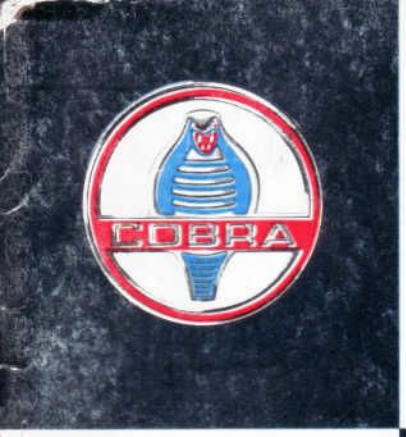
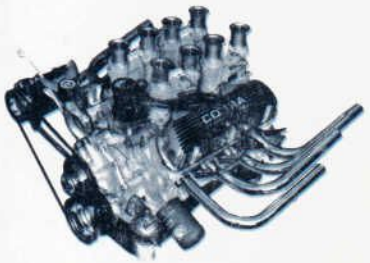
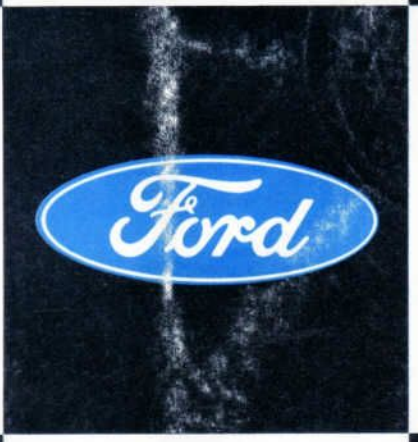
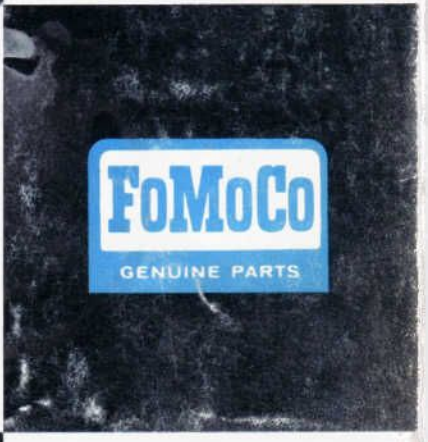
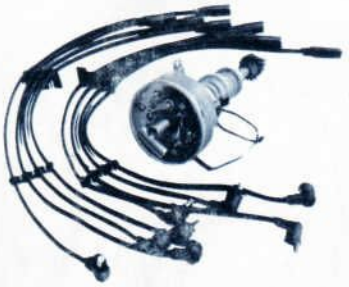
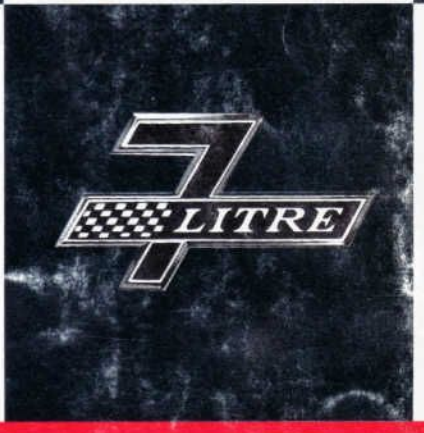






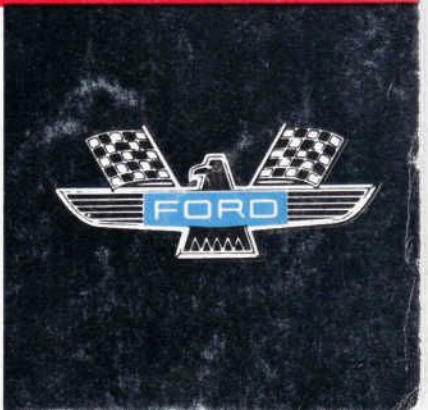






Ford HIGH PERFORMANCE

a guide to its fundamentals and performance products offered by Ford



Contents

Introduction

This reference book is designed to acquaint you with high performance and some of the performance products offered by Ford Motor Company. You can obtain these products, as well as service and other high performance information, by contacting your nearest Ford Dealer.

Ford is unique in offering the services of a Performance Advisor to aid in the selection and application of items that will be compatible with your particular vehicle and personal driving requirements. He is Akton O. (Ak) Miller who has had a distinguished career in the performance field.

Ak was a co-founder of the world's oldest hot rod club, and during his term as President of the Southern California Timing Association, the first Bonneville Speed Trials were run; the modern method of classification of cars with respect to cubic inch breakdown versus body styles was established; and the first legitimate drag strip activity was started. He was also one of the founders of the National Hot Rod Association and currently serves as Vice President. His professional racing career commenced in 1952 in the Pan American Road Race in Mexico. Ak's current hobby is building and racing his own cars in the Pikes Peak Hill Climb, where he holds a record of six wins in the sports car category during the past eight years.

We invite you to take advantage of the service offered by this distinguished member of the high performance field. Write to:

AK MILLER
Ford Performance Advisor
P. O. Box 627, Dearborn, Michigan 48121

NOTE: Prices shown are manufacturer's suggested retail price. Installation charges and state or local taxes, if any, are extra.

The prices, descriptions and specifications contained in this book were in effect at the time this publication was approved for printing and are subject to change without notice and without liability therefore.

The Ford Division of Ford Motor Company, whose policy is one of continuous improvement, reserves the right to discontinue or change models at any time.

What Does Ford High Performance Mean To You?

