preload, a shorter to reduce preload. Crane offers various length pushrods, (see pages 306 through 309) and offers custom length pushrods (see page 305).

Many methods are illustrated throughout the catalog, here are a few of them:

- Custom length pushrods
- Bottleneck stud shims
- Bridge mount rocker arm shims
- Pedestal mount rocker arm shims
- Adjustable conversion rocker arm studs/kits
- "Kool Nut" adjusting nuts
- Guideplate and rocker arm conversion kits
- Adjustable rocker arms (both stud and shaft mounted)
- Replacement guideplates and studs

Using Adjustable Rocker Arms to set Hydraulic Lifter Preload

The easiest method to arrive at proper lifter preload is when you have an engine with "Adjustable Valve Train". Unfortunately, since 1967 most domestic engines, with the exception of small and big block Chevrolets, have been made with non-adjustable rocker arms. The Crane Catalog shows you several ways of converting your engine to an adjustable rocker arm system. The following sections will describe how to set the preload with adjustable rocker arms.

Hydraulic Lifters Can Be Adjusted at Any Engine Temperature

Since hydraulic lifters can compensate for thermal expansion of the engine, the adjusting can be done with the engine cold; hot adjustment is not necessary.

Adjusting Hydraulic Lifters for Proper Preload

In order to adjust the preload, the lifter must be properly located on the base circle or "Heel" of the lobe. (See Figure 2.) At this position the valve is closed and there is no lift taking place. You will need to watch the movement of the valves to determine which lifter is properly positioned for adjusting.

- 1. Remove the valve covers, and pick a cylinder that you are going to set the preload on.
- 2. Hand rotate the engine in its normal direction of rotation and watch the exhaust valve on that particular cylinder. When the exhaust valve begins to open, stop and adjust that cylinder's intake rocker arm. (Why? Because when the exhaust valve is just beginning to open, the intake lifter will be on the base circle of the lobe, the correct position for adjusting the intake.)
- 3. Back off the intake rocker arm adjuster and remove any tension from the pushrod. Wait a minute or two for that hydraulic lifter to return to a neutral position. The spring inside the lifter will move the pushrod seat up against the retaining lock if you give it time to do so. (If you are installing brand new lifters they will be in the neutral position when they come in the box.)
- 4. Now spin the intake pushrod with your fingers while tightening down the rocker arm. When you feel a slight resistance to the turning of the pushrod, you are at "Zero Lash". Turn the adjusting nut down one half to one full turn from that point. Lock the adjuster into position. The intake is now adjusted properly.

- 5. Continue to hand turn the engine, watching that same intake. It will go to full open and then begin to close. When it is almost closed, stop and adjust the exhaust rocker arm on that particular cylinder. (Again, when we see the intake almost closed, we are sure that exhaust lifter is on the base circle of the lobe.) Loosen the exhaust rocker arm and follow the same procedure described before in steps 3 and 4 to adjust this rocker arm.
- Both valves on this cylinder are now adjusted, and you can move on to your next cylinder and follow the same procedure again.

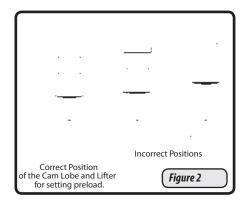
Do Hydraulic Lifters Need to be Primed with Oil?

Many people mistakenly believe that hydraulic lifters must be soaked in oil overnight and be hand pumped up with a pushrod before installing into a new engine, however this is not necessary. In fact, this could cause the lifter to act as a "solid" and prevent obtaining proper preload. What is very necessary is the priming of the entire engine's oil system before starting up a new engine for the first time. This is done by turning the oil pump with a drill motor to force oil throughout the entire engine. Crane Cams offers oil pump primers for Chevrolet and Ford engines. (see page 331)

What is a Hi Intensity Hydraulic Lifter?

Part of engineering a hydraulic lifter is to determine what its "Bleed Rate" will be. The "Bleed Rate" is a scientific method of determining the time it takes the hydraulic lifter to lose its pressure once it is fully pumped up solid with oil. By changing this rate, the lifter can give different performance factors to the engine. One such design is the Crane Cams Hi Intensity Lifter. Its increased bleed rate enables it to provide improved vacuum, increased cylinder pressure and performance in the lower RPM ranges. It is best suited for those engines that are using a big camshaft profile that requires more compression ratio than the engine actually has. This situation would normally cause a loss of bottom end performance, but with the Crane Cams Hi Intensity Lifter the bottom end torque is restored.

NOTE: Hi Intensity Lifters are only for use if the compression ratio is below the recommended minimum shown on the application page for the particular camshaft you have selected. Otherwise higher than desired cylinder pressures may result, causing detonation.



Adjusting the Valve Train

Mechanical Lifters

All pushrod engines using mechanical (solid) lifters, or mechanical roller lifters, must have an adjustable valve train so that precise adjustment for "Valve Lash" can be made to match the camshaft's requirements. Valve lash is the running clearance that exists between the tip of the valve stem and the valves mating surface of the rocker arm. (It is expressed in the Crane Catalog as "Valve Lash" and on the camshaft specification card as "Valve Setting". Both terms mean the same thing.) The amount of valve lash can vary between camshaft profile designs, being as small as .010" on some and as great as .035" on others. It is important to use the recommended valve lash when you first test the performance of the engine. You must also be concerned with thermal expansion of the engine components. This is especially true if using aluminum alloy cylinder heads, or block. For this reason, Crane requires that the valve lash be set with the engine "Hot" on all pushrod engines using mechanical lifters. This will insure that the minimum required clearance (valve lash) is maintained throughout the engine's operating temperature range.

Compensating for a Cold Engine when Adjusting Valve Lash

When installing a new cam, the engine will be cold but the lash specifications are for a hot engine. What are you to do? There is a correction factor that can be used to get close. We mentioned that the alloy of the engine parts can be affected by thermal expansion in different ways, therefore the amount of correction factor to the lash setting depends on whether the cylinder heads and block are made out of cast iron or aluminum. You can take the "hot" setting given to you in the catalog or cam specification card and alter it by the following amount to get a "cold" lash setting.

- With iron block and iron heads, add .002"
- With iron block and aluminum heads, subtract .006"
- With both aluminum block and heads, subtract .012"

Remember this correction adjustment is approximate and is only meant to get you close for the initial start up of the engine. After the engine is warmed up to its proper operating temperature range, you must go back and reset all the valves to the proper "hot" valve lash settings.

Setting Valve Lash on Mechanical Cams

All the valves must be set individually and only when the lifter is properly located on the base circle of the lobe. At this position the valve is closed and there is no lift taking place. How will you know when the valve you are adjusting is in the proper position with the lifter on the base circle of the cam? This can be accomplished by watching the movement of the valves.

- When the engine is hot (at operating temperature) remove the valve covers and pick the cylinder that you are going to adjust.
- 2. Hand turn the engine in its normal direction of rotation while watching the exhaust valve on that particular cylinder. When the exhaust valve begins to open, stop and adjust that cylinder's intake valve. (Why? Because when the exhaust is just beginning to open, the intake lifter will be on the base circle of the lobe, so the intake is the one we can now adjust.)

- 3. Use a feeler gauge, set to the correct valve lash, and place it between the tip of the valve stem and rocker arm, unless otherwise specified. Adjust until you arrive at the proper setting and lock the adjuster in place.
- 4. After the intake valve has been adjusted, continue to rotate the engine, watching that same intake valve. The intake valve will go to full lift and then begin to close. When the intake is almost closed, stop and adjust the exhaust valve on that particular cylinder. (Again, when we see the intake valve almost closed, we are sure that the exhaust lifter is on the base circle of the lobe.) Use the feeler gauge and follow the procedure described before in step 3.
- 5. Both valves on this cylinder are now adjusted, so move to your next cylinder and follow the same procedure again. In the future you may find shortcuts to this method, but it still remains the best way to do the job correctly.

Using Valve Lash to Help Tune the Engine

The engine only responds to the actual movement of the valves. Since the valve cannot move until all the running clearance (valve lash) has been taken up, the amount of valve lash you use affects the engine's performance. For example, if you decrease the amount of (hot) valve lash, the valve will open slightly sooner, lift higher, and close later. This makes the camshaft look bigger to the engine, because of a slight increase of actual running duration and lift. If you increase the amount of (hot) lash the opposite occurs. The valve will open later, lift less, and close sooner. This shows the engine a smaller cam with slightly less actual running duration and lift. You can use this method on a trial basis to see what the engine responds to and keep the setting that works the best. Just remember, the more lash you run, the noisier the valve train will be. If the clearance is excessive it can be harsh on the other valve train components. Therefore, for prolonged running of the engine we do not recommend increasing the amount of hot lash by more than +.004" from the recommended setting. Nor do we recommend decreasing the hot lash by more than -.008".

Warning:

"Tight Lash" camshafts cannot deviate from the recommended hot lash setting by more than +.002" increase, or -.004" decrease. "Tight Lash" cams are those which have recommended valve settings of only .010", .012", or .014" on the specification card. These lobe designs have very short clearance ramps and cannot tolerate any increase in the recommended valve lash. The extra clearance can cause severe damage to valve train components.

With "Tight Lash" cams, we recommend using only the prescribed amount of hot valve lash, and that close inspection of the engine be maintained.

Please realize that changing valve lash settings from the recommended design specifications will change the harmonic characteristics of the valve train, possibly causing valve spring deteriation and breakage.

Commonly Asked Valve Spring Questions



Commonly Asked Valve Spring Questions

What is Valve Spring Installed Height?

Installed height is the dimension measured from the bottom of the valve spring retainer, where the outer valve spring locates, to the spring pocket in the cylinder head, when the valve is closed. (See Figure 3)

How Does Installed Height Affect the Spring Tension?

Installed height is the determining factor of what the valve spring "Closed Tension" will be. The camshaft specification card, and the spring section of the catalog both show what the approximate tension a particular valve spring will exert if installed at a specific height. For example, spring part no. **99848** shows 114# @ 1.700". This means that if this spring is installed at a height of 1.700" it should exert 114# of tension with the valve closed.

How Do You Change Installed Height, and What Effect Does it Have?

The easiest way to lessen installed height is to insert a shim in the spring pocket below the valve spring. Another method is to use a different design valve spring retainer. Retainers with a deeper dish will have more installed height; with a shallower dish, less installed height. (See Figure 3) You can also use a valve lock that is designed to change the location where the retainer is positioned on the valve stem. For specific retainer or valve lock height specifications and options look in the Buyers Guide section of the catalog. Longer length valves can also be used.

The shorter the installed height, the higher the valve spring tension will be, and the less distance the spring can travel before reaching coil bind.

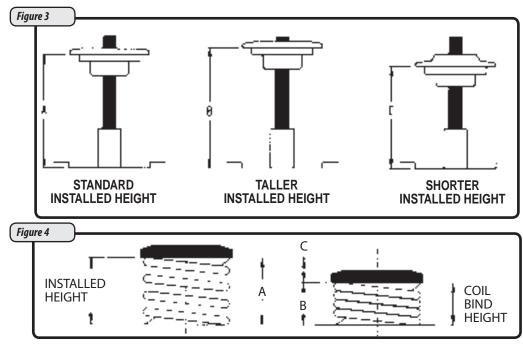
The taller the installed height, the less the valve spring tension and the further the spring can travel before coil bind occurs.

What is Valve Spring Coil Bind and How Does it Relate to Spring Travel and Valve Lift?

When the valve spring is compressed until its coils touch one another and can travel no further, it is said to be in coil bind. The catalog (pages 337 to 339) shows the approximate coil bind height for the various Crane Cams valve springs. To measure this you must install the retainer in the valve spring, then compress the spring until it coil binds. Now measure from the bottom side of the retainer to the bottom of the spring. This measurement is the coil bind height. (See Figure 4) This can be done on the cylinder head with a spring compression tool, in a bench vise, or in a professional valve spring tester.

Using Figure 4, subtract the coil bind height "B" from the valve spring installed height "A". The difference "C" is the maximum spring travel. The spring travel should usually be at least .060" greater than the full lift of the valve. This safety margin of .060" (or more) is necessary to avoid the dangers of coil bind and over-stressing the spring.

If coil bind occurs, the resulting mechanical interference will severely damage the camshaft and valve train components.



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Commonly Asked Valve Spring Questions

Commonly Asked Valve Spring Questions (continued)

How Do You Increase the Spring Travel?

The valve spring must have sufficient travel (plus .060" safety margin) to accommodate the amount of valve lift created by the camshaft and/or an increase in rocker arm ratio. To increase spring travel you can either raise the installed height (but this will lessen the spring tension), or change to a spring with additional travel. If there is not a standard diameter spring available with enough travel, then the cylinder heads will have to be machined and a larger spring installed.

Crane Cams offers some special valve springs in standard diameters which saves you from having to machine the cylinder heads. For example, a small block Chevrolet engine can use spring kit part no. **11309-1** to handle .550" to .600" valve lift. The 85-00 302 Ford hydraulic roller engines can use spring kit part no. **44308-1** to handle .550" lift. Consult the Buyers Guide for specific spring information and options.

Besides Coil Bind, What Other Types of Mechanical Interference Should You Look Out For?

When you increase the valve lift with a bigger cam or increased rocker arm ratio, you must be sure that there is no interference between any of the moving parts. Some of the components that must be inspected for clearance are:

- 1. Distance from the bottom of the valve spring retainer and the top of the valve stem guide (see Figure 5), or the top of the valve stem seal (see Figure 5), must be equal to the net valve lift of the valve plus at least .060" more for clearance.
- 2. When using rocker arms mounted on a stud, the length of the slot in the rocker arm body must be inspected to be sure it is long enough to avoid binding on the stud. The ends of the slot must be at least .060" away from the stud when the rocker is at full valve lift and when the valve is closed.

Crane Cams offers steel long slot and extra long slot rocker arms to relieve this interference problem. Aluminum roller rocker arms may be required to provide sufficient travel on larger lift camshafts.

- 3. The underside of the rocker arm body cannot touch the valve spring retainer. You will need at least .040" clearance to the retainer throughout the full movement of the rocker arm. If necessary, a different shape retainer or rocker arm design will be required. In some cases, installing a lash cap on the tip of the valve stem can provide the clearance required.
- 4. Valve to piston clearance must be checked to be sure there is sufficient clearance. The intake valve must have at least .100" clearance to the piston and at least .120" clearance on the exhaust valve.

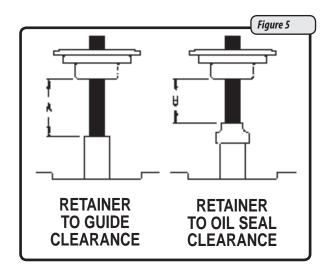
What is a Quick Way to Check Valve to Piston Clearance on an Assembled Engine?

Low tension checking springs, part no. **99881-2**, must be used (instead of your normal valve spring) to mock up your valve train and to check the piston to valve clearance on the engine. Assemble the valve train and verify correct lifter preload or valve lash. By mounting a dial indicator on the cylinder head with the plunger's tip on the valve spring retainer, you can quickly check the clearance. Hand rotate the engine through a complete cycle (two rotations of the crankshaft), stopping at several points before and after Top Dead Center (T.D.C.) to check the valve clearance. The least amount of clearance will usually occur between 15 degrees before T.D.C. and 15 degrees after T.D.C. This also provides a graphic illustration that gross valve lift does not determine piston to valve clearance, as the piston is fairly far down in the cylinder when maximum valve lift is reached. By pushing the rocker arm down with your finger, the valve will contact the piston. The amount of movement shown on the dial indicator is the valve clearance at that point of engine rotation. Rotate the crankshaft a few degrees and re-check the clearance. As the piston moves through this area, the dial indicator reading will lessen, then become larger as you rotate the engine past the critical point. The shortest reading you get is the actual valve to piston clearance.

