I borrowed this of the SUMMIT RACING site; I figured some of the newer guys could use the info

The Basics On Choosing the Right Street Cam
Not so long ago, the bigger is better philosophy reigned supreme regarding camshafts. The result was overcammed engines that sounded great and could crank serious top-end power, but were not very streetable and couldn't idle to save their lives.

But thanks to modern cam technology, you can come pretty darn close to the Holy Grail of street bumpsticks—cams that make high rpm power, have good low-end torque and drivability, decent vacuum for power brakes, and that loping idle we all love. Camshaft theory is a complex subject that can take a book-length article to explain. We're going to concentrate on the basics you'll need to know to choose a good street cam.

Lift and Duration
Lift and duration are the primary factors that determine a cam's profile. Lift is the amount a cam lobe actually moves a valve off its seat, and is measured in fractions of an inch. Duration is the amount of time a cam keeps a valve off of its seat, measured in degrees of crank rotation.
Lift and duration combined determine total open valve area—the space available for air and fuel to flow into and out of the combustion chamber. The more valve area open to flow, the more power an engine can theoretically make. The trick is to "size" a cam to optimize valvetrain events for your particular engine combination and vehicle.

Cam Sizing
Virtually every cam maker uses duration to rate camshafts. When someone talks about a "big" cam, they are referring to cams with longer duration. This keeps the valves open longer, increasing midrange and top-end power at the expense of low-end torque. A shorter duration cam does just the opposite. Because it doesn't keep the valves open as long, a smaller cam boosts low rpm torque and drivability. There are two ways to measure duration:
Advertised Duration is the figure you usually see in the cam ads and hear about at those late-night bench races. The problem with advertised duration is cam makers use various methods of measuring it, making it difficult to compare cams from different makers.
Duration at .050 measures duration at .050 inches of valve lift. Since all cam grinders use this measurement, it's a much more accurate way to make a comparison. Two cams may be very close in advertised duration, for example, but make peak power at different rpms. Summit Racing uses duration at .050 ratings to help you better compare the wide variety of cams it carries.
Lobe Separation
Lobe separation is the number of degrees that separate the peak lift points of the cam's intake and exhaust lobe. Like duration, lobe separation helps determine the cam's rpm range. Generally, a cam with wider lobe separation (112-116 degrees) will make power over a wider rpm band. A cam with narrow lobe separation (under 112 degrees) is biased toward peak power and operates within a narrower rpm band. For the street, you want a cam with a fairly wide lobe separation for the best power production over the engine's entire rpm range. Go too narrow with lobe separation and you may end up with an engine with a peaky powerband biased to high rpm horsepower—not the hot ticket for a street car.

Flat Tappet vs. Roller
Now that you have an idea of what lift and duration are, let's muddy things up by comparing flat tappet and roller lifter cams. Flat tappet cams use a lifter with a slightly curved bottom that slides against the cam lobes. Virtually every V8 engine built before the late 1980s came with a flat tappet cam; they are reliable and relatively inexpensive. With literally hundreds of profiles to choose from, finding a good flat tappet cam for your street car is not difficult.
Roller cams are hardened steel cams that use lifters with a roller, or wheel, that rolls over the cam lobes. This design dramatically decreases valvetrain friction and wear, and allows designers to create profiles that offer more lift without increasing duration. That means a roller can make more midrange and top end power than a flat tappet cam of the same duration without sacrificing

bottom end power. If you need proof that roller cams are better, ask the OEMs what they put in their engines nowadays.

Hydraulic or Solid?

Flat tappet and roller cams for overhead valve engines are available with hydraulic and mechanical lifters. Hydraulic lifters are self-adjusting; they use an oil-damped, spring-loaded plunger to help maintain valve lash (the distance between the valve stem and the rocker arm tip). Hydraulic lifter cams are quiet, require virtually no maintenance, and transmit less shock to the valvetrain. Their main drawback is a tendency to "pump-up" (overfill with oil) and cause the valves to float, or stay open too long, at high rpm. Valve float kills power, and can lead to engine damage if you keep your foot planted in the throttle.

Mechanical, or solid, lifters are not self-adjusting. They rely on a properly set up, adjustable valvetrain to maintain proper valve lash. Because solid lifter cams are less susceptible to valve float at higher rpms, they are ideal for more radical street and racing profiles. The price of running solid lifters is periodic adjustment of valve lash and increased valvetrain noise.