What is performance? It has many facets. It encompasses ride . . . handling . . . economy . . . safety . . . durability . . . high speed operation and many other things, depending on what features you want in a car. Put them all together, and you have what Ford builds into every car . . . total performance. Add a little extra in the area that interests you, and you not only have total performance, but a car that excels . . . one with *high performance.*

With Ford Motor Company you can obtain high performance in almost any degree you wish. You can get it ready-made in "hot performers" right off the showroom floor such as in the 427 Galaxie and High Performance Mustang with a special handling package . . . the Fairlane GT and GTA. You can modify any Ford to meet individual driving requirements. You can achieve it little by little or all at once with high performance components ranging from tachometers to complete engines . . . whether it be for the street, the drag strip, or sustained high speed competitive events.

Only Ford can offer the Total Performance car and a vast variety of choices to increase performance because only Ford possesses an unmatched record of "performance proven" components in open competition.

INDIANAPOLIS: The Indianapolis "500" has long been recognized as a supreme test of engine, chassis and tires, with only the most durable of entries finishing the race. Over the past three years the Ford-powered Lotus cars have rewritten the record book and changed much that was tradition at "Indy."

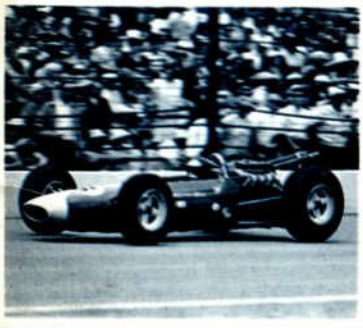
In 1963, a basic Fairlane "260" block was cast in aluminum and modified to meet Indianapolis regulations. Mounted in the rear of a lightweight Lotus body, it finished second, burning gasoline instead of racing fuels,and broke all previous speed records.

"Indy" cars powered by Ford again gave an outstanding performance in 1964. In 1965 Jimmy Clark drove his Lotus-Ford to an easy victory at a record speed of 150.686 miles per hour. The first four cars were powered by Ford, as were eight of the eleven that finished!

STOCK CAR RACING: Competition-modified production cars must withstand the same rigorous treatment as the specially designed cars of Indianapolis. Ford has won the NASCAR Manufacturer's Award for Excellence for three consecutive years in recognition of Ford's dominance on the ovals. During the 1965 season, Ford won all 10 races of 300 miles or longer, and 48 of the 55 events they entered. Dan Gurney started the 1966 season by driving a Ford to an unprecedented fourth straight win at Riverside.

DRAG RACING: This test of acceleration from a standing start over a measured distance, usually a quarter mile, has brought many new laurels to Ford. Competition in events ranging from the stock car without any modifications to the specially designed "rail cars" burning exotic fuels in supercharged engines brought immediate success. Some of the 1965 champions were: Les Ritchie winning the A/FX title in an experimental Mustang at the National Hot Rod Association Nationals and Bud Shellenberger winning the top stock eliminator title in a Ford Galaxie. Connie Kalitta became the first man to better 200 m.p.h. in an AHRA national meet with his Ford-powered rail car, "Bounty Hunter".

ROAD AND RALLY COMPETITION: Road racing not only requires speed and durability, but superior handling, steering, braking, gearing and, of course, driving skill. The Ford GT burst upon the international scene at Le Mans, setting lap records and winning many events around the world in 1965. The Mustang GT 350 and the Ford-powered Cobras of Carroll Shelby dominated competition in their classes. A modified version of the Ford GT called the Mark II began the 1966 season with a 1-2-3-5 finish at the 24-hour Daytona International.



INDIANAPOLIS

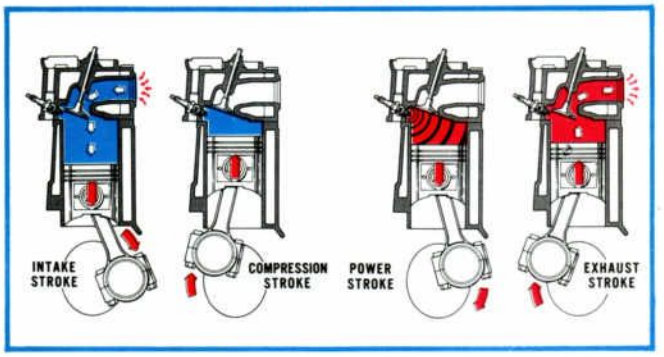
STOCK CAR RACING

DRAG RACING

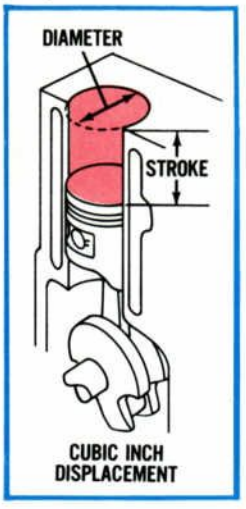
ROAD RACING

Why is it that one car outperforms another? If we assume driving abilities are equal, then it stands to reason the difference must be "under the hood." Strictly speaking, that means the engine. And while the engine is the heart of any performance car, the transmission, rear axle, tires and a host of other factors, like horsepower-to-vehicle-weight ratio, are important. So let's take a quick look at a few fundamentals, so as to gain a better knowledge of how to select and modify a car for high performance.

THE ENGINE



The power-producing ability of an engine is dependent upon the amount of air it can consume. The power is produced by burning the air mixed with fuel under compression, which generates high temperatures (up to 4500° F) resulting in an expansion of the gases and high pressures which force the piston downward. Here are some of the more important factors that determine how much air is consumed during the power-producing process.