What is the Critical Point of Crankshaft Rotation for Checking Valve to Piston Clearance?

The critical point for both valves is the "Overlap Period" as the exhaust cycle is ending and the intake cycle is beginning. You must start checking the clearance before and continue after T.D.C. on both the intake and exhaust valves to be sure you have the correct readings through the overlap period.

You can find all the tools required for checking valve to piston clearance (as well as degreeing a cam) in Crane Cams' Tune-A-Cam Kit, part no. **99030-1**.



Section Continued `



Cam and Valve Train Questions



Commonly Asked Valve Train Questions

What is meant by Basic RPM?

The camshaft's basic RPM is the RPM range within which the engine will produce its best power. The width of this power band is approximately 3000 to 3500 RPM with standard lifter cams, and 3500 to 4000 RPM with roller lifter cams. It is important that you select the camshaft with the "Basic RPM Range" best suited to your application, vehicle gearing and tire diameter.

Why is Cruise RPM at 60 MPH important?

When selecting a new camshaft, you can raise or lower the engine's basic RPM range. It is important to be sure the vehicle's drive train is capable of matching your selection. The cruise RPM at 60 MPH is a way of rating your rear end gearing and tire diameter to determine if these components match the RPM potential you are desiring. You can use the formulas and chart on page 15 to calculate your cruise RPM.

What is Camshaft Duration and why is it important?

Duration is the period of time, measured in degrees of crankshaft rotation, that a valve is open. Duration (at .050" lifter rise) is the deciding factor to what the engine's basic RPM range will be. Lower duration cams produce the power in the lower RPM range. Larger duration cams operate at higher RPM, but you will lose bottom end power to gain top end power as the duration is increased. (For each ten degree change in the duration at .050", the power band moves up or down in RPM range by approximately 500 RPM.)

What is the difference in Advertised Duration and Duration at .050" Lifter Rise (Tappet Lift)?

In order for duration to have any merit as a measurement for comparing camshaft size, the method for determining the duration must be the same. There are two key components for measuring duration— the degrees of crankshaft rotation and at what point of lifter rise the measurements were taken. Advertised durations are not taken at any consistent point of lifter rise, so these numbers can vary greatly. For this reason, advertised duration figures are not good for comparing cams. Duration values expressed at .050" lifter rise state the exact point the measurement was taken. These are the only duration figures that are consistent and can accurately be used to compare camshafts.

How does Valve Lift affect the operation of an engine?

Lift is the distance the valve actually travels. It is created by the cam lobe lift, which is then increased by the rocker arm ratio. The amount of lift you have and the speed at which the valve moves is a key factor in determining the torque the engine will produce.

What is Camshaft Lobe Separation and how does it affect the engine?

Lobe separation is the distance (in **camshaft** degrees) that the intake and exhaust lobe centerlines (for a given cylinder) are spread apart. Lobe separation is a physical characteristic of the camshaft and cannot be changed without regrinding the lobes. This separation determines where peak torque will occur within the engine's power range. Tight lobe separations (such as 106°) cause the peak torque to build early in basic RPM range of the cam. The torque will be concentrated, build quickly and peak out. Broader lobe separations (such as 112°) allow the torque to be spread over a broader portion of the basic RPM range and shows better power through the upper RPM.

What are Intake and Exhaust Centerlines?

The centerline of either the intake or exhaust lobe is the theoretical maximum lift point of the lobe in relationship to Top Dead Center in degrees of crankshaft rotation. (They are shown at the bottom of the camshaft specification card as "MAX LIFT.") The centerline of the cam can be moved by installing the camshaft in the engine to an advanced or a retarded position.

How does Advancing or Retarding the camshaft's position in the engine affect performance?

Advancing the cam will shift the basic RPM range downward. Four degrees of advance (from the original position) will cause the power range to start approximately 200 RPM sooner. Retarding it this same amount will move the power upward approximately 200 RPM. This can be helpful for tuning the power range to match your situation. If the correct cam has been selected for a particular application, installing it in the normal "straight up" position (per the opening and closing events at .050" lifter rise on the spec card) is the best starting point.

Why is it necessary to know the Compression Ratio of an engine in order to choose the correct cam?

The compression ratio of the engine is one of three key factors in determining the engine's cylinder pressure. The other two are the duration of the camshaft (at .050" lifter rise) and the position of the cam in the engine (advanced or retarded). The result of how these three factors interact with one another is the amount of cylinder pressure the engine will generate. (This is usually expressed as the "cranking pressure" that can be measured with a gauge installed in the spark plug hole.) It is important to be sure that the engine's compression ratio matches the recommended ratio for the cam you are selecting. Too little compression ratio (or too much duration) will cause the cylinder pressure to drop. This will lower the power output of the engine. With too much compression ratio (or too little duration) the cylinder pressure will be too high, causing pre-ignition and detonation. This condition could severely damage engine components. It is important to follow the guidelines for compression shown on the application pages of the catalog.

Section Continued



Cam and Valve Train Questions

Commonly Asked Valve Train Questions (continued)

How does Cylinder Pressure relate to the octane rating of today's unleaded fuel?

In very basic terms, the more cylinder pressure we make the more power the engine will produce. But look out for the fuel! Today's pump gasoline cannot tolerate excessive cylinder pressures. About 165 PSI with iron cylinder heads and 180 PSI with aluminum cylinder heads are reasonable limits to adhere to. Remember, cylinder pressure is affected by the static compression ratio and the camshaft specifications (primarily the intake valve closing event). Excessive pressures will cause detonation, resulting in internal engine damage. Octane boosters, or a racing grade of fuel, may be required to avoid difficulties.

How does an increase in Rocker Arm Ratio improve the engine's performance?

The lobe lift of the cam is increased by the ratio of the rocker arm to produce the final amount of valve lift. A cam with a .320" lobe lift using a 1.50:1 ratio rocker arm will have .480" valve lift (.320" x 1.50 = .480"). If you install rocker arms with an increased ratio of 1.60:1, with the same cam, the lift would increase to .512'' ($.320'' \times 1.60 = .512''$). The engine reacts to the movement of the valve. It doesn't know how the increased lift was generated. It responds the same way it would as if a slightly larger lift cam had been installed. In fact, since the speed of the valve is increased with the higher rocker arm ratio, the engine thinks it has also gained 2° to 4° of camshaft duration. The end result is an easy and quick way to improve the performance of the existing cam without having to install a new one. See the Buyers Guide section for availability of increased ratio rocker arms. Remember, whenever you increase the valve lift, with either a bigger cam or larger rocker arm ratio, you must check for valve spring coil bind and for other mechanical interference. Please review the previous sections concerning these mat-

Must new (Standard Design) lifters always be installed on a new camshaft?

YES! All new standard (flat-faced) hydraulic and mechanical camshafts must have new lifters installed. The face of these lifters do have a slight crown, and the mating lobe surface they ride on has been ground with a slight taper. The purpose of this is to create a "spinning" of the lifter as it rides on the lobe. This is necessary to prevent premature wear of the lifter and lobe. Therefore, these parts will be mated to one another during the initial break-in period. Used lifters will not mate properly, causing the lobe to fail.

If you are rebuilding an engine and plan to re-use the existing cam and lifters (in the same block) it can be done, as long as the lifter goes back on the same lobe it is mated to. To keep your components in order, a Crane Cams "Organizer Tray" part no. **99015-1** would be helpful. If the lifters get mixed up, they cannot be used, and a new set will be required. The new lifters would also have to go through the break-in procedure to mate to the old cam.

Can used Roller Lifters be installed on a new camshaft? YES. Roller lifters are the only ones that can be re-used. This design lifter has a wheel (supported by needle bearings) attached to the bottom of it. The lobe the roller lifter rides on does not have any taper. This is a very low friction design and does not require the lifter to mate to the cam. As long as the wheel shows no wear, and the needle bearings are in good condition, the hydraulic roller or mechanical roller lift-

What Engine Oil and Lubricants should I use?

er can be re-used.

Crane Cams does not recommend the use of synthetic oils during the initial break-in period for a new camshaft. Use a good quality grade of naturally formulated motor oil during this period. If you choose to use synthetic oil after the engine has been broken in, change the oil filter and follow the oil manufacturer's instructions.

When using either regular oil or synthetic it is important to pick the weight oil that best matches your engine bearing clearances, the engine's operating temperature, and the climate the vehicle will be operating in. Use the oil manufacturer's recommendation to satisfy these conditions.

Crane Cams offers lubricants to aid during the critical breakin procedure, and to prolong the engine's life. See the Buyers Guide section, page 303, for specific information on Crane Cams Lubricants and their application.

Should I use Oil Restrictors in my engine?

No, Crane Cams does not recommend the use of oil restrictors. The oil is the life blood of the engine, not only lubricating but cooling the engine components as well. For example, a valve spring builds in temperature as it compresses and relaxes. This increase of temperature affects the characteristics of the spring material, and if excessive, will shorten the life of the spring. Oil is the only means the spring has for cooling.

How do I prime the engine's oiling system?

It is critical that the engine's oiling system be primed before starting the newly built, or rebuilt, engine for the first time. This must be done by turning the oil pump with a drill motor to supply oil throughout the engine. If this is done with the valve covers off, you will be able to see that the oil is being delivered to the top of the engine and to all the valve train components. Crane Cams offers oil pump primers for Chevrolet and Ford engines, see page 331.

What is the Most Important thing to remember?

Reading and following the instructions supplied to you is most important. If there is something you don't understand, contact the people who supplied you the parts, or call one of the Crane Cams Technical Consultants. Get answers to your questions before proceeding.

Any non-roller camshaft and lifters must be pre-lubricated before installation. Use Crane Cams Assembly Lube, part number 99002-1, and Crane Cams Super-Lube, part number 99003-1.

Degreeing the Cam



Degreeing the Cam

What is Meant by Degreeing the Camshaft, and Why is it Necessary?

The term "Degreeing In Your Camshaft" means you are making sure the camshaft's position in the engine coincides with that of the crankshaft, so that their rotation is synchronized. This is the only way you will know if the rise and fall of the pistons properly matches the opening and closing of the valves, so the engine will run properly. A few degrees of misalignment can affect the engine's operation dramatically. If the circumstances were perfect, one would only need to line up the marks on the timing chain sprockets and the cam would be degreed. In reality, you are dealing with a group of components (the camshaft, crankshaft, timing chain, and sprockets), all with their own standards and tolerances. If these tolerances stack up against you, it could throw you out of alignment. Without degreeing the cam you can never be sure that the parts are in correct position. If you have the tools and expertise, we always recommend that the camshaft's position in the engine be degreed in.

Is There More Than One Way to Degree a Cam, and Which is Better?

Currently there are two popular methods for degreeing a cam: the **centerline method**, and the **duration at .050" lift method**. We believe it is far better to degree the camshaft with either method than not to degree the cam at all; but of the two methods, the **duration at .050" lift is much more accurate**.

The main problem with the centerline method is it has you finding the theoretical centerline of the intake and/ or exhaust lobe and line up on it. It makes the basic assumption that the lobe you are checking is symmetrical, with its opening side being the exact same shape and size as the closing side of the lobe. The truth is that most modern lobes are asymmetrical, with the opening side of the lobe being much more aggressive and the closing side being more gentle. Therefore, when you attempt to locate the middle (or centerline) of the asymmetrical lobe there is an automatic error factor. It could be as little as 2° off or as much as 6°, depending on the exact lobe shape and the procedure used during the degreeing operation. **Neither does it verify that** the camshaft has been properly ground with the correct duration lobes, which can drastically affect performance.

Since the duration at .050" lift method is not affected by the asymmetrical lobe design, we believe it is the more accurate way to degree.

What Tools Will I Need to Degree the Cam? The basic tools required are:

1. A degree wheel, such as Crane Cams part no. **99162-**1. You can also use a professional fully degreed damper or hub, or install degree tape to your stock damper. Be sure to get the tape that matches the diameter of the damper. Use whatever will give you accurate markings for 360°.

- 2. A stable pointer that can be conveniently mounted to the engine.
- 3. A dial indicator with at least a half inch of travel in .001" increments. A rigid stand that mounts to the engine or with a magnetic base to hold the dial indicator will also be required.
- 4. A positive stop device to locate T.D.C. such as Crane Cams part no. **99410-1** or **99412-1** will be necessary. (You can make your own by using an old spark plug. Remove the porcelain insides, then drill and tap the interior of the spark plug housing and thread a long bolt through it.)

All of the above tools are in the Crane Cams Tune-A-Cam Kit, part no. **99030-1**.



Tune-A-Cam Kit

Critical cam and valve train checking chores can be made easier, more accurate and faster when you have the correct tools handy. Crane Cams' Tune-A-Cam Kit, Part No. 99030-1, contains all the items required to degree-in your camshaft, check valve-to-piston clearance, etc. These items are all enclosed in their own foam protected, hard plastic carrying case.

Section Continued



Degreeing the Cam

Degreeing the Cam (continued)

How Do You Find Top Dead Center (T.D.C.)?

Determining exactly where Top Dead Center is can be tricky. The problem in finding the true T.D.C. of the piston's travel is that the piston dwells at T.D.C. for several degrees of crankshaft rotation. You must use a device to stop the piston in the same position on either side of T.D.C. and take readings from the degree wheel. You will then split the difference in these readings and move the pointer this amount, making it the true T.D.C. point.

Begin the procedure by first mounting the degree wheel on the end of the crankshaft securely, and rotating the engine to approximately T.D.C. Mount the pointer and line it up at zero on the degree wheel. Now rotate the engine to move the piston down into the cylinder. Install your positive stop device into the spark plug hole and extend the bolt. Now hand turn the engine (do not use the starter motor or you will put a **hole through the piston**), rotating it until the piston comes up and stops against the bolt. Look at the degree wheel and write down the number of degrees shown by the pointer. Hand turn the engine in the opposite direction until the piston comes up and stops on the bolt again. Go back to the degree wheel and write down the degrees it now reads. Add these two readings together and divide the answer by two. Now either move your pointer by this many degrees, or carefully loosen the degree wheel (without disturbing the position of the crankshaft) and move the wheel this required amount. Retighten the bolts, and rotate the engine again making sure that the readings on each side of T.D.C. are equal degrees away from zero. If they are, the zero on the degree wheel will now be the true T.D.C. point.

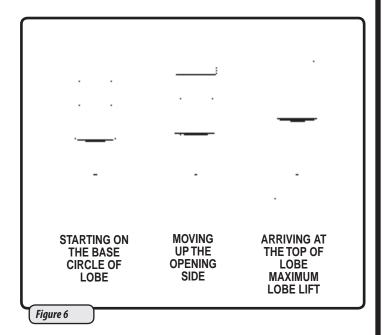
Be sure to remove the positive stop device from the spark plug hole, as this procedure is complete.

A Simple Explanation of Cam Degreeing

In simple terms, the degreeing process can be thought of as using a dial indicator and degree wheel as tools to map out one revolution around the cam lobe. You will start on the base circle of the lobe where there is no lift. (See Figure 6) Then by rotating the engine you will move up the opening side, go over the top of the lobe, then move down the closing side, finishing back on the base circle. The dial indicator will move from zero, up to maximum lobe lift, then back to zero during this revolution. You will watch the dial indicator, and stop at two key points to take readings from the degree wheel. Both points will be when the dial indicator shows .050" of lifter rise. This .050" reading will occur on the opening side and again on the closing side of the lobe. These readings will then be compared to the specification card to see how close you are. If necessary, corrections can be made to put the camshaft in the exact position.