Overhead Cam Considerations

Overhead cam engines, like Ford's 4.6 and 5.4 liter Modular V8s, follow the same rules regarding cam selection as overhead valve engines. The primary difference is how valve lift is determined. Overhead cam engines don't use rocker arms, so there is no multiplication effect to increase valve lift (cam lift x rocker arm ratio = valve lift). Thus, cam lift and valve lift are the same.

The only way to increase lift with an overhead cam is to reduce the diameter of its base circle (the rounded bottom portion of the lobes). Changing the base circle increases valve lash as well, requiring the use of taller lash caps on the valve stems to maintain proper valve lash. This is a fairly involved process, which is a big reason why you'll see many street cams for overhead cam engines with various duration figures but the same lift number.

Information, Please

Your sales rep or cam maker will need to know the following parameters to help you get the right cam grind for your particular vehicle and engine combination:

Vehicle Weight: You can run a bigger cam in a lightweight vehicle because less low-end torque is necessary to get it moving. Heavy vehicles need cams that emphasize low-end power.

Rear Axle Gear Ratio and Tire Size: If you have a bigger (numerically higher) gear ratio, you can use a bigger cam. Lower "economy" gears work better with a mild cam that makes power at low rpm. Tire height is important because it helps determine the final drive ratio.

Transmission Type: Cams for automatics have to work over a broader rpm range. Manual transmissions can tolerate a bigger cam biased to making peak power. The cam's powerband should match torque converter stall speed or clutch "dump" rpm.

Engine Size and Compression: A cam's profile is affected by displacement. Most cam descriptions for small block Chevys, for example, are based on 350 cubic inch engines. Put a cam in a 383 stroker and it will act like a milder grind. The more duration a cam has, the more compression is needed to maintain proper cylinder pressure at low rpm.

Airflow: Your cam needs to work within the airflow capabilities of the engine. The airflow characteristics of the cylinder heads (amount, intake/exhaust ratios, port work, etc.), induction system, and exhaust system are all factors.

Power Adders: Superchargers, turbos, and nitrous require special cam profiles to take advantage of the extra power potential. In general, cams made for use with power adders are ground with wider lobe separation to take advantage of the extra cylinder pressure.

Rocker Arm Ratio: Going to a larger rocker arm ratio increases valve lift on overhead valve engines. The cam should be tailored to work with your specific ratio to avoid slapping valves into pistons or trashing valve springs.

Cam Comparison: 5.0L Mustang

Let's compare two popular hydraulic roller cams for a 5.0L Fox-body Mustang that specs out as follows:

•3,400 pound vehicle weight, 5-speed, 3.73 rear axle gear
•306 cubic inch small block, 9.5:1 compression with EFI, aluminum heads, shorty headers, and cat-back exhaust

Cam One: Ford Racing X303
(Part Number FMS-M6250X303)
Advertised Duration: 286 degrees intake/exhaust
Duration at .050: 224 degrees intake/exhaust
Valve Lift (with 1.6 rocker): .542 inches intake/exhaust
Lobe Separation: 110 degrees
Powerband: 2,500-6,200 rpm

Cam Two: Comp Cams Xtreme Energy OE Roller 35-514-8
(Part Number CCA-355148)
Advertised Duration: 266 degrees intake, 274 degrees exhaust
Duration at .050: 216 degrees intake/224 degrees exhaust
Valve Lift (with 1.6 rocker): .545 inches intake/.555 inches exhaust
Lobe Separation: 112 degrees
Powerband: 1,600-5,600 rpm

If you look at just advertised duration, the Comp grind looks less aggressive than the Ford Racing cam. But when you check duration at .050, both cams are virtually the same. This is an example of why duration at .050 is a much better comparison method.
Where our cams diverge is in lift and lobe separation. The Comp Xtreme Energy grind offers far more lift and a relatively wide 112 degree lobe separation, so it makes good power across the rpm band. The extra lift and duration on the exhaust side helps improve the small block Ford's poor exhaust breathing. Comp recommends the cam for cars with 3.27-3.73 gears, Mass Air systems, and mild modifications like a larger throttle body, headers, and free-flowing exhaust. Either a five-speed or an AOD automatic with a mild stall converter would work with this cam.
The Ford Racing X303 has slightly lower lift figures, but is ground with a narrower 110 degree lobe separation. That makes the cam more biased toward high rpm power production. In fact, peak horsepower rpm comes at a rather lofty 6,500 rpm, almost 1,000 rpm higher than the Xtreme Energy cam. Ford Racing says the X303 should be used with a five-speed manual transmission.
We hope this little primer gave you the knowledge you need to choose the right cam for your street ride. If you want to get a PhD in camshaft-ology, companies like Crane, Comp Cams, and Iskenderian have loads of information on their websites to help you become Dr. Bumpstick. Happy cam shopping!