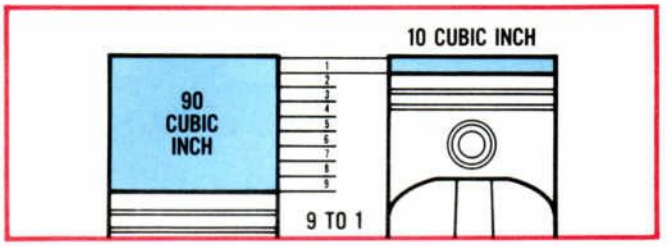
CUBIC INCH DISPLACEMENT (CID).

Cubic Inch Displacement is the total volume of all cylinders in an engine . . . calculated as follows: Bore (or diameter) squared times Stroke (or length) times 0.7854 times the number of cylinders. All other things being equal, the CID is an index of how much power the engine may be expected to produce.

For additional power, it is possible to increase the cubic inch displacement by one of two methods: The first would be to bore out the cylinders and install oversize pistons. The second would be to increase the stroke of the crankshaft (normally referred to as a stroker kit). These kits generally include special oversize pistons plus a reworked crankshaft. Unless the cam and carburetion are also modified, boring and stroking generally only increase low and mid-range power.

COMPRESSION RATIO.

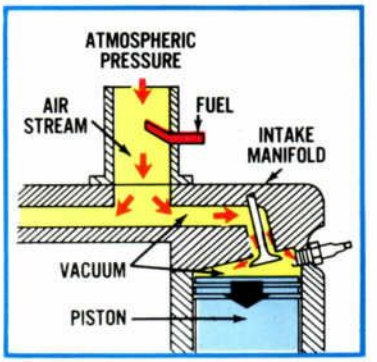
This is a comparison of the volume of air in the cylinder when the piston is at the bottom of its stroke (bottom dead center, "BDC") and the compressed volume of air when the piston is at the top of its stroke (top dead center, "TDC"). The greater the compression (squeezing the combustible charge into a smaller space) the more power it is possible



to generate when the mixture is ignited. Since the space (compression chamber) into which the mixture is squeezed is located above the piston head, installing "milled" heads with smaller compression areas, using thinner head gaskets or special "domed" pistons, are the most common methods of increasing compression ratio and power.

CARBURETION.

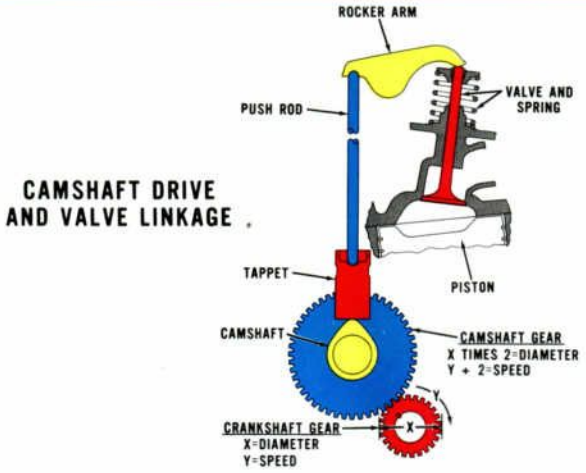
The carburetor together with the intake manifold mixes air with fuel and routes the mixture to the cylinders. This is often called "induction". The carburetor is essentially a tube or barrel through which an air stream passes and picks up droplets of fuel. The air stream is caused by atmospheric pressure pushing the air into the vacuum created by the downward intake stroke of the pistons. To obtain maximum power from the air/fuel mixture, all the oxygen in the air must be consumed. Ideally, about 1 part of fuel is required to burn 14.8 parts of air. However, a number of conditions prevent the ideal situation. As a result, the mixture must be enriched by mixing less air (13.0:1) to insure complete combustion of all the oxygen.



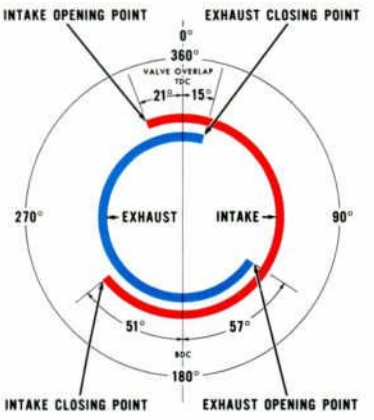
One of the conditions which prevents getting an ideal charge of air/fuel into the cylinder for maximum power is the size, number and shape of passages in the intake manifold. Increasing the size and number of carburetor barrels (venturis) increases the rate at which the air/fuel mixture can be fed into the cylinders. Special manifold designs such as the "high riser" manifold allow gently curved passages which reduce restriction of air flow and increase breathing capacity and hence add to performance.

VALVE TIMING.

To obtain peak performance, the intake valve must open in time to let the maximum volume of air/fuel into the cylinder. Likewise the exhaust valve must open in time to purge the maximum volume of residual gases from the cylinder. Conversely, they must also close soon enough to produce maximum compression and power. Each stroke takes 180° of crankshaft rotation, or a total of 720° for the complete four-cycles. Therefore, the camshaft which controls the valves must rotate at one-half crankshaft speed. Valve timing, however, is expressed in degrees of crankshaft rotation. The shape of the camshaft lobe determines the rate at which the valves open and close, length of time it remains open (duration) and how far it opens (lift). As RPMs increase, the intake and exhaust gases do not start to flow as soon as the valves open, nor do the valves open instantane-



CAMSHAFT DRIVE AND VALVE LINKAGE



VALVE TIMING DIAGRAM

ously. There is also less time for the gases to enter and exit the cylinders. Therefore, the valves must be opened and closed before the strokes are completed. This results in both valves being open at the same time; a condition called "overlap". Performance cams may have overlap in excess of 70° and a total valve opening duration of over 300°. Cams of this design produce significant power increases at high RPMs, but tend to cause a slight loss of power and rough operation at low RPMs.