Important Tips to Remember When Degreeing a Camshaft

- 1. You must always use the same type and size lifter that your camshaft was designed for. For example, you cannot use a .842" diameter lifter on a camshaft designed for a .875" diameter lifter. You cannot use a standard (flat) lifter to degree a roller camshaft. If your roller camshaft was designed to use a .920" diameter roller, it will not degree properly with a .750" diameter roller, etc.
- Clean off any excessive lubricant from the lobes and lifters that you are checking. Thick oil, especially assembly lube (paste) can cause false readings to occur. Wipe the parts clean before checking, and remember to re-lubricate them when you are finished.
- 3. If you make a mistake and rotate the engine past the point you wished to take a reading, **do not back up the rotation**. If you do, any slack in the timing chain or lash in the gears will affect the readings, causing an error. If you miss your stopping point, just continue rotating the engine in the normal direction until you return to the desired point.



Section Continued



Degreeing the Cam



Degreeing the Cam (continued)

The Procedure to Degree the Camshaft

- 1. The dial indicator and stand must be attached securely to the engine. Any deflection could cause an error in your readings. Using the number one cylinder as a starting point, hand rotate the engine in a normal direction (usually clockwise, when standing in front of the engine) until the intake valve is closed (the lifter is down on the base circle of the cam lobe). If the intake manifold is off the engine, mount the plunger of the indicator directly on top of the intake lifter itself. If the intake manifold is on the engine, you can use the pushrod as an extension to the dial indicator and mount the plunger tip directly on top of the pushrod. In either case, it is important to make sure the angle of the dial indicator plunger is the same angle as the lifter or pushrod travel. We want to read "straight line" (linear) movement of these parts, so the plunger must be aligned properly. With the indicator in position, set the dial indicator to zero.
- 2. Hand rotate the engine in its normal direction of rotation while watching the dial indicator. As the lifter starts to move up the opening side of the lobe, the reading on the dial indicator will start to increase. Continue rotating the engine until the dial indicator shows .050" of rise. Stop and take a reading on the degree wheel and write it down.
- 3. As you continue to rotate the engine, the reading on the dial indicator will rise up to the maximum lobe lift. The lifter is now on the top of the lobe. (The maximum lobe lift is shown on the spec card and can be verified at this point). Continue the rotation and the lifter will start down the closing side of the lobe. Carefully watch the dial indicator as the numbers descend. When the indicator descends back to the .050" reading, stop, take a reading from the degree wheel and write it down. Rotate the engine and return to the base circle of the lobe. The dial indicator must read zero again to be sure the process was correctly done.
- 4. You now have the two important readings from the degree wheel, both taken when the dial indicator read .050". One reading as the indicator was ascending on the opening side, the other when it was descending on the closing side. Compare these numbers to those on your camshaft inspection card to verify the position of the intake lobe. The camshaft specification card provides much information, but the numbers you are most interested in for the degreeing of the cam are at the bottom of the card. In the box identified as "Cam timing at .050" Tappet Lift". (Just a reminder, the word tappet and lifter mean the same thing. This can also be expressed as .050" lifter rise.) Inside this box are the degree readings that the degree wheel would show for the intake "opening" side of the lobe and the intake "closing" side of the lobe when the dial indicator is at .050" of lift. (Below those figures are the opening and closing figures for the exhaust.) Compare your readings for the intake to those on the card. If you're within a

- degree, your camshaft is installed in the correct position. (See example of Specification Card on next page.)
- 5. You can follow exactly the same procedure on the exhaust lobe to determine its opening and closing degree points at .050" of tappet (or lifter) rise, and compare these readings to those on the specification card. If you also check the exhaust lobe you will have four points of reference (intake opening and closing, and the exhaust opening and closing) to go by. Remember, if you are within plus or minus one degree of these readings, your cam is in the correct location and will be synchronized to the crankshaft's rotation.

What Can You Do If Your Camshaft is Off Of Location and Needs Correction?

There are several methods of adjusting the location of the camshaft to correct for misalignment. Most high performance timing chain sets have the lower crank sprocket machined with three or more keyways, allowing you to advance or retard the camshaft. There are also offset keys made for the crankshaft. Another popular method is offset eccentric timing bushings that can be installed in the upper camshaft sprocket to change the camshaft's position in relation to the sprocket on those camshafts that use a dowel pin for indexing. Use any of these methods, then degree the camshaft once again to be sure it is correct.

See the Buyers Guide section for degreeing bushings and performance timing chain sets.

Cam Timing Explained

Cam Timing Explained

Cam advance, lobe separation, lobe centerline, intake lobe centerline, etc. are all terms being used for comparing and devising camshaft specifications. With so many similar terms being used, there can be a bit of confusion when folks from different backgrounds start talking about them.

Lobe separation is the measurement in CAM degrees between the maximum lift point of the exhaust lobe to the maximum lift point of the intake lobe on any cylinder. Some also refer to this as lobe centerline. This dimension is ground into the camshaft and can not be changed by advancing or retarding the camshaft (unless it's an engine with separate intake and exhaust cams.)

Intake lobe centerline, or intake maximum lift, refers to the distance in crankshaft degrees from the cylinder's Top Dead Center point to the maximum lift point of the intake lobe on any one cylinder. This is usually measured as degrees After Top Dead Center. This figure WILL change when the cam is advanced or retarded. As you advance the cam, this number will get smaller, as you are opening it fewer degrees AFTER Top Dead Center. Retarding the cam will make this number larger, as you are opening it more degrees AFTER Top Dead Center.

Exhaust lobe centerline, or exhaust maximum lift, is usually expressed in crankshaft degrees Before Top Dead Center. As you advance the cam, this number will get larger, since you are opening it more degrees BEFORE Top Dead Center. Retarding the cam will make this number smaller.

The average of the intake lobe centerline and the exhaust lobe centerline should equal your lobe separation.

The cam timing figures (as measured at a specific lobe lift: .004", .020", .050", etc.) may show the maximum lift point to be distorted when you're dealing with nonsymmetrical camshaft lobes (the opening side has a different shape than the closing side). If you split the difference between the opening and closing figures at .020" or .050" lobe lift, this figure will not coincide with the actual maximum lift point of the lobe. There are instances where a non-symmetrical intake lobe is paired with a symmetrical exhaust lobe (or vice-versa), or lobes with varying amounts of non-symmetry may be used as intake and exhaust. We believe that where the opening and closing events actually occur are the most important figures to pay attention to when degreeing your camshaft. Just finding the maximum lift points doesn't really tell you anything about the camshaft, or it's even the correct camshaft! By documenting the opening and closing numbers as you tune, you will gain more knowledge as to what actually helps or hinders your performance. This is also a good time to emphasize keeping track of your cranking compression whenever you change valve lash, cam timing, rocker arm ratio, and especially when changing camshafts.

You may have noticed that most Crane Cams have a certain amount of advance ground into them when you check out the cam specification card. This is primarily done to insure that you have adequate torque to establish a good performance baseline. We have also found over the years, that the correct camshaft for most applications will run best with some amount of advance in it. We believe that it's certainly better to begin with too much bottom end and mid-range torque, and tune from there, than to have a shortage of torque, and try to figure out how to compensate for that.

The following is a general rule for how we grind most of our camshafts:

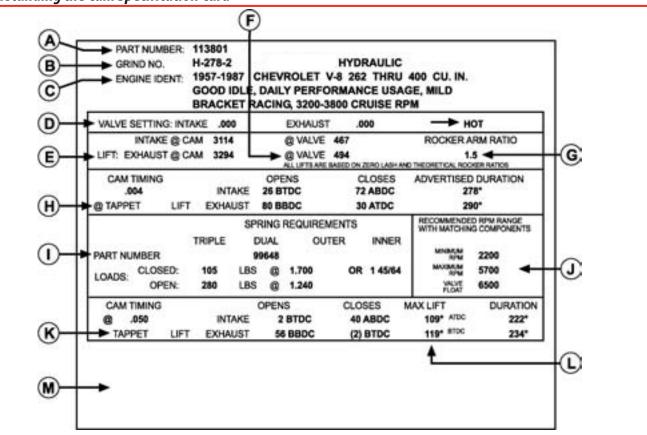
Lobe Separation	Degrees Advance
Up to 102	0
103-104	2
105	3
106-107	4
108 or more	5

This has certainly not been a list of all of the terms and philosophies we use when producing our camshafts, but it will hopefully provide a bit of insight as to some of our methods of camshaft recommendation and production. We invite any questions or comments that you may have.

Understanding the Cam Specification Card



Understanding the Cam Specification Card



- **Part Number**
- **Grind Number** refers to engineering design information only. (This is not a part number)
- **Identification** of the engine series
- Recommended **valve setting** for the particular cam shaft profile. This represents the running clearance or Valve Lash required. This setting is chosen for maximum performance and valve train reliability.
- **Cam lobe lift** as measured at the lifter (tappet) with a dial indicator having .500 inch minimum travel capacity.
- The **valve lift** data is determined by multiplying the cam lobe lift by the rocker arm ratio.
- **G.** The **rocker arm ratio** listed is the engine manufacturer's standard specified (or otherwise recommended) ratio.
- **H.** The **cam timing** events used to compute advertised duration. The opening and closing events, and at what lifter rise (tappet lift) they were taken, show how the advertised duration is calculated.

Example:

26° B.T.D.C. Intake Opening Crankshaft Rotation

+ 180° + 72° A.B.D.C. Intake Closing

Advertised Duration $= 278^{\circ}$

These events are not meant for degreeing the cam. You should use the events (K) at .050" lifter rise (tappet lift) only for best accuracy.

- The **valve spring** requirements shown represent the maximum safe closed and open spring loads, and the most reliable valve springs for the camshaft profile and valve train combination.
- **Recommended RPM** range is to be used as a guideline. This will vary depending on engine displacement and other equipment combinations.
- **Cam timing** figures at .050" lifter rise (tappet lift) are provided for degreeing of the camshaft. They are expressed in degrees of crankshaft rotation. See pages 405-407 for additional degreeing information.
- **L.** The **maximum lift** (centerline) figures shown represent the theoretical maximum lift points of the intake and exhaust lobe centerlines. Due to most modern cam lobe designs being asymmetrical, this may not be the actual point at which the centerline occurs. This figure is provided as a point of reference and **should not be used** to degree a camshaft.
- M. When necessary, special instructions are provided at the bottom of the cam card.

Ignition Excellence

Ignition Excellence

The Crane Cams Ignition product line is the most technologically advanced in the aftermarket ignition industry. Crane's ignitions and electronics are designed using the latest in cutting edge high technology, introducing unique and innovative products each year.

The Crane Cams Ignition line includes high output ignition for street performance, points replacements, drag racing, oval track racing, road racing, high output coils, distributors, and spark plug wire.

Advanced Manufacturing Processes

Crane Ignitions and accessories are manufactured using a highly automated process. Assembly is performed almost entirely using high speed automated equipment, far more accurate than it could be done by hand. Computer based test steps, again, a task that could not be done by hand effectively

Crane Ignitions are assembled using the finest quality grade components, automated manufacturing equipment, and the highest quality assurance to provide you with a product that is far superior in performance and reliability, at an affordable price.



Powerful and Reliable!

Crane Cams Ignition systems are tested in the lab and on the track as a proven ignition for daily street use or all out racing, where reliability is primary.

From the start, our engineers and technicians have been committed to designing systems that have the most current technology, the finest components, and the most advanced manufacturing processes. The result is a product line that makes us proud and performs for you.

A Winning Future Begins Here for You...

Powered by Crane Cams Ignitions!

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Street Performance, Trucks, Trailer-Towing, RV's

HI-6S Multi-Spark/Inductive Ignition

- For 4, 6, 8 cylinder with distributor.
- Up to 70% more spark-gap energy than stock ignitions!
- Max output up to 8,000 RPM for up to 9.5:1 comp. ratio!
- Soft-urethane encapsulation seals against moisture, dirt, dust, vibration, heat!
- Points or module triggered.
- Built-in adj. rev limiter in 100 RPM increments from 3100-9900 RPM.
- Inductive ignition with long duration spark.
- Low cost boost retard (with optional MAP sensor) or 0-20° selectable nitrous retard.



Applications

Applications	
Description	Part No.
HI-6S Ignition-Only For computer-controlled cars/trucks without vacuum advance. Triggers from stock electronic ignition. Not compatible with distributorless ignitions. 50 states legal CARB E.O., D-225-59.	6000-6300
HI-6S and Coil Kit – Ford Applications HI-6S and PS-91 coil for 1985-95 Ford TFI-IV applications, including Mustang 5.0 H.O. Will not work with distributorless ignitions. 50 states legal CARB E.O., D-225-59.	6000-6301
HI-6S and PS91 Coil Kit – GM Applications HI-6S and PS-91 coil for late model GM applications with dual plug coil (not LT-1). Will not work with distributorless ignitions. 50 states legal CARB E.O., D-225-59.	6000-6302
HI-6S and LX91 Coil Kit — Universal Applications	6000-6305

Recommended Coils

Description	Part No.
LX91 E-Core Coil, Lightweight, Low-Profile, with Black Aluminum Bracket.	730-0891
PS91 E-Core Coil With Plated-Steel Bracket.	730-0091
PS60 Canister Style Coil.	730-0060

Specifications

Specifications.	
Operating voltage	6 to 18v, reverse polarity protected, neg. ground
Current draw	5.0 amps max. at 7,000 RPM
RPM operating range	8,000 RPM (can be extended to 10,000 RPM on 4 cyl. engines).
RPM limiter range	3,100 to 9,900 RPM when digital stage rev limiter mode selected.
Multiple Spark Duration	Approximately 20 degrees crank shaft rotation below 2,000 RPM. Max 12 sparks per sequence.
Primary voltage output	450 volts (inductive discharge)
Spark duration	2,800 microseconds at 2,000 RPM
Trigger input	Module trigger (12v square wave).
Dimensions	5-1/2″L x 3″W x 1-1/2″H, 2-3/8 lbs.

Street Performance, Trucks, Trailer-Towing, RV's Cams

HI-6S Multi-Spark/Inductive Ignition

A. TRC-2 Timing Retard Control (For Nitrous-Oxide, Supercharged, Turbo, Towing, RV, etc.)

Driver adjustable 0-20 degree timing retard (not req. for HI-6S built-in retard modes). Three retard modes: continuous, demand and boost proportional. Mounts underdash. **Part No. 6000-6425**



B. MAP "Manifold Absolute Pressure" Sensor (2 Bar)

Used as boost sensor for boost proportional retard with optional TRC-2 Timing Retard Control.

Part No. 9000-0110



C. Optical Trigger (Allows Use Of HI-6S on Points Distributor Models)

Replaces breaker points and triggers HI-6S. Use HI-6S on pre-1975 vehicles, replacing stock breaker points, and some 1974-83 imports. 12 volt negative ground only. Requires separate installation kit.