Additional Sources

http://www.symuli.com/vw/camp1.html

http://www.symuli.com/vw/camp2.html

http://www.chevytalk.com/tech/101/Cam_Theory.html

Comp Cams: www.compcams.com
Crane Cams: www.cranecams.com
Ed Iskenderian Cam Co.: www.iskycams.com
Lunati Cams: www.lunaticamshafts.com

Here's a different sites info

Misunderstood Ideas

Overlap and Compression- A very common idea, although for the most part incorrect, is that overlap bleeds off compression. Overlap, by itself, does not bleed off compression. Overlap is the angle between the exhaust closing and intake opening and is used to tune the exhaust's ability draw in additional intake charge as well as tuning idle vacuum and controlling power band width. Cylinder pressure is generated during the compression cycle, after the intake valve has closed and before the exhaust opens. Within practical limits, an early intake closing and late exhaust opening will maintain the highest cylinder pressure. By narrowing the Lobe Separation Angle 'LSA' for a given lobe duration, the overlap increases, but the cylinder pressure can be increased as well. Thus cylinder pressure/compression can actually increase in this scenario, by the earlier intake closing and later exhaust opening. By increasing duration for a given LSA, the overlap will increase, the intake closing will be delayed, and the exhaust opening will occur earlier. This will decrease cylinder pressure, but the decrease/bleed-off of compression is not due to the overlap, it is due to the intake closing and exhaust opening events.

Adjusting Lash on Mechanical/Solid Cams- If valve lash changes significantly over time, then something is wrong. Cam wear is very slight, along the order of .002 or less. If the lash setting changes more than .005 then there has been a component failure (loosened hardware or actual mechanical failure). Lash settings should be taken/adjusted at the same temperature and same order as the previous or original setting. This is the only way to rule out expansion/contraction of the components from temperature changes. This temperature delta is usually the culprit of most valve lash dilemmas. At initial start-up and break-in of a new set-up: cam, lifters, rockers, pushrods, valve job, etc., the lash may move around during the break-in procedure and for a short time after. This is because all the parts are seating into their new wear patterns. Once this occurs, the lash setting should stay steady.

Hydraulic Lifter PreLoad- Hydraulic lifters are intended to make up for valvetrain dimensional differences as well as providing a self-adjusting method of maintaining valve lash, or rather the lack of. By setting the valvetrain so the lifter plunger is depressed slightly, the lifter is able to compensate for these differences, making a convenient hassle-free valvetrain set-up. For performance applications, lifter preload is not needed or wanted. As rpm's increase, the lifter has a tendency to bounce over the back of the lobe as it comes back down from the maximum lift point. The pressurized oil fills the lifter body to account for this bouncing. Eventually, after several engine revolutions, the oil can completely fill the lifter body and the plunger will be pushed up to its full travel (pump-up). Higher oil pressures can amplify this problem. With the lifter pre-loaded, this can cause a valve to run off its seat and can cause piston clearance issues if and when pump-up occurs. By setting the valvetrain at 'zero' preload, lifter pump up is eliminated and in most cases, the cam will rev higher. Ford tech articles in late 60's actually urged 'stock' class racers to run .001-.003 lash on hydraulic cams.

Piston To Valve Clearance- Piston clearance is a function of lobe geometry and phasing to the piston. Cam lift should not be a deciding a factor in clearance issues. Valves will hit the piston in the overlap period, while exhaust is closing and intake is opening. Exhaust clearance problems will typically occur just before TDC and intake just after TDC, not at max lift. Some cylinder head venders and other component manufacturers advertise a max duration or lift before clearance issues arise. This is very misleading. Maximum safe duration is a totally bogus value, and is completely worthless without knowing anything about the ramp rates or actual timing/phasing events of the installation. At least with maximum safe lift, the vendor can a apply a ridiculously fast ramp at a very early opening/closing and arrive at a somewhat meaningful measurement, but without knowing the design specifics the information is still next to useless.