High RPMs also have the effect of adding great weight to all components of the valve train. Dual or "stiff" valve springs are needed around 5000 RPM to quickly close the valves and prevent valve "float" (valves not fully closing between strokes). As RPMs pass 5000 mechanical or solid lifters are most generally used since they are more effective in preventing valve float. At high RPMs the hydraulic lifter has trouble maintaining zero lash or clearance in the valve train, so it "pumps up", thereby destroying valve train adjustment. Solid lifters tend to be noisy because there is some lash in the valve train, but they tend to eliminate valve float.

IGNITION.

Peak performance also depends upon burning the highly compressed air/fuel mixture in the shortest possible time to obtain the highest possible temperatures and pressures. The voltage necessary to jump the air gap of the spark plug and achieve a strong "hot" spark for fast combustion increases as the compression ratio increases. High RPMs also mean the coil has less time to produce the surges of high voltage. Replacing the single breaker point distributor with dual breaker points or with transistorized ignition enables the coil to produce high voltages at high RPMs. A hotter spark can also be obtained if the radio suppression wiring, which contains a resistance core, used on standard cars, is replaced by a solid core type wire with no resistance. A radio supression kit should be installed with this type wiring.

EXHAUST PRESSURE.

Sharp corners and small passages restrict the flow of exhaust gases just as they do intake gases. This subtracts from the power output of the engine. If more air is fed into the engine via multi-barrel carburetors and special manifolds, provisions must be made to exhaust more gases. Dual exhausts and "tuned" exhaust manifolds (headers) reduce back pressure and provide free breathing for improved performance.

CLUTCH

All recently built cars with performance engines have a high performance clutch installed at the factory to handle the high torque loads and control slipping at the high RPMs where gears are shifted. If a car that was built without a high performance clutch is being modified, one should be installed. For an extra margin of safety, a heavier clutch housing (scatter shield) should also be installed.

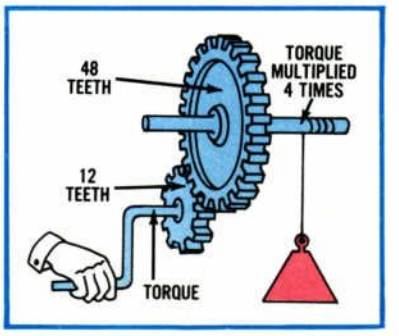
TRANSMISSION

Three- and four-speed manual transmissions are used almost exclusively in performance cars because they afford great flexibility to meet a wide variety of driving conditions. However, recent developments indicate that automatic transmissions may soon be used with equal success.

Regardless of what type transmission is used, its basic function is to multiply engine torque. This is accomplished by having a small gear turn a larger gear. By counting the number of teeth on each gear, the torque multiplying power or "ratio" can be computed. The higher the ratio, the greater the torque multiplying power.

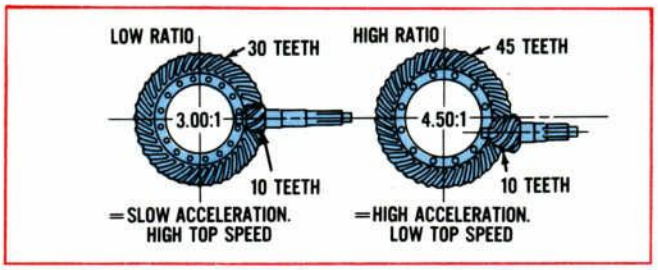
Low power from the engine, combined with the weight of the car, requires high gear ratios to set the car in motion. As the speed of the car increases, less torque multiplication is required, so gear ratios are changed (shifted) until the transmission is in high (1.00:1 ratio) and power from the engine is sufficient to move the car effectively.

Peak performance is achieved when engine RPMs are maintained at the point where maximum power output is achieved. A tachometer is an efficient accessory to indicate engine RPM and, thus, proper "shift points". Each time a shift is made to a higher gear, the RPMs momentarily drop because of the difference in ratios. The closer the ratios the easier it is to maintain the desired RPM. Four speeds are superior to three speeds in this respect since the ratios are more closely spaced together. Optional "close ratio" gear sets are also available when this is a most important factor, such as in drag competition. However, acceleration suffers with "close ratios" below about 20 MPH because the low gear ratio is not high enough. If maximum acceleration is desired, choose a transmission with a numerically high first gear.



REAR AXLE

Like choosing the proper transmission gearing, rear axle gearing is just as important in selecting and modifying an engine. The rear axle gears multiply engine torque at all times, whereas the transmission multiplies it in all gears except high. Several different ratios are available for varying amounts of multiplication. Numerically low ratios give less multiplication and

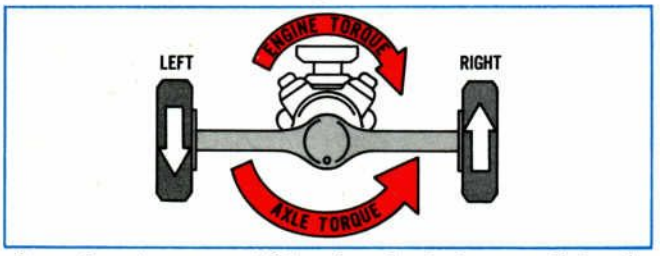


acceleration, but greater top speed and economy. Conversely, high numerical gear ratios give greater acceleration but a lower top speed. Generally, ratios above 4:00 are not practical on the "street" and should only be used in competition cars.

Because high performance engines develop greater torque at the rear wheels, and because the standard rear axle design allows wheel spin under certain conditions, a limited slip type axle is desirable. Even if one wheel spins, full power is transferred to the opposite wheel and peak performance is maintained.