Part No. 715-0020





730-0891



730-0091



730-0060

Street, Street Performance, Race

HI-6/Digital Multi-Spark CD Ignition

- HI-6 (Pt. No. 6000-6440) delivers higher spark-gap current* than comparable digital CD ignitions!
- Multi-Spark CD, for race, street, up to 14.5:1 compression ratio, nitrous-oxide, supercharged and turbo. More HP, torque, crisper throttle response! For 4, 6, 8 cylinder with distributor.
- Bigger rotary switches with precise "Click-In" detents for easy rev limit adjustments. No "chips" needed. Adjusts in 100 RPM increments.
- Sequential rev limiting stops engine damaging "popping and banging" at rev limit.
- Built-in timing retard available with optional Control Module, Pt. No. 6000-6425.
- Points, module, mag triggered.
- Fully potted with new, soft urethane for heat, dirt and moisture protection.
- Surface-mount, fully digital components. The most reliable CD ignition available.
- CARB E.O., D-225-66



Description	Part No.
HI-6 Capacitive Discharge Multi-Spark Ignition, black	6000-6440
HI-6 and LX92 Coil Kit - Universal Applications	6000-6445

Recommended Coils

Description	Part No.
LX92 E-Core Coil Lightweight, Low-Profile, with Black Aluminum Bracket.	730-0892
PS92 E-Core Coil With Plated-Steel Bracket.	730-0092



Specifications

_	
Operating voltage	6 to 18v, reverse polarity protected, neg. ground only
Current draw	7.0 amps max. at 10,000 RPM
RPM operating range	12,000 RPM (with rev limiter disabled).
RPM limiter range	600 to 9,900 RPM in 100 RPM increments.
RPM limiter accuracy	±30 RPM
Timing accuracy	± 0.5 degrees from 500 to 9,900 RPM
Multiple Spark Duration	20 degrees crankshaft rotation below 3,000 RPM. Max 12 sparks per sequence with 1 millisecond interval between sparks.
Primary voltage output	450 volts
Primary energy output	1200 millijoules/sequence
Peak spark gap current	380 milliamps with LX91 coil, 510 milliamps with LX92 coil.
Dimensions	8"L x 4-1/2"W x 2"H; 4-1/2 lbs.

*Must use Crane FireBall LX-92 coil Pt. No. 730-0892 for maximum ignition output.

Street, Street Performance, Race



HI-6/Digital Multi-Spark CD Ignition

Optional HI-6 Accessories

A. TRC-2 Timing Retard Control (For Nitrous-Oxide, Supercharged, Turbo, Towing, RV, etc.)

Driver adjustable 0-20 degree timing retard. Three retard modes: continuous, demand and boost proportional. Mounts underdash.

Part No. 6000-6425



B. MAP "Manifold Absolute Pressure" Sensor (2 Bar)

Used as boost sensor for boost proportional retard with optional TRC-2 Timing Retard Control.

Part No. 9000-0110



C. HI-6 Tach Adapter For Module Trigger Applications

Required for some 1981-1995 non-OBD II applications triggering the HI-6 from the stock electronic ignition module. Connects to trigger input on HI-6 and feeds high voltage pulse required for tachometer and fuel injection operation back into the stock engine control system.

Part No. 6000-8910



D. Optical Trigger (Allows Use Of HI-6 on Points Distributor Models)

Replaces breaker points and triggers HI-6. Use HI-6 on pre-1975 vehicles, replacing stock breaker points, and some 1974-83 imports. 12 volt negative ground only. Requires separate installation kit.

Part No. 715-0020





730-0892



730-0092

Street, Street Performance, Race

HI-6R/Digital Multi-Spark CD Ignition

- Multi-Spark CD, for race, street, up to 14.5:1 compression ratio, nitrous-oxide, supercharged and turbo.
 More HP, torque, crisper throttle response! For 4, 6, 8 cylinder with distributor.
- HI-6R (Pt. No. 6000-6400) delivers higher spark-gap current* than comparable digital CD ignitions!
- Built-in timing retard available with optional Control Module, Pt. No. 6000-6425.
- "Plug-n-Go" universal harness included.
- Sequential rev limiting stops engine damaging "popping and banging" at rev limit.
- Bigger rotary switches with precise "Click-In" detents for easy rev limit adjustments. No "chips" needed. Adjusts in 100 RPM increments.
- Shock mounts included for race conditions.
- Points, Mag, or Module triggered.
- Fully potted with new, soft urethane for heat, dirt and moisture protection.
- Surface-mount, fully digital components. The most reliable CD ignition available.
- CARB E.O., D-225-52



Description	Part No.
HI-6R Racing CD Ignition	6000-6400
HI-6R and LX92 Coil Kit - Universal Applications	6000-6405

Recommended Coils

Description	Part No.
LX92 E-Core Coil Lightweight, Low-Profile, with Black Aluminum Bracket.	730-0892
PS92 E-Core Coil With Plated-Steel Bracket.	730-0092



Specifications

Operating voltage	6 to 18 volts, reverse polarity protected, negative ground only
Current draw	7.0 amps max at 10,000 RPM
RPM operating range	12,000+ RPM (with rev limiter disabled).
RPM limiter range	600 to 9,900 RPM in 100 RPM increments
RPM limiter accuracy	±30 RPM
Timing accuracy	± 0.5 degrees from 500 to 9,900 RPM
Multiple Spark Duration	20° crankshaft rotation below 3,000 RPM. Maximum 12 sparks per seq. with 1 mil- lisecond interval between sparks.
Primary voltage output	450 volts
Primary energy output	1200 millijoules/sequence
Peak spark gap current	380 milliamps with LX91 coil, 510 milliamps with LX92 coil
Dimensions	8"L x 4-1/2"W x 2"H, 4-1/2 lbs

*Must use Crane FireBall LX-92 coil Pt. No. 730-0892 for maximum ignition output.



HI-6R/Digital Multi-Spark CD Ignition

Optional HI-6R Accessories

A. TRC-2 Timing Retard Control (For Nitrous-Oxide, Supercharged, Turbo, Towing, RV, etc.)

Driver adjustable 0-20 degree timing retard. Three retard modes: continuous, demand and boost proportional. Mounts underdash.

Part No. 6000-6425



B. MAP "Manifold Absolute Pressure" Sensor (2 Bar)

Used as boost sensor for boost proportional retard with optional TRC-2 Timing Retard Control.

Part No. 9000-0110



C. HI-6R Tach Adapter For Module Trigger Applications

Required for some 1981-1995 non-OBD II applications triggering the HI-6R from the stock electronic ignition module. Connects to trigger input on HI-6R and feeds high voltage pulse required for tachometer and fuel injection operation back into the stock engine control system.

Part No. 6000-8910



D. Optical Trigger (Allows Use Of HI-6R on Points Distributor Models)

Replaces breaker points and triggers HI-6R. Use HI-6R on pre-1975 vehicles, replacing stock breaker points, and some 1974-83 imports. 12 volt negative ground only. Requires separate installation kit.

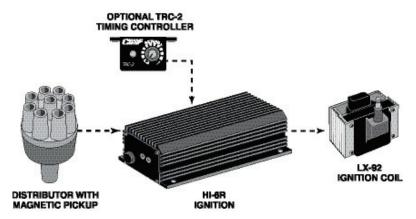
Part No. 715-0020



E. Shock/Vibration Mounts

To smooth out the ride for your ignition and coil (#10-32 thread). Set of 4. **Part No. 1000-1032**





Street Performance, Race, Turbo

HI-6TRC CD Ignition with Timing Retard

- 0-20° driver adjustable timing retard in under dash mount.
- Multi-Spark CD, for race or street, up to 14.5:1 compression ratio, nitrous-oxide, supercharged and turbo. More HP, torque, crisper throttle response! For 4, 6, 8 cylinder with distributor.
- HI-6TRC (Pt. No. 6000-6466) delivers higher spark-gap current* than comparable digital CD ignitions!
- Sequential rev limiting stops engine damaging "popping and banging" at rev limit.
- Bigger rotary switches with precise "Click-In" detents for easy rev limit adjustments.
 No "chips" needed. Adjusts in 100 RPM increments.
- Shock mounts included for race competition.
- Adapter harness included.
- Surface-mount, fully digital components. The most reliable CD ignition available.
- Fully potted with new, soft urethane for heat, dirt and moisture protection.
- Points, Mag, or Module triggered.
- CARB E.O., D-225-49



Description	Part No.
HI-6TRC Racing CD Ignition Includes Part No's. 6000-6400 and 6000-6425	6000-6466

Recommended Coils

Description	Part No.
LX92 E-Core Coil Lightweight, Low-Profile, with Black Aluminum Bracket.	730-0892
PS92 E-Core Coil With Plated-Steel Bracket.	730-0092





Specifications

Operating voltage	6 to 18 volts, reverse polarity protected, negative ground only
Current draw	7.0 amps max at 10,000 RPM
RPM operating range	12,000+ RPM (with rev limiter disabled).
RPM limiter range	600 to 9,900 RPM in 100 RPM increments
RPM limiter accuracy	±30 RPM
Timing accuracy	±0.5 degrees from 500 to 9,900 RPM
Multiple Spark Duration	20° crankshaft rotation below 3,000 RPM. Maximum 12 sparks per seq. with 1 mil- lisecond interval between sparks.
Primary voltage output	450 volts
Primary energy output	1200 millijoules/sequence
Peak spark gap current	380 milliamps with LX91 coil, 510 milliamps with LX92 coil
Dimensions	8"L x 4-1/2"W x 2"H, 4-1/2 lbs

*Must use Crane FireBall LX-92 coil Pt. No. 730-0892 for maximum ignition output.

Street Performance, Race, Turbo



HI-6TRC CD Ignition with Timing Retard

Optional HI-6TRC Accessories

A. MAP "Manifold Absolute Pressure" Sensor (2 Bar)

Used as boost sensor for boost proportional retard with optional TRC-2 Timing Retard Control.

Part No. 9000-0110



B. HI-6TRC Tach Adapter For Module Trigger Applications

Required for some 1981-1995 non-OBD II applications triggering the HI-6TRC from the stock electronic ignition module. Connects to trigger input on HI-6TRC and feeds high voltage pulse required for tachometer and fuel injection operation back into the stock engine control system.

Part No. 6000-8910



C. Optical Trigger (Allows Use Of HI-6TRC on Points Distributor Models)

Replaces breaker points and triggers HI-6TRC. Use HI-6TRC on pre-1975 vehicle, replacing stock breaker points, and some 1974-83 imports. 12 volt negative ground only. Requires separate installation kit.

Part No. 715-0020



D. Shock/Vibration Mounts

To smooth out the ride for your ignition and coil (#10-32 thread). Set of 4. **Part No. 1000-1032**





730-0892



730-0092



Compliment your Fire Power with Crane Cams' FireWire!

HI-6DSR Dual Stage Rev Limiter CD Ignition

- Dual stage rev limiting from 600 to 9900 RPM!
- Bigger rotary switches with precise "Click-In" detents for easy rev limit adjustments. No "chips" needed. Adjusts in 100 RPM increments.
- HI-6DSR (Pt. No. 6000-6424) delivers higher spark-gap current* than comparable digital CD ignitions!
- Built-in timing retard available with optional Control Module, Pt. No. **6000-6425**.
- Multi-Spark CD, for race, street, up to 14.5:1 compression ratio, nitrous-oxide, supercharged and turbo. More HP, torque, crisper throttle response! For 4, 6, 8 cylinder with distributor.
- Sequential rev limiting stops engine damaging "popping and banging" at rev limit.
- Adapter harness included.
- Surface-mount, fully digital components. The most reliable CD ignition available.
- Fully potted with new, soft urethane for heat, dirt and moisture protection.
- Points, Mag, or Module triggered.
- CARB E.O., D-225-63

Applications

Description	Part No.
HI-6DSR CD Ignition with Dual Stage Rev Limiting	6000-6424

Recommended Coils

Description	Part No.
LX92 E-Core Coil Lightweight, Low-Profile, with Black Aluminum Bracket.	730-0892
PS92 E-Core Coil With Plated-Steel Bracket.	730-0092



Specifications

Operating voltage	6 to 18 volts, reverse polarity protected, negative ground only
Current draw	7.0 amps max at 10,000 RPM
RPM operating range	12,000+ RPM (with rev limiter disabled).
RPM limiter range	600 to 9,900 RPM in 100 RPM increments
RPM limiter accuracy	±30 RPM
Timing accuracy	± 0.5 degrees from 500 to 9,900 RPM
Multiple Spark Duration	20° crankshaft rotation below 3,000 RPM. Maximum 12 sparks per seq. with 1 mil- lisecond interval between sparks.
Primary voltage output	450 volts
Primary energy output	1200 millijoules/sequence
Peak spark gap current	380 milliamps with LX91 coil, 510 milliamps with LX92 coil
Dimensions	8"L x 4-1/2"W x 2"H, 4-1/2 lbs

*Must use Crane FireBall LX-92 coil Pt. No. 730-0892 for maximum ignition output.

Street Performance, Race, Turbo



HI-6DSR Dual Stage Rev Limiter CD Ignition

Optional HI-6DSR Accessories

A. TRC-2 Timing Retard Control (For Nitrous-Oxide, Supercharged, Turbo, Towing, RV, etc.)

Driver adjustable 0-20 degree timing retard. Three retard modes: continuous, demand and boost proportional. Mounts underdash.

Part No. 6000-6425



B. MAP "Manifold Absolute Pressure" Sensor (2 Bar)

Used as boost sensor for boost proportional retard with optional TRC-2 Timing Retard Control.

Part No. 9000-0110



C. HI-6DSR Tach Adapter For Module Trigger Applications

Required for some 1981-1995 non-OBD II applications triggering the HI-6DSR from the stock electronic ignition module. Connects to trigger input on HI-6DSR and feeds high voltage pulse required for tachometer and fuel injection operation back into the stock engine control system.

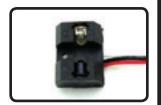
Part No. 6000-8910



D. Optical Trigger (Allows Use Of HI-6DSR on Points Distributor Models)

Replaces breaker points and triggers HI-6DSR. Use HI-6DSR on pre-1975 vehicle, replacing stock breaker points, and some 1974-83 imports. 12 volt negative ground only. Requires separate installation kit.

Part No. 715-0020



E. Shock/Vibration Mounts

To smooth out the ride for your ignition and coil (#10-32 thread). Set of 4. **Part No. 1000-1032**



_

D.



730-0892



730-0092

Oval Track, Race

HI-6RC Digital CD Ignition

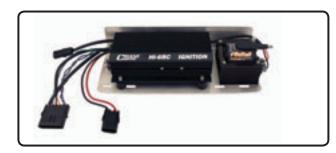
- Built-in 20 degree start retard feature, up to 600 RPM.
- Bigger rotary switches with precise "click-in" detents for easy rev limit adjustments. No "chips" needed.
- Adjusts in 100 RPM increments, 900-9,900 RPM.
- Shock mounts included for race conditions.
- Fully potted with new, soft urethane for heat, dirt and moisture protection.
- Surface-mount, fully digital components.
- The most reliable CD ignition available.
- Multi-Spark for quick, clean start up.
- CD (Capacitive Discharge) Ignition.
- Digital design for precise operation.
- · Sequential rev limiter for longer engine life.