Custom Ground Camshafts- When the performance of a particular engine combination is wanted to be optimized, the camshaft design parameters are calculated from the engine and vehicle specifications to perform within specific conditions. Let me emphasize that last statement, 'within specific conditions!'. In no way was total maximum power for the engine implied. The intent is to maximize performance within the intended design parameters. If that means taking a pro-stock motor and wanting to run it from 2000-5000 rpm, then so be it.

The camshaft's seat timing events, ramp rate, and lift are directly related to the intake and exhaust flow capabilities, crankshaft geometry, static compression, rpm range, as well as other criteria. A camshaft selected in this manner, becomes personalized to that particular engine combination. Usually a custom grind is selected as an intake lobe and exhaust lobe with a particular phasing to each other (lobe separation angle, LSA) and sometimes a specified amount of advance or retard is built in. Although, it could easily end up having completely reengineered lobe characteristics, requiring new lobe masters with specialized ramp requirements. It is possible for an off-the-shelf camshaft to be a classified as a 'custom'. If the cam design is calculated for a particular combination and an off-the-shelf part number fits the bill, then for all practical purposes that part number is a 'custom' cam (but only for that particular set-up).

Typically, cam catalogs do not specifically list custom ground camshafts, because the possibilities are endless. They stick to particular series or families of camshafts. The superstock grinds come closest to an off-the-shelf grind that is truly optimized for a combination. There will be small differences due to header sizes and engine builder's 'secrets, but usually the catalogs are pretty close to a good baseline. Likewise, brand to brand, the grinds will be very similar because of the 'class' dictated combinations and the flow characteristics being so well documented

Degreeing Camshafts- There is no special magic involved for degreeing a camshaft during installation, but this is not the same thing as random advancing, retarding, or installing the gears 'lined up'. Degreeing a camshaft involves definite known values for valve events. Typically this is specified as an Intake Centerline or as opening/closing events at specific lobe lifts. This is done to insure the cam is installed per specific requirements, such as a recommendation from an engine builder or the vendor's data sheet for that camshaft grind. Manufacturing tolerances and shop practices do not guarantee that the cam matches the data sheet, when installed at crank gear 'zero'. The cam will usually need to be advanced or retarded to the correct location. If it is correct, at crank gear 'zero', then the cam has still been degreed. It just did not require any additional tweaking to meet the requirements. This is what degreeing a cam is all about; the verification of the installation. A common mis-used term is the 'straight-up' installation. Typically this is described as installing the cam at crank gear 'zero'. This is 100% wrong. Straight-up refers to the Intake and Exhaust Centerlines being the same. In other words the cam will have no advance or retard at the installation, regardless of the amount of advance/retard ground in by the vendor. In reality, the cam may have to be advanced or retarded (from crank gear 'zero') significantly to arrive at a straight-up installation.

Exhaust System Diameter and Engine Horsepower- A popular idea is to select/size the exhaust system components to the engine's horsepower output. This idea typically attributes a header diameter or an exhaust system diameter to a particular horsepower level. To resolve this, look at how an engine operates and consider one cylinder. The cylinder will move a volume of air based on its crankshaft geometry, rpm, and sealing capability. The amount of air that can enter the cylinder is dependant on the intake flow capability, crank geometry, rpm, and valve timing as a minimum consideration. Likewise, the amount of air that exits the cylinder is dependent on the same characteristics.

An engine's output is usually thought of in terms of horsepower. Actually, an engine produces torque, and the horsepower is calculated through a units conversion. The amount of torque an engine can produce is directly related to the amount of cylinder pressure generated. This is all affected by the same previous characteristics (intake and exhaust capability, crank geometry, rpm, valvetiming, etc). So basically an engine's power output is about air exchange capability. Using this line of thinking, look at the exhaust path again. The exhaust system is more reflective of the engine's ability to move air, as opposed to horsepower numbers. Engine output does not address the breathing aspects of the engine and is probably not a good rule to use for exhaust sizing.