TRACTION

Regardless of how much power is transmitted to the rear wheels, performance falls off if it can't "get to the ground". Maximum acceleration occurs when *both* wheels are *equally* loaded and delivering power just to the point of slipping. Special air lift springs are available which are adjusted to place extra weight over the right rear wheel to counteract the



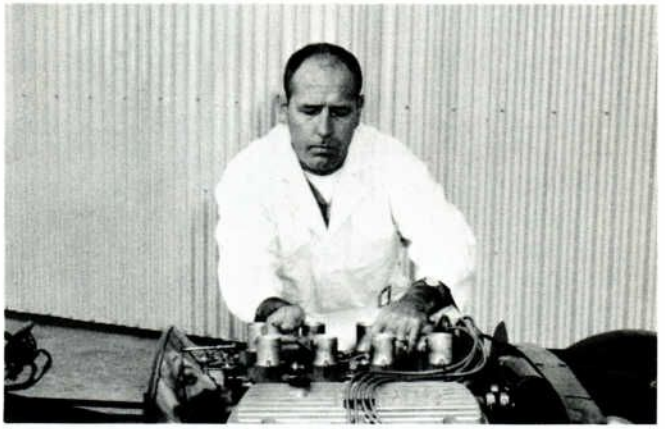
effect of engine torque lifting the wheel, thus equalizing the loads for better traction and maximum acceleration.

Another method of increasing traction is to use extra wide tires called "cheaters" or "slicks". They increase the amount of rubber contacting the road over the standard tires by approximately 12%. Many slicks look alike, but they have important differences. Some are strictly for track and will not give good traction on wet highways. Others can be used on or off the track, and still others are strictly for the street. Composition and tread design or the lack of a tread usually determine how slicks may be used.

ROADABILITY

A car's roadability or handling characteristics are a vital part of its over-all performance potential. "Quick ratio" steering gears to make a car more sensitive to steering . . . disc brakes to improve braking . . . and heavy duty springs, shocks and sway bars limit wander, bounce and roll.

Ford HOW TO SELECT



by AK MILLER

Ak Miller, one of America's top authorities on high performance equipment, gives his views and answers questions for those in need of expert advice on the selection and installation of engine modification components. Ak Miller's opinions and advice (appearing on pages 6 through 27) are his own and do not necessarily represent recommendations of Ford Motor Company.

There are many routes which lead to high performance. But they all should start with the basic decision: "What kind and how much."

In order to make a successful modification to your engine for the purpose of additional horsepower, it is very important to install components or make alterations in an orderly fashion.

After deciding the approximate amount of horsepower desired, select the RPM range in which you desire to add this horsepower and then choose the best equipment to help attain your goal.

Moderate gains from 10 to 30 horsepower are best obtained by the addition of various amounts of carburetion which, when properly applied, can increase torque as well as the total horsepower output in a fashion that is compatible with almost any transmission.

The next step would be the addition of more compression since compression likewise adds to both ends of the horsepower scale. The use of high performance exhaust manifolds with dual pipes and free-flow mufflers can contribute an additional 5 to 25 horsepower in many cases.

The final step would be the addition of the higher performance camshaft. In this area be extremely careful in selecting a cam that will give you a horsepower boost within a usable RPM range. This would, of course, be dictated by the over-all gear ratio weighed against the average use for which the vehicle is intended. We have dealt at greater length with each of the above modifications in the articles on the following pages. In selecting many of your high performance parts, you can use components from Ford high performance 289 and 427 engines, which have distinguished records in performance and reliability.

COMPONENTS AND MODIFY FOR HIGH PERFORMANCE

CARBURETION

The addition of greater amounts of carburetion to an engine for increased horsepower is an absolute must, considering the fact that an engine is basically an air pump, and the horsepower produced is a direct result of the amount of air and fuel it can burn efficiently.

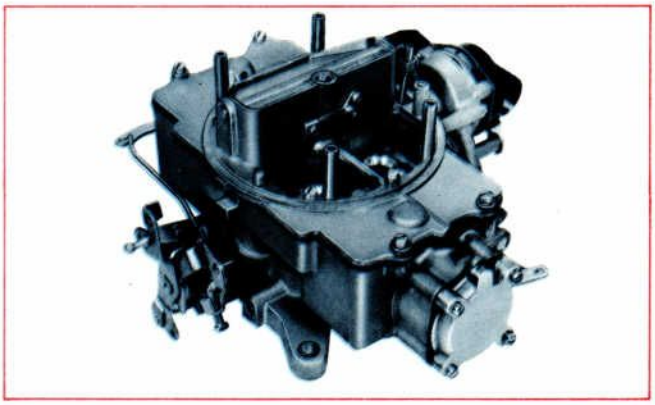
Since the air and fuel enter the engine by way of carburetor throats (venturis), it becomes apparent that we must enlarge the size of the venturis in our single carburetor or go to multiple carburetion featuring larger number of venturis of a smaller diameter or area. Small venturies are desirable from a standpoint of superior air flow control resulting in a smoother operating induction system.

The amount of air that flows through a carburetor is generally rated in cubic feet per minute (cfm). As an illustration, the standard 4-V carburetor used on the stock 390 Ford engine has a cfm rating of 540. If you wish to increase the air flow capacity of this engine, you can do so by simply installing a larger carburetor such as found on the Fairlane GTA having a flow capacity of 600 cfm. The net result should be a gain approximating 5 to 7 horsepower. Further increases in the area of larger carburetion would not be too effective since we would encounter restrictions in the inlet manifold passages.

This, of course, brings you to a choice of utilizing a larger inlet manifold in conjunction with a larger 4-V carburetor such as found on the 427 high performance engine, rated at 780 cfm. For a single carburetor to have such a capacity obviously means the venturi areas become extremely large and thus could result in "flat spots" as we go through transition periods from low to intermediate to high RPM. To minimize this effect, induction systems which feature more venturis with smaller areas but larger total volume cfm are used.