Part Number 6000-6700



•		
Operating voltage	6 to 18 volts, reverse polarity protected, negative ground only	
Current draw	7.0 amps max at 10,000 RPM	
RPM operating range	12,000+ RPM (with rev limiter disabled).	
RPM limiter range	600 to 9,900 RPM in 100 RPM increments	
RPM limiter accuracy	±30 RPM	
Timing accuracy	± 0.5 degrees from 500 to 9,900 RPM	
Multiple Spark Duration	20° crankshaft rotation below 3,000 RPM. Maximum 12 sparks per seq. with 1 mil- lisecond interval between sparks.	
Primary voltage output	450 volts	
Primary energy output	1200 millijoules/sequence	
Peak spark gap current	380 milliamps with LX91 coil, 510 milliamps with LX92 coil	
Dimensions	8"L x 4-1/2"W x 2"H, 4-1/2 lbs	





Ignition Kit

Description	Part No.
HI-6RC Ignition and Coil Kit (as shown)	6000-6701
Replacement Mounting Tray	6000-6363P

Recommended Coil

Description	Part No.
PS92N E-Core Coil	730-0192

Approved for These Sanctioning Bodies:

American Modified Series, ARCA/CRA Super Series, ARCA Midwest Tour, Blizzard Series, JEGS/CRA All Star Tour, PASS, Snowball Derby, Southern Super Series, USMTS, USRA, WISSOTA Racing Series



HI-6RN Digital CD Ignition

- Multi-spark for quick, clean start-up.
- CD (Capacitive Discharge) Ignition.
- Digital design for precise operation.
- Sequential rev limiter for longer engine life.
- Bigger rotary switches with precise "click-in" detents for easy rev limit adjustments. No "chips" needed.
- Adjusts in 100 RPM increments, 900–9,900 RPM.
- Shock mounts included for race conditions.
- Fully potted with soft urethane for heat, dirt and moisture protection.
- Surface-mount, fully digital components.
- The most reliable CD ignition available. No need to run an extra ignition for backup.

Part Number 6000-6750



Specifications

•	
Operating voltage	6 to 18 volts, reverse polarity protected, negative ground only
Current draw	7.0 amps max at 10,000 RPM
RPM operating range	12,000+ RPM (with rev limiter disabled).
RPM limiter range	600 to 9,900 RPM in 100 RPM increments
RPM limiter accuracy	±30 RPM
Timing accuracy	±0.5 degrees from 500 to 9,900 RPM
Multiple Spark Duration	20° crankshaft rotation below 3,000 RPM. Maximum 12 sparks per seq. with 1 mil- lisecond interval between sparks.
Primary voltage output	450 volts
Primary energy output	1200 millijoules/sequence
Peak spark gap current	380 milliamps with LX91 coil, 510 milliamps with LX92 coil
Dimensions	8"L x 4-1/2"W x 2"H, 4-1/2 lbs

Recommended Coil

Description	Part No.
PS92N E-Core Coil	730-0192

Approved for These Sanctioning Bodies

American Modified Series, ARCA/CRA Su per Series, ARCA Midwest Tour, IMCA, JEGS/CRA All Star Tour, PASS, Snowball Derby, USMTS, USRA, WISSOTA Racing Series

Oval Track, Race

HI-6RL Rev Limited Series

- Preset rev limiter in factory "sealed" unit, per sanction rules.
- Fully digital design since 1994.
- Multi-spark CD Ignition for fast start-up.
- Weatherpak® connectors.
- Magnetic trigger input.
- Tachometer input.
- LED light for power and trigger signal.
- Potted with soft urethane to seal from dirt, oil, moisture and vibration.
- Lightweight aluminum housing with cooling fins.





Specifications

Operating voltage	6 to 18 volts, reverse polarity protected, negative ground only
Current draw	7.0 amps max at 10,000 RPM
RPM limiter accuracy	±30 RPM
Timing accuracy	±0.5 degrees from 500 to 9,900 RPM
Multiple Spark Duration	20° crankshaft rotation below 3,000 RPM. Maximum 12 sparks per seq. with 1 mil- lisecond interval between sparks.
Primary voltage output	450 volts
Primary energy output	1200 millijoules/sequence
Peak spark gap current	380 milliamps with LX91 coil, 510 milliamps with LX92 coil
Dimensions	8"L x 4-1/2"W x 2"H, 4-1/2 lbs

Recommended Coil

Description	Part No.
PS92N E-Core Coil	730-0192

Applications

Description	Part No.
HI-6RL (6300 Rev Limit)	6000-6463
HI-6RL (7400 Rev Limit)	6000-6474
HI-6RL (7600 Rev Limit)	6000-6476
HI-6RL (7800 Rev Limit)	6000-6478
HI-6RL (8000 Rev Limit)	6000-8480
HI-6RL (8400 Rev Limit)	6000-8484

Approved for These Sanctioning Bodies

American Modified Series, ARCA/CRA Super Series, ARCA Midwest Tour, Blizzard Series, IMCA, JEGS/ CRA, All Star Tour, PASS, Southern Super Series, USMTS, USRA, WISSOTA Racing Series



HI-6RC/HI-6RN Complete Kits

HI-6RC/HI-6RN Complete Kits		4444
HI-6RC Ignition Kit For Chevy SB/BB	6000-6700C	
HI-6RC Digital CD Ignition with Adj. Rev Limiter, Start Retard	6000-6700	
Race Billet Optical Trigger Distributor	1000-1511	Chapt Mean Amen
PS92N E-Core Coil	730-0192	1
FireWire® Universal Plug Wire Kit	255-0082	And.
		1881
HI-6RC Ignition Kit For Ford 289/302	6000-6700SBF	
HI-6RC Digital CD Ignition with Adj. Rev Limiter, Start Retard	6000-6700	
Race Billet Optical Trigger Distributor	1000-1611	CENT MAN MAN
PS92N E-Core Coil	730-0192	
FireWire [®] Universal Plug Wire Kit	255-0083	400
		i iii i
HI-6RC Ignition Kit For Ford 351W	6000-6700FW	
HI-6RC Digital CD Ignition with Adj. Rev Limiter, Start Retard	6000-6700	
Race Billet Optical Trigger Distributor	1000-1613	Comment of the Commen
PS92N E-Core Coil	730-0192	
FireWire [®] Universal Plug Wire Kit	255-0083	40
		1811
HI-6RN Ignition Kit For Chevy SB/BB	6000-6750C	A CONTRACTOR OF THE PARTY OF TH
HI-6RN Digital CD Ignition with Adj. Rev Limiter	6000-6750	
Race Billet Optical Trigger Distributor	1000-1511	(200° M. AN)
PS92N E-Core Coil	730-0192	
FireWire® Universal Plug Wire Kit	255-0082	
W (DM): W F F 1200/202		A PARTY.
HI-6RN Ignition Kit For Ford 289/302		
HI-6RN Digital CD Ignition with Adj. Rev Limiter	6000-6750	
Race Billet Optical Trigger Distributor	1000-1611	
PS92N E-Core Coil	730-0192	
FireWire® Universal Plug Wire Kit	255-0083	Y
UL ADN lanition Vit For Ford 251W	6000 67F0FW	illi
HI-6RN Ignition Kit For Ford 351W		40
HI-6RN Digital CD Ignition with Adj. Rev Limiter	6000-6750	
Race Billet Optical Trigger Distributor PS92N E-Core Coil	730-0192	
FireWire® Universal Plug Wire Kit	255-0083	
The volle Oniversal Flug Wile Kit	233-0003	

Ignition

HEI Digital Ignition



- Outputs a full 8.5 amps of current.
- Most dependable, durable HEI unit available.
- Digital design means timing accuracy.
- Large heat sink dissipates heat for long life.
- Sealed to resist moisture intrusion.



Recommended Coils

Descri	ption	Part No.
A.	PS 91 E-Core Red/White	730-0191
B.	PS 91 E-Core Red/Yellow	730-0291
C.	GM HEI Coil in Cap Conversion Kit	730-0590









Timing Retard Control

- Retard control for performance, race, street, RV and towing applications.
- Driver adjustable under dash mount.
- LED light on module comes on whenever retard is commanded.
- Driver adjustable based on engine knock/load for towing or track conditions.
- Nitrous, turbo and supercharged on-demand retard hook up compatible.
- Boost proportional retard when used with optional boost (MAP) sensor to control amount of retard per PSI of boost pressure.
- Zero to 20 degree adjustable.
- 50 States Legal



Description	Part No.
TRC-2 Timing Retard Control The TRC-2 accessory adds zero to 20 degree timing retard to HI-6, HI-6R, HI-6DSR. Three retard modes: continuous, demand, and boost proportional. Sealed unit, suitable for underdash mounting. Not intended for under hood mounting. CARB E.O. D-225-57	6000-6425
TRC-1 Timing Retard Control for Ford and Honda applications TRC-1 for use with 1983 and later Ford vehicles with TFI-IV ignition systems and 1990 and later Honda 4 cylinder engines, non OBD II. Comes with an installation kit that includes 6 feet of nylon vacuum tubing and adapters for optional MAP sensor. CARB E.O. D-225-53	9000-0100
MAP Sensor - 2 Bar MAP (Manifold Absolute Pressure) sensor. Used as boost sensor for boost proportional retard with TRC-1 and TRC-2.	9000-0110



Specifications	
Operating voltage	6 to 18 volts, reverse polarity protected, negative ground only
Retard range	0 to 20 degrees.
Boost pressure range	0 to 15 psi (with optional MAP sensor)
Boost retard range	0 to 4 degrees per psi (with optional MAP sensor, Part No. 9000-0110)
Dimensions	3"L x 2"W x 1-1/2"H, 3/8 lbs.
	Under dash mounting in passenger com-

partment only.

Hall Effect Crank Trigger Sensor

- Absolute stable timing.
- Allows static timing of engine, no timing light required.
- LED light for ease of static timing built right in.
- Compatible with most performance ignitions.
- ¾-16 UNF threads fit most brackets.
- Accuracy to within ±0.1 of a degree.

Part Number 1000-2100



Points Conversion Kits

Optical Trigger Conversion

- Easy to install in less than 1 hour!
- Converts points-type distributor to precision optically triggered system!
- No maintenance!
- Drives HI-6, HI-6S and most aftermarket ignitions with points/module input.
- Stable timing with precise settings!
- Eliminates spark scatter for greater energy
- No more tune-ups due to worn points!
- Installation kit is required; not included.
- Now you can use a high output CD ignition on your older points-type vehicle!

Applications

Description

* *	
Description	Part No.
Optical Trigger Conversion Unit (Installation Kit Required)	
	715-0020

Includes shutters and brackets for installation of optical trigger on domestic 4, 6 and 8

cylinder and VW/Bosch "009" breaker point distributor applications.



Specifications

Operating voltage

Trigger output

6 to 18 volts, reverse polarity protected, negative ground only. Not compatible with 6 volt electrical systems.

Points/module type (12 volt square wave). Triggers spark on rising edge. 1/4 amp maximum load. Short circuit protected.

NOTE: Output cannot directly drive any coil or Part No. 6000-8910 tach adapter.

Optical Trigger - Installation Kits

Includes shutters and brackets for installation of optical trigger on most import 4, 6 and 8 cylinder breaker point applications. Also used as universal installation kit for many other breaker point applications.	700-2231
Includes shutters and brackets for installation of optical trigger on 1974-83 imports with 4 and 6 cylinder engines equipped with certain Bosch, Hitachi, or Nippondenso OE Electronic Ignition Modules. For applications where the OE module has failed and must be eliminated.	700-2292
Includes shutters and brackets for installation of optical trigger on 1979-83 British imports with 4, 6, and 8 cylinder engines equipped with Lucas OPUS distributors. For applications where the OPUS module has failed and must be eliminated. Note that the HI-6S is not compatible with 12 cylinder engines.	700-2300
Includes shutters and brackets for installation of optical trigger on Mallory YL Dual Point and Unilite 8 cylinder distributor applications.	700-2309



Part No.

700-2226



XR-i Points To Electronic Ignition

- Easy 2 wire hook-up.
- Improved fuel mileage.
- Faster, more reliable engine starts.
- Industry's 1st with rev limiter.
- Adjustable rev limiter from 4000-8000 RPM.
- Fully digital and maintenance free.
- Timing picked up from distributor cam lobe.
- Pinpoint accurate ignition timing.
- Complete under cap restoration perfect.
- Never replace or adjust points again!
- Fully sealed from moisture and dirt.
- High temperature protection won't leave you stranded!
- CARB E.O. D-225-67 50 state legal.

Applications

Description	Part No.
XR-i Only	
1959-74 Ford V-8	750-1700
1957-74 Chevy V-8	750-1710
1957-74 (most) Pontiac V-8	750-1720
1967-Up Oldsmobile V-8	750-1720
XR-i & PS20 Coil Kit	
1959-74 Ford V-8	750-1705
1957-74 Chevy V-8	750-1715
1957-74 (most) Pontiac V-8	750-1725
1967-Up Oldsmobile V-8	750-1725

Recommended Coils

Description	Part No.
A. PS20, Black, Canister Style	730-0020
B. PS40, Chrome, Canister Style	730-0040



Specifications

Operating voltage	6-18 v. reverse polarity protection, negative ground
Current draw	3 amps max @ 5,500 RPM
RPM operating range	8,000 RPM
RPM limiter range	4,000 to 8,000 RPM
Primary voltage output	400 volts (inductive discharge)
Primary energy output	45 millijoules with PS20 coil and 1.65L ballast resistor
Peak spark gap current	50 milliamps with PS20 coil and 1.65L ballast resistor
Spark duration	2100 microseconds @ 2,000 RPM





В.

XR700 Points-To-Electronic Ignition

- Converts points type distributors to electronic ignition!
- Increased timing accuracy.
- Replaces many Bosch, Lucas, Hitachi and ND units.
- Status LED light for easy diagnostics.
- Fully potted for protection from dirt, moisture and vibration.
- Optical trigger for precise ignition timing!
- More powerful signal than points type
- Most reliable of its type
- 6th generation of reliability
- Short circuit proof
- Positive ground compatible
- 50 State Legal

Applications

Description	Part No.
XR700 System	
For Domestic 4, 6 and 8 Cylinder and VW/Bosch "009" Distributor Applications. 12 Volt Negative or Positive Ground. For 1975 and earlier vehicles. CARB E.O. D-47-2	700-0226
For Import and Universal 4, 6 and 8 Cylinder Applications. 12 Volt Negative or Positive Ground. For 1975 and earlier vehicles. CARB E.O. D-47-2	700-0231
For 1974-83 Imports with 4 and 6 cylinder engines equipped with Bosch, Hitachi, or Nippondenso OE Electronic Ignition Modules. For applications where the OE module has failed and must be eliminated. See applications chart for details. CARB E.O. D-47-3.	700-0292

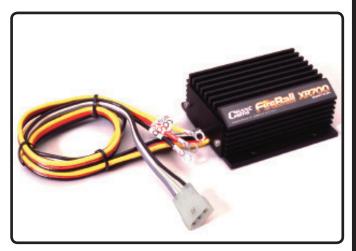
For 1979-83 British imports with 4, 6 and 8 cylinder engines equipped with Lucas OPUS distributors. For applications where the OPUS module has failed and must be eliminated. OPUS system has three wires on OE pickup. If pickup has two wires, you have a conventional magnetic pickup distributor and cannot install an optical trigger. You must use an HI-6R (**Pt. No. 6000-6400**) connected directly to the magnetic pickup in the Lucas distributor.

CARB E.O. D-47-3. 700-0300

For Mallory YL Dual Point and Unilite Distributor applications only.
For 1975 and earlier vehicles. **CARB E.O. D-47-3 700-0309**

Recommended Coils

Description	Part No.
PS20, Black, Canister Style	730-0020
PS40, Chrome, Canister Style	730-0040



Specifications

Operating voltage	6 to 18 volts, reverse polarity protected, negative or positive ground. Not compatible with 6 volt electrical systems as these may drop below 4 volts during cranking.
Coil current limit	4.5 amps (externally limited by ballast resistor on XR700). Internal short circuit protection limit set at 7 amps.
RPM range	6,000 RPM (RPM range higher for 4 and 6 cylinder engines).
Primary voltage output	400 volts (inductive discharge)
Primary energy output	60 millijoules with PS20/40 coil.
Peak spark gap current	60 milliamps with PS20/40 coil.
Spark duration	300 microseconds at 6,000 RPM
Dimensions	3-1/2"L x 3"W x 1-1/2"H, 1 lb.