There is a very good reason that tuners/engineers/specialist have attempted to assign exhaust to intake relationships around 70-80% for a typical natural aspirated set-up. In non-detailed terms, it is a range that offers a good balance for power capability. Other relationships, such as 1:1, are used and they work very well, but these methods have to be applied and tuned for very specific circumstances. This relationship does not stop on the flow bench, it goes all the way from the intake path opening to the exhaust system termination. In short, try to maintain exhaust sizes that are inline with the intake capability. Also, do not stop your analysis at the intake and exhaust paths. If the engine already has the camshaft, look at the valve events. If the specs favor a restricted exhaust (indicated by early and wider exhaust openings with wider lobe separation angles), then size it accordingly by using exhaust components with smaller cross-sections. If the valve timing specs favor the intake, then the engine needs some serious exhaust flow capability which is only possible with larger cross-sections.

This section was written with natural aspirated combinations in mind. However, by using the 'air exchange' rationale, it becomes apparent why forced induction engines typically benefit from increased exhaust flow capability. Also, look at the nitrous combinations. The intake system remains virtually unchanged, yet with the major increases in cylinder pressure it acts like a substantially larger engine on the exhaust side, requiring earlier exhaust openings and/or higher exhaust flow capability.

Pushrod Length- Incorrect pushrod length can be detrimental to valve guide wear. Most sources say that centering the rocker contact patch on the valve stem centerline at mid valve lift is the correct method for determining the optimum pushrod length. This method is wrong and can actually cause more harm than good. The method only applies when the valvetrain geometry is correct. This means that the rocker arm lengths and stud placement and valve tip heights are all perfect. This is rarely the case. To illustrate this, think of the valve angle and the rocker stud angle. They are usually not the same. If a longer or shorter valve is installed, then the relationship of the valve tip to the rocker stud centerline has changed. Heads that have had multiple valve jobs can also see this relationship change. Note, the rocker length (pivot to tip) remains unchanged, so the rocker contact patch will have to move off the valve centerline some particular distance for optimum geometry to be maintained.

The optimum length, for component longevity, is the length that will give the least rocker arm contact area on the valve stem. In other words the narrowest wear pattern. This assures that the relationship is optimized and the rocker is positioned at the correct angle. This means that the optimum rocker tip contact point does not necessarily coincide with the valve stem centerline, and probably will not. What is the acceptable limit for being offset from the valve stem centerline? That will depend on the set-up. A safe margin to strive for is about +/-.080" of the centerline of an 11/32 diameter valve stem. This means that no part of the wear pattern should be outside of this .160" wide envelope. As the pushrod length is changed, the pattern will change noticeably. As the geometry becomes closer to optimum, the pattern will get narrowest. If the narrowest pattern is too far from the valvestem centerline, then the valve to rocker relationship has to be changed. In this case, valve stem length will need to change.

What is meant by basic RPM?
The camshafts 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.

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 .050î lifter rise) is the deciding factor to what the engines 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’s.)

Advertised duration and duration at .050î 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 .050î 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.

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 engines 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°) allows the torque to be spread over a broader portion of the basic RPM range and shows better power through the upper RPM.

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 centerlines of the intake and exhaust lobes can be moved by installing the camshaft in the engine to an advanced or a retarded position. Generally speaking, the average of the intake and exhaust lobe centerline figures is the camshaft lobe separation in camshaft degrees.

How does advancing or retarding the camshafts 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 .050î 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 engines cylinder pressure. The other two are the duration of the camshaft (at .050î 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 engines 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.

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 gas is too volatile and cannot tolerate high compression ratio (above 10.5:1) and high cylinder pressure (above approximately 165 PSI) without risking detonation. Fuel octane boosters or expensive racing gasoline will be necessary if too much cylinder pressure is generated.

How does an increase in rocker arm ratio improve the engines 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 .320î lobe lift using a 1.50:1 ratio rocker arm will have a .480î valve lift (.320î x 1.50 = .480î). If you install rocker arms with an increased ratio of 1.60:1, with the same cam, the lift would increase to .512î (.320î x 1.60 = .512î). 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.
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 matters

Must new (Standard Design) lifters always be installed on a new camshaft?

YES! All new standard hydraulic and mechanical camshafts must have new lifters installed. The face of these lifters 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. 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 lifter can be re-used.

What engine oil and lubricants should I use?

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 several lubricants to aid during the critical break-in procedure, and to prolong the engines life.

Should I use Oil Restrictors in my engine?

No, Crane Cams does not recommend the use of oil restrictors. The oil is the lifeblood 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’s 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 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.