Ford offers two alternatives for their larger engines such as the 352-390 series. The first induction kit is commonly referred to as the 3 2-V, meaning 3 carburetors each with two venturi sections or a total of six venturis, having a combined cfm capacity of 860. By spreading the venturis over a larger area, in relation to inlet port locations, we are able to aid in the even distribution of fuel to the individual ports or cylinders. We also are able to exercise better control of the throttle system by the use of progressive mechanical linkage. This allows the utilization of one carburetor for normal operation, and all three when maximum horsepower is desired. We, therefore, have a great advantage in terms of a smooth operating engine over a broad range.

The second alternative is the use of the 8-V induction kit such as used on the 427 high performance production engine with a cfm rating of 1200. By utilizing eight smaller venturis



we are able to achieve a further gain in air flow capacity without sacrificing engine performance in regard to varying RPM ranges. As with the 6-V kit, progressive throttle mechanism is used with the added advantage of a fully automatic secondary throttle system regulated by vacuum diaphragms. With this arrangement throttle control is automatically opened at a time dictated by engine operating conditions. This represents the ultimate in total air flow capacities as well as the most sophisticated throttle arrangement for any given engine application, all for the sake of smooth power output.

For owners of the Fairlane series engines (221-260-289), Ford also offers basically the same arrangements outlined above.

CARBURETION TIPS

1. All carburetion systems should utilize an air fuel ratio of approximately 13 to 1.
2. Always try to install induction kits that are complete with respect to throttle arrangement and fuel lines; and have been proven by past performance to be suitable for your particular application.
3. The changing of jet sizes for maximum horsepower can best be accomplished with the aid of an air-fuel ratio meter. For trial and error experimentation, try .002 rich or lean for safe results.
4. Jet sizes are affected by changes in elevation. Higher elevations call for leaner jets.
5. Heat risers in intake manifolds should be blocked on competition engines.
6. Carburetion specifications for float settings should be carefully observed.
7. Carburetors demand specific amounts of fuel pressure and volume. Factory specifications should be used for best results.
8. Addition of supplementary fuel supply, such as electric pumps, when mounted near the source of fuel supply is beneficial for high performance applications.

COMPRESSION

When one considers increasing horsepower in a production engine, it is only natural to think of adding compression inasmuch as this is the one item which all high performance engines have in common.

Simply stated, higher compression creates greater working pressures and heat, which, in turn, extract more power from the air and fuel mixture. It also gives favorable horsepower and torque curves throughout the complete RPM range.

High compression ratios, however, induce the phenomenon we most often refer to as "pinging" or detonation. This condition denotes improper burning of fuel within the cylinders and must be controlled. The method by which we control the point of detonation is found in the type of fuel used. Since fuels are rated in terms of octane numbers, we must,of course, use the fuel with the right amount of anti-knock value expressed in these octane ratings.

For example, with a compression ratio of 9 to 1, you could generally use the so-called regular gasolines which have an octane rating varying from 85 to 95. If the compression ratio is raised to 10.5 to 1, you should use ethyl fuel which is generally rated at 95 to 100 octane. For higher compression ratios, super-premium fuels which usually have an octane rating of 98 to 104 should be used.

There are, of course, other factors which promote pinging or detonation. Some of these are excessive spark lead, incorrect fuel mixtures and high engine temperatures.

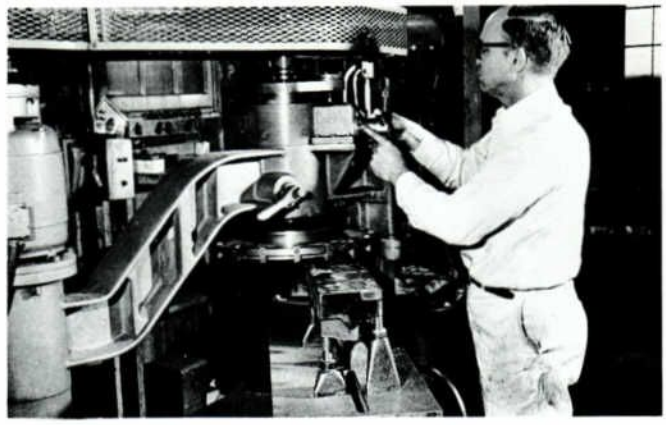
The modern high performance engine, such as the 427, can effectively utilize compression ratios on the order of 12 or 13 to 1; whereas, the standard production engine, such as the 390 2-V, utilizes 9.3 and the 4-V, 10.5.

The three most common methods of achieving more compression are: (1) Add special pistons with deflector domes. (2) Mill the cylinder heads or block. (3) Use thinner head gaskets.

The most popular and least expensive methods are thinner head gaskets, if available, or milling the cylinder heads. Naturally, there are limitations to the amount one can safely mill from a particular cylinder head, such as deck or casting thickness, valve to piston clearance, etc. It is a common practice to mill cylinder heads on most modern engines .010 to .040.

When milling cylinder heads or block surfaces, we must also mill intake manifolds so as to keep a proper alignment of ports and a good gasket seal condition. Most automotive specialty shops are well suited to accomplish both tasks.

The end result of adding compression to an engine is an appreciable increase in horsepower at all speeds and at a minimum cost.