XR700 Replacement Parts

And Optional Accessories

A. XR700 Ignition Module

For 12 Volt Negative or Positive Ground (does not include optical trigger or required installation kit)

Part No. 700-0001

B. Optical Trigger

For XR700 (requires installation kit sold separately)

Part No. 700-0020

C. XR700 Ignition Module and Optical Trigger

For 12 Volt Negative or Positive Ground (requires installation kit sold separately)

Part No. 700-0021

D. Installation Kits

Part No. 700-2226

Includes shutters and brackets for installation of optical trigger on domestic 4, 6 and 8 cylinder and VW/Bosch "009" breaker point distributor applications.

Part No. 700-2231

Includes shutters and brackets for installation of optical trigger on most import 4, 6 and 8 cylinder breaker point applications. Also used as universal installation kit for many other breaker point applications.

Part No. 700-2292

Includes shutters and brackets for installation of optical trigger on 1974-83 imports with 4 and 6 cylinder engines equipped with certain Bosch, Hitachi, or Nippondenso OE Electronic Ignition Modules. For applications where the OE module has failed and must be eliminated.

Part No. 700-2300

Includes shutters and brackets for installation of optical trigger on 1979-83 British imports with 4, 6 and 8 cylinder engines equipped with Lucas OPUS distributors. For applications where the OPUS module has failed and must be eliminated. Note that the HI-6S is not compatible with 12 cylinder engines.

Part No. 700-2309

Includes shutters and brackets for installation of optical trigger on Mallory YL Dual Point and unilite 8 cylinder distributor applications.

TECH TIPS: BALLAST RESISTANCE

How can I tell if my vehicle has ballast resistance?

Here's a quick test for ballast resistance. run the engine at fast idle and measure battery voltage using a volt meter. It should be about 14 volts. Then measure the voltage at the COIL+ terminal. If there is a difference of more than 3 volts, a ballast resistor is present.

When is a ballast resistor required?

A ballast resistor is required only with XR700 systems. Without proper ballast resistance, the XR700 and coil will overheat and fail. All vehicles with original equipment points ignition are factory equipped with ballast resistance. This can be in the form of a ceramic ballast resistor or a resistance wire between the ignition key and COIL- terminal. It can also be in the form of internal resistance within the coil, such as Bosch® blue coils (typical on VW) and Lucas® coils found on older British vehicles.

What do I need to do about ballast resistance when installing an XR700?

If the vehicle had points and you are keeping the original coil, you do not need to do anything else. If you are changing coils and your vehicle has a ceramic ballast resistor or resistance wire, everything should still be OK. follow the coil installation instructions.

If you are changing coils and your original coil had internal ballast resistance, you must add a ballast resistor (usually supplied with the coil). Use a volt-ohmmeter to check the original coil. Coils with internal ballast resistance will read at 3 ohms or more.









XR3000 Points-To-Electronic Ignition

- All new status LED light for easy diagnostics.
- 150% greater spark gap energy over stock points ignition.
- Uses high output coil without ballast resistor.
- Optical trigger for precise ignition timing accuracy.
- Converts points type distributor to electronic ignition.
- Fully sealed for protection from dirt, moisture and vibration
- SMT = "Surface Mount Technology" for reduced size and greater reliability.
- Short circuit protection.
- XR3000 is the high performance version of the XR700.
- 50 States Legal

Applications

* *	
Description	Part No.
XR3000 System	
For Domestic 4, 6 and 8 Cylinder and VW/Bosch "009" Distributor Applications. 12 Volt Negative Ground Only. 1991 and earlier non-computer controlled vehicles. CARB E.O. D-225-52	3000-0226
For Import and Universal 4, 6 and 8 Cylinder Applications. 12 Volt Negative Ground Only. CARB E.O. D-225-5	3000-0231
For Replacement of Bosch, Hitachi, and Nippondenso 4 and 6 Cylinder OE Electronic Ignition Modules. 1974-83 vehicles. CARB E.O. D-225-5	3000-0292

Recommended Coils

necommenaca com	
Description	Part No.
PS50, Black,Canister Style	730-0050
PS60, Chrome, Canister Style	730-0060
PS91, E-Core Coil with Plated-Steel Bracket	730-0091
LX91 E-Core Coil with Aluminum Bracket	730-0891







Specifications

<u>'</u>	
Operating voltage	6 to 18 volts, reverse polarity protected, negative ground. Not compatible with 6 vol electrical systems as these may drop below 4 volts during cranking.
Coil current limit	4.5 amps internal short circuit protection limit set at 7 amps.
RPM range	6,500 RPM
Primary voltage output	400 volts (inductive discharge)
Primary energy output	90 millijoules with PS91 coil.
Peak spark gap current	100 milliamps with PS91 coil.
Spark duration	2800 microseconds at 2,000 RPM
Dimensions	5"L x 3"W x 1-1/2"H, 1-1/2 lbs.





XR3000 Replacement Parts

And Optional Accessories

A. XR3000 Ignition Module

For 12 Volt Negative Ground Only (does not include optical trigger or required installation kit)

Part No. 3000-0001

B. Optical Trigger

For XR3000 (requires installation kit sold separately)

Part No. 700-0020

C. XR3000 Ignition Module and Optical Trigger

For 12 Volt Negative Ground Only (requires installation kit sold separately)

Part No. 3000-0021

D. Installation Kits

Part No. 700-2226

Includes shutters and brackets for installation of optical trigger on domestic 4, 6 and 8 cylinder and VW/Bosch "009" breaker point distributor applications.

Part No. 700-2231

Includes shutters and brackets for installation of optical trigger on most import 4, 6 and 8 cylinder breaker point applications. Also used as universal installation kit for many other breaker point applications.

Part No. 700-2292

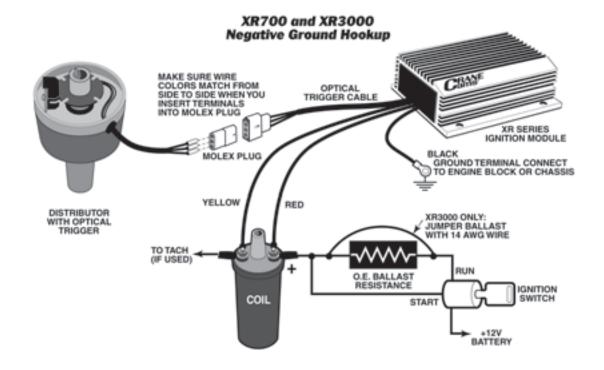
Includes shutters and brackets for installation of optical trigger on 1974-83 imports with 4 and 6 cylinder engines equipped with certain Bosch, Hitachi, or Nippondenso OE Electronic Ignition Modules. For applications where the OE module has failed and must be elminated.











Distributors

Race Billet Distributor

- Analog design
- Locked out timing
- Stainless steel shaft
- Billet lower housing
- Large or small cap design
- Bearing on top and bottom
- Includes gear!
- Magnetic trigger
- Highly accurate
- No maintainence!
- Drag Race and Circle Track





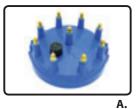
Applications

Description	Part No.
Large Cap	
Chevy V8 SB & BB 55-96	1000-1510
Chrysler LA 273-318-340-360	1000-1810
Ford 289/302	1000-1610
Ford 351W	1000-1612
Ford 351C/429/460	1000-1614
Ford FE 352–428	1000-1616

Description	Part No.
Small Cap	
Chevy V8 SB & BB 55-96	1000-1511
Chrysler LA 273–318–340–360	1000-1811
Chrysler B 383–400	1000-1812
Chrysler RB 426—440	1000-1813
Ford 289/302	1000-1611
Ford 351W	1000-1613
Ford 351C/429/460	1000-1615
Ford FE 352–428	1000-1617

Replacement Parts

Description	Part No.
A. Distributor Cap - Large	1000-1550
B. Cap Adapter	1000-1551
C. Distributor Cap - Small	1000-1552
D. Rotor - Small	1000-1556
E. Rotor - Large	1000-1557













Oval Track Pro Race Distributors





- Machined, billet housing.
- Approved for use in NASCAR® competition.
- Dual Optical Triggers synchronized at the factory to within ±0.2 degrees (crankshaft).
- Precision, stainless steel, photochemically etched trigger disc
- Electronically synthesized magnetic trigger output.
- Ground and polished steel shaft.
- Wire retainer cap for secure fit.
- Individual cylinder timing capability.
- Double lip seal on shaft for oil and vacuum control.
- Most accurate "out of the box" distributor available.
- Status LED light for quick diagnostic check on optical triggers.
- Adjustable slip collar on GM model.

- \bullet Timing light tuning to within \pm .5 degree of optimum timing point.
- Distributor equipped with two optical triggers for redundancy
- Weatherpak® or Deutsch® style plugs.

Applications

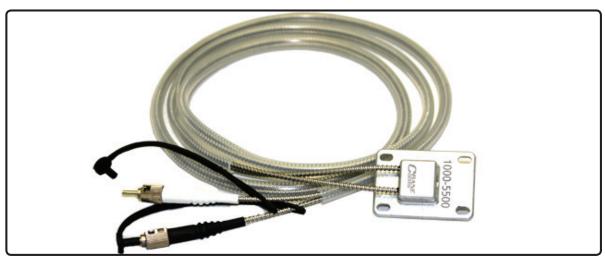
трричини	
Description	Part No.
Dodge R5	1000-1409*
Dodge R6	1000-1419*
Ford S/B	1000-1441
Ford 351W	1000-1401*
Ford 351W 90° Trigger	1000-1421
Ford FR9	1000-1451*
GM S/B, B/B	1000-1400*
GM S/B, B/B Single Trigger	1000-1430
GM R07	1000-1440*
Toyota (Deutsch®)	1000-1412*

^{*} Approved for use in NASCAR® competition

Distributors

Oval Track Pro Race Distributors

Optional Accessories and Replacement Parts



A.

A. Fiber Optics, the absolute most accurate, durable distributor trigger on the market. High speed, accuracy, repeatability, and strength — all in one and approved for use in NASCAR® competition.

Part No. 1000-5500

B. Dashboard mount fiber optic trigger interface converter. High speed laser in a lightweight package approved for use in NASCAR® competition. Part No. 1000-5600

C. RH Rotor Part No. 1000-1404

> LH Rotor Part No. 1000-1405

- D. Distributor Cap Part No. 1000-1403
- E. Wire Retainer for Distributor Cap Part No. 1000-1408
- F. Optical Trigger Sensor Unit (each) -Part No. 1000-1424 (Weatherpak) Part No. 1000-1423 (Deutsch)
- G. Cap Adapter Kit Part No. 1000-1411
- H. Replacement Hardware Kit for Rebuild/Refurbish Part No. 1000-1406 (not shown)













Performance Ignition Coils



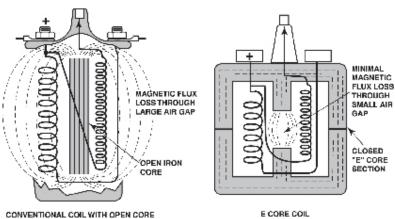
LX91, LX92 Coils

- High-output E-core ignition coils.
- Up to 70% higher energy at the spark plug than stock for maximum performance, race or street.
- E-core design with closed magnetic path. Reduced leakage inductance cuts losses and improves energy transfer to the spark plug.
- Solid epoxy encapsulated. Resists severe shock and harsh vibration.
- **Insulated primary connector for safety.** No exposed high voltage on primary terminals for enhanced safety. An important consideration when used with high output CD systems.
- SAE-spec high voltage tower protects against arcing. Improved coil wire retention and longer creep path to protect against high voltage arcing.
- Heavy gauge wire used for all windings. Results in much lower resistance and better heat dissipation for greater high RPM endurance.
- Windings optimized with computer aided design. Our exclusive CAD (Computer-Aided-Design) windings produce maximum spark gap current and highest available voltage.
- Crane LX91 and LX92 E-core coils are 50 states street legal for recommended applications.
- **Lightweight**, low profile black anodized housing.





E-CORE VERSUS CONVENTIONAL COIL



Performance Ignition Coils

LX91, LX92 Coils

A. LX91 High Output Universal E-Core Ignition Coil

Highest possible spark energy and spark gap current – up to 100% greater than comparable OE coils. Recommended coil for street use with Crane HI-6, Mallory® Hyfire®, MSD 6® CD systems. Also works great with Crane HI-6S and XR3000 inductive discharge ignitions. Not for use in race or extended high RPM use with high output ignition. Not for use with points. For 1995 and earlier non-OBD II applications. **CARB E.O. D-225-60**

Part No. 730-0891



Professional race coil for use with CD systems only. Highly recommended for maximum performance with Crane HI-6 systems. Gives up to 12 times greater output than OE. Can also be used with Mallory® Hyfire®, MSD 7® and MSD 8® systems. *Caution: MSD 6® systems are not capable of driving the high current demanded by the LX92.* Not compatible with Crane HI-6S, XR-i, XR700, or XR3000 systems. For non-OBD II vehicles with distributor-type CD ignition system.

CARB E.O. D-225-60 Part No. 730-0892

C. GM HEI Coil in Cap Conversion Kit

Replace your in-cap type coil with a performance externally mounted type. **Part No. 730-0590**

D. LX Series Locking Coil Wire Kit

Coil wire kit with a special locking clip that provides positive retention for demanding race applications. Fits all LX series coils. Includes 40" length of 8.5mm spiral core FireWire and an assortment of boots and terminals to fit both SAE tower style and conventional distributor terminals.

Part No. 235-0001



	LX91	LX92
Primary resistance	.40 ohms	.23 ohms
Secondary resistance	4.6 kohms	920 ohms
Primary inductance	4.7 mH	1.7 mH
Secondary inductance	14.4 H	4.5-6.5 H
Leakage inductance	.23 mH	.14 mH
Turns ratio	57:1	60:1
Typical dimensions:	3-3/4"L x 2-1/2"W x 3"H, 1-1/4 lbs.	









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PS91, PS92, PS92N E-Core Coils

- · High-output E-core coils for race and street.
- Up to 70% higher energy at the spark plug than stock for maximum performance, race or street.
- E-core design with closed magnetic path. Reduced leakage inductance cuts losses and improves energy transfer to the spark plug, for maximum ignition performance.
- Plastic overmolded core with urethane encapsulation.
 Improved urethane encapsulation material provides improved protection against severe shock, harsh vibration, and high voltage breakdown. Eliminates the exposed E-core.
- Insulated primary connector for safety. No exposed high voltage on primary terminals for enhanced safety. An important consideration when used with high output CD systems. Mating connector included.
- SAE-spec high voltage tower. Improved coil wire retention and longer creep path to protect against high voltage arcing.
- Crane PS91 and PS92 E-core coils are 50 states street legal for recommended applications.
- Custom fit coils are available for most Ford and GM original equipment (OE) replacement purposes.