HEAD MILLING CHART FOR 332-352-390-406 AND 427 ENGINES

Heads	Manifold Sides	Manifold Bottom	Heads	Manifold Sides	Manifold Bottom
.010	.010	.014	.030	.030	.042
.020	.020	.028	.040	.040	.057

HEAD MILLING CHART FOR 221-260-289 ENGINES

Heads	Manifold Sides	Manifold Bottom	Heads	Manifold Sides	Manifold Bottom
.010	.012	.017	.040	.049	.069
.020	.025	.034	.050	.062	.086
.030	.037	.052			

COMPRESSION TIPS

1. When milling heads, it is advisable to reface and reset valves.
2. Always install factory replacement head gaskets.
3. Milling in excess of .050 is not recommended.
4. Valve clearances should be reset or adjusted.
5. It is sometimes advisable to add steel shims under rocker assembly stands for proper hydraulic lifter clearance.
6. Always set valve springs to maximum factory specifications.
7. High compression ratios are very compatible with high performance camshafts.
8. When milling heads or changing cams, always check clearances between valve head and piston head at top dead center. .075 is the recommended minimum. Cams with greater overlap require more clearance in this area.
9. Compression should never be added to an engine that is not in top mechanical condition.

CAMSHAFTS

Undoubtedly the most frequently discussed component in the modern high performance automobile engine is the camshaft, as it enjoys more romance when it comes to speculation as to what it can and will do, or should have done, than any other single item one could possibly mention.

You can very easily find any number of cams that will exterminate all opposition, turn thousands of revolutions over and above the call of duty, or offer so much torque as to make the bolts literally shear from the rear wheels. This is all good, since it does help to focus attention in this critically important area when we finally decide to make the big switch from the stock cam to one of potentially higher performance. In this area most automotive enthusiasts would rather switch than fight.

When making a cam change it is very important to separate fact from fiction as all cams basically perform the same task of raising and lowering the valves of the four-cycle engine. There are three basic functions involved in this process, and they are commonly referred to as lift, duration and overlap, and all have a vital effect on the incoming fuel charge as well as the disposition of exhaust gases after combustion has occurred. The difference in camshafts, of course, is the manner in which they accomplish these functions.

It certainly takes no magician to grind lobes that lift higher, open quicker, or hold open for longer periods of time. The big problem is one of compatibility or of selecting the proper cam for the engine and the specific driving conditions. We have heard the remark many times that a particular camshaft is no good because it did not work in a specific car. Of course, 98% of the time one will find that the cam was all right, but, in the final analysis, the application was wrong.

To better understand a camshaft, we must first understand that with every function there are certain limitations. Upon closer examination, we find that excesses in any one of the areas mentioned, such as valve lift, duration and overlap, can alter power characteristics and engine reliability to an alarming degree. When engineers design camshafts, they must constantly compromise all three of the above-mentioned functions.

As an example, high lift cams are desirable for high power output; since we do not adversely affect the low speed characteristics, it is reasonable to assume the greater the lift, the better the cam. However, valve lift brings on a multitude of problems, such as excessive loads against cam followers, extra work for the valve spring and high wear rates on valve guides and stems. With all of these problems inherent with valve lift, we must therefore arrive at the right amount of lift in order to get high engine efficiency with complete mechanical reliability.

The next function the camshaft provides is known as duration, and it occurs simultaneously with the lifting of the valve. Duration deals primarily with the element of time in relation to crankshaft rotation and is always expressed in terms of degrees. The primary purpose of duration is to allow the incoming gases ample time to fill the cylinder with a fresh charge of fuel and air and more time to rid the combustion chamber of burned gases.

Longer duration aids in horsepower in the higher RPM ranges but at the same time adversely affects idle and low speed characteristics. Therefore, a compromise must again be made with respect to the conditions or applications for which the engine is primarily used.

Longer duration timing angles also bring into sharp focus the next cam function, which is referred to as the overlap, or the condition at top dead center of piston travel where both the inlet and exhaust valves are slightly off the seats. The primary function of overlap is that of scavenging residual gases by taking advantage of pressure variations existing in the cylinder at top dead center. Once again, we find more overlap advantageous in high RPM usage, but for low and moderate speeds too much overlap can cause rough running engine and low torque in the lower RPM's. Caution must be used when selecting the cam that will do the best job for one's particular needs.

In conclusion, we find camshafts of long duration and large overlap periods tend to work well in the high RPM ranges but adversely affect low speed performance. Conversely, cams with low duration and shorter overlap periods enhance idle and low speed power and at the same time tend to reduce horsepower at higher RPM.

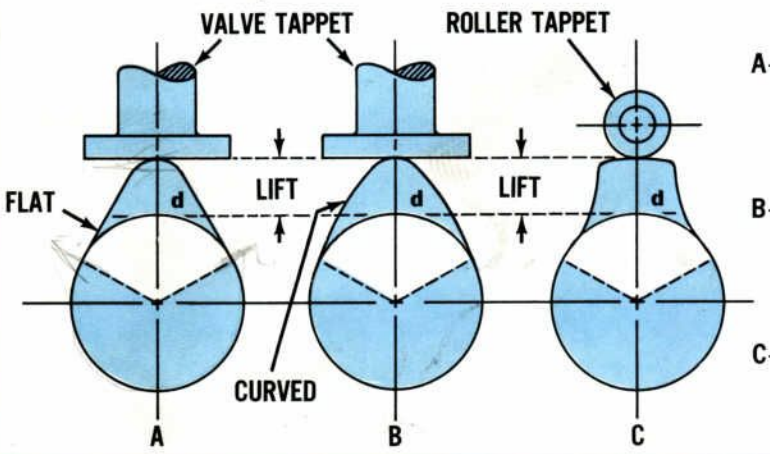
When purchasing your camshaft, know and understand the timing specifications and how they may help or hinder your engine performance.

In selecting one of the many camshafts offered by Ford, you can be assured of proven mechanical reliability with the ultimate in desired performance.