Coil Specifications

	PS91	PS92	PS92N
Primary resistance	.43 ohms	.20 ohms	.20 ohms
Secondary resistance	3.0 kohms	.82 kohms	.82 kohms
Primary inductance	5.5 mH	1.9 mH	1.9 mH
Secondary inductance	16 H	6.8 H	6.8 H
Leakage inductance	.32 mH	.14 mH	.14 mH
Turns ratio	54:1	60:1	60:1
Typical dimensions:	4-1/2"L x 3-1/2"W x 3-1/2"H, 2-3/4 lbs.		4-1/2"L x 3-1/2"W x 3-1/4"H, 2-1/8 lbs.

Performance Ignition Coils

PS91, PS92, PS92N E-Core Coils

A. PS91 High Output E-Core Ignition Coil

Up to 100% greater than stock coils and 70% greater than competitors coils! (SAE J973a tests) For street use with Crane XR3000 and HI-6S, Mallory® Hyfire® and MSD-6® CD systems. **Not for use with points.** For 1995 and earlier non-OBD II with distributor ignition. **CARB E.O. D-225-60**

Part No. 730-0091

B. PS92 Performance Coil for Use with CD Ignition Systems

Street performance coil for use with CD systems only. Recommended for maximum performance with Crane HI-6 systems. Produces up to 12 times greater output han OE. Can also be used with Mallory® Hyfire®, MSD7® and MSD8® systems. Not compatible with Crane HI-6S, XR700, or XR3000 systems. Includes nickel plated bracket. For 1995 and older non-OBD II vehicles with distributore type, CD ignition system. **CARB E.O. D-225-60**Part No. 730-0092

C. PS92N Race Coil for Use with CD Ignition Systems

Coil for use with CD systems only. Recommended for race applications and extended high RPM use. Includes lightweight black anodized aluminum bracket. **CARB E.O. D-225-60**.

Part No. 730-0192

D. PS 91 E-Core Red/Yellow Part No. 730-0291

E. PS91 Coil for GM Coil-In-Cap HEI with Red/White Wires

Same characteristics as standard PS91. Drop in upgrade for 1974-up GM internal coil-in-cap HEI systems. Includes special low resistance carbon button. **CARB E.O. D-225-60.**

Part No. 730-0191

F. PS91 Coil for Ford TFI-IV Applications

Same characteristics as standard PS91. Direct plug-in upgrade for Ford E-core coil used in 1983 and later TFI-IV systems. Fits OE bracket and connector. **CARB E.O. D-225-60.**

Part No. 730-0391

G. PS91 Coil for GM External HEI Applications

Same electrical characteristics as standard PS91. Direct plug-in upgrade for late model GM external HEI coil with dual plugs used on many 1985 and later GM vehicles. Fits OE bracket and connectors. **CARB E.O. D-225-60.**

Part No. 730-0491

H. Replacement Low Resistance Carbon Button for GM Coil-In-Cap HEI Replacement part for low-resistance carbon button supplied with 730-0191 and 730-0291 coil.

Part No. 730-8412

I. PS91 Coil To GM External HEI Adapter

Allows installation of Crane FireBall PS91 ignition coil **730-0091** in late model GM vehicles, 1985-95. Not required with **730-0491** coil.

Part No. 6000-8878

J. GM HEI Coil-In-Cap Conversion Kit

Replace your in-cap type coil with a performance externally mounted type. Includes length of wire and assorted boots and terminals.

Part No. 730-0590

K. Coil Harness for PS91/PS92 Coils (Pair) Part No. 6000-6465 (not shown)





















Performance Ignition Coils



PS20, PS40, PS50, PS60 Canister Style Ignition Coils

- Canister-style, oil-filled performance and replacement coils. Crane offers a complete line of canister style oil filled coils for both performance and universal replacement applications. For optimum performance on newer vehicles that do not require a canister style coil, use our PS and LX series E-core coils.
- 20-50% higher energy at spark plug than typical stock coils. Gives improved starting, better throttle response, and more high end power. Tested to conform to SAE J973a test procedure.
- Oil filled for maximum cooling of internal windings and high reliability.
- Windings optimized with computer aided design for maximum spark gap current and high available voltage.
- Alkyd coil towers. Alkyd coil towers eliminate failure from flash over and carbon tracking.
- 50 states street legal.

Coil Specifications

1				
	PS20	PS40	PS50	PS60
Primary resistance	1.4 ohms	1.4 ohms	.40 ohms	.40 ohms
Secondary resistance	5.2 kohms	5.2 kohms	3.8 kohms	3.8 kohms
Primary inductance	7.5 mH	7.5 mH	5.3 mH	5.3 mH
Secondary inductance	26 H	26 H	15 H	15 H
Leakage inductance	1.3 mH	1.3 mH	.50 mH	.50 mH
Turns ratio	60:1	60:1	54:1	54:1
Finish	Black	Nickel Plate	Black	Nickel Plate
Typical dimensions:	2-1/8"D x 5-3/4	″L, 1-3/4 lbs.		

Applications

Description Part No.

A. PS20 Premium Street Coil

Great as a high output replacement for OE electronic ignition and points applications on vehicles that require a conventional round coil. Designed for use with Crane XR700 ignitions. For general purpose use in applications when engine RPM does not exceed 6500 RPM. Includes ballast resistor for points applications. Black finish. Fits most OE brackets. CARB E.O. D-225-60

730-0020

B. PS40 Nickel Plated Premium Street Coil

Chrome appearance version of PS20. Electrical characteristics and applications same as PS20. **CARB E.O. D-225-60**

730-0040

C. PS50 Performance Coil

Special low resistance windings. Output characteristics similar to Crane PS91 E-core coil. Designed for extended use such as oval track, road racing, off road, and high RPM street engines. Compatible with all OE electronic ignitions. Recommended for use with Crane XR3000, and HI-6S. Not for use with points. Black finish. Fits most OE brackets. CARB E.O. D-225-60

730-0050

D. PS60 Performance Coil

Special low resistance windings. Output characteristics similar to Crane PS91 E-core coil. Designed for extended use such as oval track, road racing, off road, and high RPM street engines. Compatible with all OE electronic ignitions. Recommended for use with Crane XR3000, and HI-6S. Not for use with points. Nickel plated finish. Fits most OE brackets. **CARB E.O. D-225-60**

730-0060









Performance Plug Wires

8.5mm Fire Wire

LOW RESISTANCE!

- Double-silicone reactive core spark plug wire sets.
- Up to 50% more spark energy! FireWire's low per-foot resistance transmits up to 50% more energy to the spark plugs than other "performance" suppression core wires.
- 8.5mm pure silicone double-layer construction! Our 8.5mm "silicone-on-silicone" design resists high underhood temperatures and insulation breakdown caused by abrasion. Designed for use on tube-steel header equipped racing engines!
- State-of-the-art "reactive core" filters RFI! FireWires actually filter out RFI and EMI noise generated by today's high-output ignition systems, protecting on-board computer systems and instruments!
- High performance 550 degree boots!
- Pure Silicone Boots



8.5mm Sleeved FireWire®

- Racing-design, braided, fiberglass sleeving offers an extra barrier layer of protection against abrasion and extreme heat up to 1200° F.
- The ultimate spark plug wire for drag racing, oval track, road racing, marine or serious street performance!
- Exclusive Reactive-Core design actually filters RFI "noise" from the highest-output electronic ignition systems.
- Kevlar® reinforced with braided fiberglass mesh for added strength and protection.
- Pure silicone outer jacket features a double-layer of protection against extreme heat and underhood fluids.
- Available for small-block and big-block, over and under valve covers. Black only. Pre-terminated custom sets for specific
 engine applications or universal cut-to-fit sets.



Performance Plug Wires



8.5mm Fire Wire

Universal Application "Cut to Fit" Sets		8.5 mm (Black)	8.5 mm (Sleeved)
4 Cylinder			
All	Universal Straight Boot	255-0041	N/A
6 Cylinder			
All	Universal Straight Boot	255-0061	N/A
8 Cylinder			
All	Universal Straight Boot	255-0081	295-0081
All	Universal 90 Degree	255-0082	295-0082
All	Universal 45 Degree	255-0083	295-0083

Numbering Kits	Part Number
Cylinder Numbering Heat Shrink Kit – 8.5mm Universal	230-0007

Coil Wire	Part Number
40" Universal Coil Wire for Crane Cams LX Series coils. Clamp is custom fitted to coil boot.	235-0001
LX Coil Boot & Clip Kit	235-0003
Coil wire only - 10.5" long with 90 Degree HEI Boots	235-0004

Custom Application		Spark Plug Boot	Distributor Terminal	8.5 mm Part No.
Small Block Chevy V-8				
All	Over Valve Covers	90 Degree	non-HEI	255-2400
All	Over Valve Covers	90 Degree	HEI	255-2402
All	Under Headers	90 Degree	non-HEI	255-2405
All	Under Headers	90 Degree	HEI	255-2407
Big Block Chevy V-8				
All	Under Headers	90 Degree	HEI	255-2416
All	Over Valve Covers	Straight	non-HEI	255-2417
LS1/LS6				8.0 mm Part No.
Camaro, Corvette, Firebird	2002-up			255-2419
Truck LS1 Vortec	2002-up			255-2420
Ford				8.5 mm Part No.
All	351W Engines	45 Degree	HEI-style	255-2426
GM Sprint Car				
GM Sprint Car Set				255-2404

Custom Fit Hi-Temp Sleeved Sets		Spark Plug Boot	Distributor Terminal	8.5 mm Part No.
Big Block Chevy V-8				
All	Under Headers	90 Degree	HEI	295-2416
Chrysler/Dodge				
95-2001	2.0L SOHC			255-4100
2001-up	2.4L DOHC, SRT-4, PT Turbo			255-4040
Ford				
All	351W Engines	45 Degree	HEI-style	295-2426
Ford USAR® Pro Cup Motor				295-2428
GM				
GM USAR® Pro Cup Motor				295-2401

Performance Plug Wires

FireWire Spark Plug Wire

Now Available in Convenient 100' Rolls

- Engine builders, performance retailers and tuner shops will now be able to economically build custom ignition wire sets now that Crane is offering its remarkable FireWire in convenient 100-foot rolls.
- Crane's FireWire has a low resistance which assures that maximum spark energy is delivered to the plugs.
- FireWire features a state-of-the-art reactive core design, which effectively filters out RFI and EMI "noise" created by high-output ignition systems. This protects onboard computer systems, instruments, and preserves audio clarity.
- The wire features 8.5mm pure silicone double-layer construction that is Kevlar weave reinforced for strength.
- FireWire is designed for use with tubular steel headers and extreme heat up to 1200° (F).

Also available from Crane are a variety of boots and terminals in handy 2-packs & 25-packs that will allow the builder to construct ignition wire sets for virtually any 4, 6 or 8-cylinder engine.



rippiituitions	
Description	Part No.
A. 100' roll of FireWire	255-0001
B. 2-pack of 90° spark plug boots & terminals	255-0010-2
B. 25-pack of 90° spark plug boots & terminals	255-0010-25
C. 2-pack of straight spark plug boots & terminals	255-0011-2
C. 25-pack of straight spark plug boots & terminals	255-0011-25
D. 2-pack of 45° spark plug boots & terminals	255-0013-2
D. 25-pack of 45° spark plug boots & terminals	255-0013-25
E. 2-pack of 90° cannister coil boots & terminals	255-0025-2
E. 25-pack of 90° cannister coil boots & terminals	255-0025-25
F. 2-pack of 90° HEI spark plug boots & terminals	255-0032-2
F. 25-pack of 90° HEI spark plug boots & terminals	255-0032-25















Digital Rev Limit Tester

- Accurately measures the rev limit of any Crane Cams Digital HI-6 series, MSD® 6 series, or Mallory® CD ignition system to within +/- 5 RPM.
- Tach calibration feature built in to check accuracy of tachometer in car.
- Comes with test plug and FireWire® length to fire the coil.





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		104211	88	109811	90	111431	74	114581	66
		104221	88	109821	90	111451	76	114681	72
		104224	88	109831	90	111452	76	114691	74
10003	56	104225	88	109841	92	111501	76	114701	76
100032	56	104227	94	109851	90	111502	76	114711	76
10004	56	104241	94	109861	90	111751	76	114721	76
100042	56	10507	276	109871	92	11307-1	69	11515-16	299
10005	58	105072	276	110082	62	11308-1	358	11515-2	299
100052	58	10508	276	110112	66	11309-1	358	11515-8	299
10007	62	105082	276	110172	60	11310-1	358	11519-12	
100072	62	10510-1	299	110251	62	113501	56	11519-16	
10008	62	10510-16	299	110271	64	113502	56	11519-2	299
100082	62	10530-12	294	110291	64	113511	58	11519-8	299
10011	66	10530-16	294	110301	64	113512	58	11532-16	294
100112	66	10530-2	294	110311	66	113521	60	11532-2	294
10013	60	10535-1	294	110501	64	113522	60	11562-16	
100132	60	10535-16	294	110521	64	113531	62	11562-2	294
10017	60	10621-16	306	110541	66	113532	62	11570-16	
100172	60	10621-12	306	110551	62	113541	64	11570-2	299
10018	62	10621-2	306	110591	62	113542	64	11571-16	
100182	62	10750-1	317	110592	62	113801	62	11571L-2	299
1020541	46	10750-16	317	110601	62	113802	62	11571R-2	
1020561	46	10751-1	317	110651	64	113821	62	11572-16	
1020571	46	10751-12	317	110691	64	113822	62	11572-2	299
1020631	46	10751-16	317	110692	64	113841	72	11573-16	
1020641	46	10756-1	317	110711	66	113861	74	11573L-2	299
102621-16	306	10756-16	317	110741	66	113901	56	11573R-2	
102621-2	306	10758-1	317	110742	66	113902	56	11574-16	299
10303	114	10758-16	317	110901	72	113931	58	11574-2	299
103032	114	10759-1	317	110911	72	113932	58	11575-16	
10304	114	10759-16	317	110921	72	113941	58	11575L-2	299
103042	114	10800C-1	313	110922	72	113942	58	11575R-2	
10305	114	10800C-16	313	110931	72	113971	56	11576-16	
103052	114	108521	94	110941	72	113972	56	11576-2	299
10306	116	108541	94	110951	72	114051	64	11577-16	
103062	116	108551	94	110961	72	114102	56	11577L-2	299
10307	116	108571	94	110971	74	114112	56	11577R-2	
103072	116	108611	94	110981	74	114122	56	11578-16	
10308-1	358	109651	92	110982	74	114132	56	11578-2	299
10309-1	358	109661	92	110991	76	114142	58	11579-16	
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11600-1	363	11762R-1	317	118461	86	119561	68	123573-16	300
11604-1	363	11765L-1	317	118471	86	119571	68	123573L-2	300
11621-12	306	11765R-1	317	118481	86	119581	70	123573R-2	300
11621-16	306	11766L-1	317	118491	86	119591	70	13003	196
11621-2	306	11766R-1	317	118521	78	119601	70	130032	196
11622-16	306	11771-1	317	118531	78	119611	70	13004	196
11622-2	306	11771-16	317	118541	78	119651	70	130042	196
11624-16	306	11772-1	317	118551	78	119661	68	13005	196
11624-2	306	11772-16	317	118571	78	119671	68	130052	196
11628-16	306	11774-1	316	118581	78	119681	70	13006	198
11628-2	306	11774-12	316	118591	80	119691	70	130062	198
11630-16		11774-16	316	118611	78	119701	68	13009	198
11630-2	306	11775-1	316	118631	78	119711	70	130092	198
11632-16		11775-12	316	118661	82	119721	70	130201	116
11632-2	306	11775-16	316	118691	80	11973-1	288	130211	116
11633-16		11776-1	316	118711	80	11975-1	328	130211	118
11633-10	306	11776-12	316	118741	80	11976-1	328	130231	118
11635-16		11776-12	316	118751	80	11977-1	329	130231	118
11635-10	306	11770-10	316	118761	80	11977TB-1	329	130721	118
11650-1	311	11777 10	316	118771	0.4	11978-1	220	120721	110
11744-1	315	11777-12 11777-16	316		84 84	11976-1	329 288	130731 131101	118 126
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11744-12		11800-1	312	118791	84	119811	68	131111	126
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11745-1	315	11801-1	312	118811	80	119831	68	131131	126
11745-12	315	11801-16	312	118821	80	119841	68	131141	128
11745-16		11801C-1	313	118831	82	11984-1	329	131151	130
11746-1	315	11801C-16	313	118841	82	11984TW-1	329	131161	130
11746-12		11802-1	312	118861	82	11984TWT-1		131171	130
11746-16		11802-16	312	118871	84	11985-1	291	131181	130
11747-1	315	11802C-1	313	118881	84	11986-1	291	131271	126
11747-12		11802C-16	313	118891	86	11988-1	288	131281	128
11747-16		11803-16	312	118901	86	11990-1	288	131291	130
11748-16		118131	78	118911	80	11991-1	287	131311	128
11750-1	317	118291	84	118921	82	12003	74	131441	128
11750-12	317	118321	84	118931	82	123570-16	300	131541	130
11750-16		118331	84	118941	82	123570 To	300	131641	130
11752-1	317	118361	86	118951	80	123570E-2	300	131761	130
11752-16		118381	86	118961	86	123571-16	300	132561	116
11755-1	317	118411	82	118971	80	123571L-2	300	13303	230
11755-16	317	118421	84	118991	86	123571R-2	300	133032	230
11759-1	317	118431	82	11950-1	289	12357 In-2 123572-16	300	133032	230
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133052	232	13562-16	295	13643-2	307	138681	134	139801	122
133072	116	13562-2	295	13650-1	311	138701	136	139811	122
13308-1	358	13570-16	300	13744-1	315	138711	136	139821	124
13309-1	358	13570-2	300	13744-16	315	138771	138	139831	124
133101	118	13571-16	300	13750-1	318	138781	132	139841	124
133102	118	13571L-2	300	13750-12	317	138791	132	139851	124
13313	230	13571R-2	300	13750-16	318	138801	134	139861	124
133132	230	13572-16	300	13755-1	318	138811	134	13984-1	329
133801	116	13572-2	300	13755-16	318	138831	134	13984TW-1	329
133802	116	13573-16	300	13759-1	318	138841	134	140550-16	302
133841	126	13573 L-2	300	13759-16	318	138851	136	140550-2	302
133901	114	13573R-2	300	13763TR-1	318	138861	136	1439531	52
133902	114	13574-16	300	13763TR-16	318	138871	132	1439721	52
133931	114	13574-10	300	13774-1	316	138881	132	1439731	52
133941	114	13575-16	300	13774-16	316	138891	134	1439801	52
133942	114	13575L-2	300	13800-1	312	138911	138	1439811	52
133971	114	13575R-2	300	13800-16	312	138921	138	144313-1	358
13404	244	13575k-2 13576-16	300	13801-1	312	138931	136	144314-1	358
134042	244	13576-1	300	13801-16	312	138941	136	144316-1	358
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13405	244	13577-16	300	13801C-1	313	138951	138	144317-1	358
134052	244	13577L-2	300	13801C-16	313	138961	138	144460-16	362
134112	114	13577R-2	300	138101	132	138971	138	144460-2	362
134122	114	13578-16	300	138131	134	138981	138	144511-1	299
134241	116	13578-2	300	138141	132	139001	120	144511-16	299
134242	116	13579-16	300	138291	134	139011	120	144530-16	294
134261	128	13579L-2	300	138301	134	139021	120	144530-2	294
134551	116	13579R-2	300	138351	136	139351	120	144532-16	294
134552	116	13602-1	363	138361	136	139601	120	144532-2	294
134561	118	13628-16	307	138391	138	139611	120	144533-16	294
134571	118	13628-2	307	138401	138	139651	122	144533-2	294
134691	128	13629-16	307	138451	136	139661	124	144536-1	294
134692	128	13629-2	307	138461	136	139671	122	144536-16	294
134761	128	13630-16	307	138471	136	139681	122	144568-16	299
134762	128	13630-2	307	138551	132	139691	122	144568-2	299
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13515-16	300	13635-2	307	138591	136	139761	120	144622-2	306
13515-10	300	13640-16	307	138601	132	13977-1	329	144650-1	311
13519-16	300	13640-2	307	138631	132	139771	120	144651-1	311
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144750-16	318	1449231	102	15750-16	318	180-0012	150	19800-8	28
144750A-16	318	1449241	102	158171	112	180-0014	150	198091	18
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144759-1	318	1449261	102	158-0010	148	180-0016	150	198131	18
144759-16	318	1449271	106	158-0012	148	180-0018	150	198161	18
144759A-16	318	1449281	106	158-0014	148	180-0020	150	1989491	16
144759AF-16	318	1449291	106	158-0016	148	180-0022	150	1989501	16
144760-1	318	1449331	100	158-0018	148	180-0024	150	1989511	16
144760-16	318	144944-16	350	158-0020	148	180-0026	150	1989521	16
144761-1	318	144944-2	350	158660-16	149	180-0028	150	199501	18
144761-16	318	1449511	96	158711	112	18005	212	199511	18
1448011	104	1449561	96	158830-16	149	180052	212	199521	18
1448021	104	1449591	98	158830-2	337	180830-16	151	199531	18
1448031	104	1449601	100	159511	110	180830-2	337	199541	18
1448041	104	1449611	102	159521	110	190021	186	200511	4
1448051	104	144984-1	329	159531	110	190071	186	200541	4
1448061	104	144985-1	329	16510-1	300	19128	82	201141	4
144838-16	338	144986-1	329	16510-16	300	19137	82	201221	4
144838-2	338	15005	154	168291	144	19139	84	201311	4
144846-16	337	150052	154	168351	144	19145	82	201650-1	31
144846-2	337	15006	156	168401	144	19146	82	201651-1	31
144847-16	338	150061	110	168411	144	192211	186	201750L-1	31
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1449041	96	150291	110	168631	144	192241	186	201755-1	31
1449051	96	150301	110	168711	140	192251	186	2017591-1	31
1449061	96	150311	110	168721	140	192261	186	201759-16	31
1449071	96	150421	112	168731	140	193-0010	150	201760I-1	31
1449081	96	150431	112	168741	140	193-0012	150	201760-16	31
1449091	98	150441	112	168761	140	193-0014	150	201761L-1	31
1449101	98	150811	112	168771	142	193-0015	150	201761-16	31
1449111	98	151341	112	168781	140	193-0016	150	2019341	10
1449121	98	15519-16	301	168791	140	193-0018	150	2019371	10
1449131	98	15519-2	301	168801	140	193-0020	150	2019381	10
1449141	98	15621-16	307	168811	142	193-0022	150	2019391	10
1449151	100	15621-2	307	168831	142	193-0024	150	203761E-1	
1449161	100	15630-16	307	168841	142	193-0026	150	203761I-1	31
1449171	100	15630-2	307	168851	142	193-0028	150	203761-16	31
1449181	100	15634-16	307	169651	142	19315	138	203901	4
1449191	100	15634-2	307	169691	142	19333	138	2039271	10
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20621-2	306	27750-1	319	28750-16	319	342-0107	264	350501	250
20622-12	306	27750-16	319	28755-1	319	343801	244	350541	250
20622-2	306	27757-1	319	28755-16	319	343802	244	350551	252
20750-1	317	27757-16	319	28758-1	319	343901	244	350561	252
20750-12	317	27759-1	319	28758-16	319	343902	244	350571	252
20990-1	288	27759-16	319	28774-1	316	343941	244	350681	252
223-0010	190	27771-1	319	28774-16	316	343942	244	351201	256
223-0012	190	27771-16	319	28800-1	313	343971	244	351211	256
223-0014	190	27774-1	316	28800-16	313	344-0010	264	351212	256
224-0010	190	27774-16	316	288521	280	344-0012	264	351341	256
224-0012	190	280441	276	288531	280	344-0102	264	351351	256
224-0014	190	280451	278	288541	280	344341	244	351511	256
224-0016	190	280511	276	288551	280	344342	244	351601	256
224-0018	190	280601	278	288811	280	344561	244	351611	256
250321	50	280901	280	289611	278	34619-1	321	351621	256
250511	50	280921	280	289621	278	34619-2	321	351631	256
252-0010	262	280981	280	289631	278	344621	244	35308-1	359
252-0012	262	281241	280	289641	278	34621-16	308	353901	250
253901	50	281441	280	289651	278	34621-2	308	353902	250
253902	50	28308-1	359	289661	278	34622-16	308	353931	250
253941	50	283511	276	28975-1	328	34622-2	308	353932	250
254112	50	283512	276	28990-1	289	34641-16	308	353941	250
254122	50	283521	276	30518-16	302	34641-2	308	353942	250
25621-12	306	283522	276	30518-2	302	34752L-1	321	354551	250
25621-2	306	283801	276	30532-16	295	34752R-1	321	354552	250
25750-1	317	283802	276	30532-2	295	34772-1	312	354561	252
25750-12	317	283901	276	30570-16	302	34772-16	312	354562	252
25759-1	317	283902	276	30570-2	302	34791-1	321	35532-16	295
25759-12	317	283941	276	30574-16	303	348291	248	35532-2	295
26535-1	295	283942	276	30574-2	303	348301	248	35570-16	302
26535-16	295	283951	276	340-0002	264	348511	248	35570-2	302
26640-16	307	283952	276	340-0010	264	348521	248	35571-16	302
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268701	146	284571	278	340301	244	348821	248	35571R-16	302
268711	146	28532-16	295	340321	246	348831	248	35571R-2	302
268721	146	28532-2	295	340471	246	348841	248	35574-16	302
268731	146	28570-16	302	340721	244	349511	246	35574-2	302
268741	146	28570-2	302	341191	246	349551	246	35575-16	302
268761	146	28624-16	308	341341	246	349561	246	35575L-2	302
268771	146	28624-2	308	341461	246	349571	246	35575R-16	302
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35621-2	308	363901	196	36774-1	316	409511	240	441161	22
35622-16	308	363902	196	36774-16	316	409512	240	441231	22
35622-2	308	363931	196	36775-1	316	409513	240	441301	22
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358211	258	364211	200	36801-16	312	409524	240	44308-1	35
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358231	260	364382	198	368601	202	409602	240	443502	21
358241	260	364551	198	369541	200	409611	240	443511	21
358251	260	364552	198	369601	200	409612	240	443512	21
358501	258	364561	198	36970-1	290	409621	240	443901	21
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359331	254	36532-16	295	37830-24	337	435-0010	266	444222	20
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How to Return Product for Warranty

Should you encounter problems with any Crane Cams product, we urge you to first contact one of our Crane Cams Technical Service Reps before you return the items for warranty consideration. Many times problems come from the specific application, and its variances, and can be easily solved on the phone.

If you are advised by the Crane representative to return the parts for warranty consideration you will be issued a **Return Goods Authorization (RGA)** number. Please refer to this RGA number in all future actions or correspondence about this claim.

DO NOT RETURN CRANE PRODUCTS TO THE DISTRIBUTOR WHERE WERE THEY **WERE ORIGINALLY PURCHASED!**

Instead, write out detailed information regarding your problem (don't forget your **RGA number!**) and **enclose the** note along with the parts you wish to return. Be sure to include **your full** name, address, daytime telephone number, engine make, year, cubic inch- Daytona Beach, FL 32117 es, modifications to the engine and the Crane Cams person with whom you spoke. Also, where the parts were purchased, and when they were bought. Even though you phoned, you must still (866-388-5120). We answer phone include a note along with the parts being returned. Failure to do this can delay your warranty claim.

If the product is a hydraulic or mechanical lifter cam being returned, you must also return all of the lifters **used** (if they are Crane) for evaluation. Crane's warranty is limited to repair or replacement of Crane products only. Non-Crane parts will be returned upon your request only. Send the note and the parts you wish to return to:

Crane Cams Attn: Warranty Dept. 1830 Holsonback Drive

Should you telephone about any warranty claim parts already returned to us, be sure to ask for Customer Service calls Monday through Friday, 8:00 am to 5:00 pm.

Crane Cams normally handles claims in less than 10 days of receipt of the parts. We will return any repaired or replaced warranty parts prepaid for surface shipping, at our expense. (We reserve the right to select the carrier.)

Crane Cams Limited Warranty

Crane Cams warrants that all of its products are free from defects in material and workmanship. All Crane Cams performance products are subject to the conditions established in this policy.

Crane Cams warrants that when our products are properly installed in their correct application, they will be free from defect and will function as specified.

Due to the variety of modifications made on performance engines that may affect performance, economy and engine life, Crane Cams' obligation under this warranty is limited to the repair or replacement, only of Crane products, when the consumer returns these Crane Cams products directly to Crane Cams, Warranty Department, 1830 Holsonback Drive, Daytona Beach, FL 32117.

There is absolutely no warranty, implied or otherwise, on Crane Cams parts used in competition (racing) engine applications.

This limited warranty begins on the date of purchase and is good for a period of one year from the

validated date of purchase unless otherwise specified to the original purchaser.

This warranty will be void on all products that show evidence of misapplication, improper installation, abuse, lack of proper maintenance, negligence, racing engine use, or alteration from their original design.

Crane Cams reserves the right to make necessary changes in the products it manufactures and markets at any time to improve product performance. These changes in products will be made without obligation to change or improve products that were previously manufactured.

This warranty limits any implied warranty to one year, and no person, company or organization is authorized to assume for Crane Cams any other liability in connection with the sale of Crane Cams products. Some states do not allow limitations on how long an implied warranty lasts.

This limited warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Cams...from Beginning to End!



Genuine Crane 8620 and 9310 Steel Billet Cams... The Strongest Available!

Our famous carburized roller cams begin as 8620 or 9310 alloy steel billet bar stock. Each cam then undergoes numerous precision manufacturing operations required to produce a finished cam. You can identify a genuine Crane cam core by the distinctive copper plating between the lobes! Crane 8620 and 9310 steel billet cam cores are used by prominent racers, engine builders, and manufacturers.

Lobe-To-Lobe, Cam-To-Cam Accuracy!

Only Crane Cams delivers that famous Crane lobe-tolobe, cam-to-cam

accuracy that engine builders trust! Crane Cams are always **measurably more**

accurate because we begin with the industry's most accurate tooling and end with the industry's most accurate manufacturing... **all performed in-house**, by Crane!



Roller Cam Power With Hydraulic Cam Convenience!

The world's finest, strongest, most durable *carburized* and *induction hardened* steel billet cams and the proven power making capabilities of Crane Cams' *hydraulic roller* lobe profiles produce roller cam power with the easy maintenance of a standard hydraulic cam!

The World's Most Powerful Cam Profiles For All-Out Racing!

For more than 55 years Crane Cams have powered **winners** and **broken records!** Crane-pioneered **dual-pattern** cam lobe profiles first appeared in the 1960's, and are today's primary component in shattering drag racing's 330 mph Top Fuel barrier and the Pro/Stock 200 mph barrier! When records fall, Crane Cams make it happen!





Daytona Beach, FL Phone 386-310-4875 Toll Free 866-388-5120 Fax 386-236-9983 www.cranecams.com



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