CAMSHAFT TIPS

1. When replacing a cam, always replace related components such as cam followers, springs, and spring retainers.
2. Always check for ample clearance between valve and piston head. A good rule is .075 minimum.
3. Cams with mild or medium duration and overlap should be used with cars equipped with automatic transmissions.
4. A good cam should always be complemented with improved carburetion and a good exhaust system.
5. Always use additional lubricant on wearing surfaces when installing new cam or valve train components.
6. Timing chain and gears should always be replaced to insure proper timing.

CAMSHAFT TIMING SPECIFICATIONS



TYPICAL LOBE DESIGNS

A—Sides of cam flat. Gives quick lift since flat of tappet rests on flat of cam just before and after opening. Used with large area valves of limited maximum lift.

B—Side of cam curved. Provides more gradual opening, thus greater effective opening and closing action than (A) while retaining the same duration (d).

C—Very quick lift and fall, with a longer period of maximum opening. Usually used in racing engines (apt to be noisy). Used with roller ended tappet.

The following camshafts are recommended for application to the 352-390-406 and 427 engines:

C3AZ-6250-K—427 8-V Solid Lifter

Intake Opens 0° 30′ ATC	Duration: 324° theo.
Intake Closes 28° 30′ ABC	Valve Overlap—112° theo.
Exhaust Opens 31° 30′ BBC	Valve Lift .524 Zero lash
Exhaust Closes 3° 30′ BTC	Measured at .100 cam lift

C3AZ-6250-D—427 4-V Solid Lifter

Intake Opens 15° 30′ ATC	Duration—306° theo.
Intake Closes 29° 30′ ABC	Valve Overlap—78°
Exhaust Opens 32° 30′ BBC	Valve Lift .524 Zero lash
Exhaust Closes 18° 30′ BTC	Measured at .100 cam lift

C60E-6250-A GTA Hydraulic Cam

Intake Opens 18° BTC	Duration—270°
Intake Closes 72° ABC	Valve Overlap—40°
Exhaust Opens 68° BBC	Valve Lift 480 Zero lash
Exhaust Closes 22° ATC	

The following camshaft is recommended for application to the 221-260-289 engines:

C30Z-6250-C—289 High Performance Cam

Intake Opens 30° BTC	Duration—282°
Intake Closes 72° ABC	Valve Overlap—54°
Exhaust Opens 78° BBC	Valve Lift .457 .020 lash
Exhaust Closes 24° ATC	

Here is a good all-round performer . . . a hydraulic cam that interchanges from 1958 to 1963 352–390 engines. It can be used very effectively with cars equipped with automatic transmissions.

C3SZ-6250-A Hydraulic Cam

Intake Opens 28° 30′	Exhaust Closes 29° 30′
Intake Closes 77° 30′	Duration 286°
Duration 286°	Valve Overlap—58°
Exhaust Opens 76° 30′	Valve Lift .453 Zero lash

Installation Tips

C3AZ-6250-K cam is not recommended for use with automatic transmissions. It should always be used for extreme competition. It works best with compression ratios on the of 11 or 12 to 1. Maximum torque occurs at 3700 RPM. Poor idle characteristics; low torque values in intermediate range. Effective RPM range to 6500.

C3AZ-6250-D is an ideal cam for combination road and performance. Reasonable idle; develops moderate torque figures in intermediate RPM range. Maximum torque occurs at 3200 RPM. Usable RPM range to 6200. Not recommended for use with automatic transmissions.

C6OE-6250-A. This is an ideal cam for all street and strip use. Also acceptable with automatic transmissions. Excellent low speed torque characteristics. Maximum torque occurs at 3200 RPM. Usable RPM range to 5200. Quiet and smooth.

C3OZ-6250-C. This cam is a real all around star performer. Hard to beat in any of the Fairlane series engines. Excellent torque curve in low and medium ranges. Maximum torque occurs at 3400 RPM. Usable RPM range to 6500. Can be used with automatic transmissions revamped for extended RPM.

EXHAUST

When modifying an engine for greater performance, it is important to consider the exhaust side, for as we increase the amount of air the engine breathes in, we likewise must increase its capacity to exhaust a greater volume of spent gases.

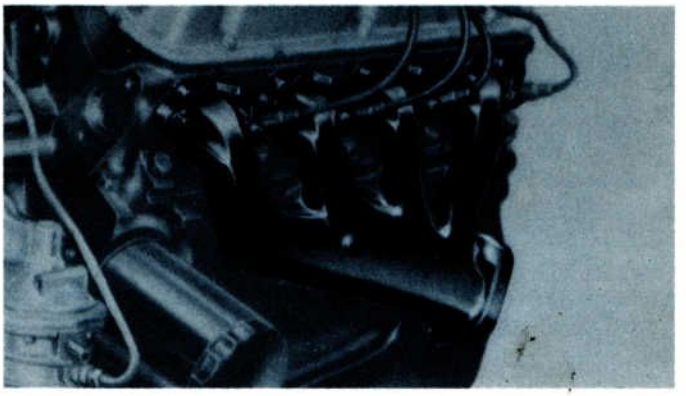
It is quite common to install dual pipe arrangements of one form or another with free-flow type mufflers and, in some cases, larger tubing diameters. This is all well and good, but in most instances the largest area of back pressure occurs in the exhaust manifolds themselves. Some restriction in the manifolding system proper is common in ordinary production type exhaust systems since they do not generally operate in the higher RPM ranges where back pressures from two to six pounds are normal.

To get rid of this back pressure, the primary solution should be that of incorporating high performance exhaust manifolds. Such manifolds utilize larger inside dimensions as well as less restrictive bends, which, in turn, help reduce the back pressure in the exhaust system. By relieving back pressure we allow the camshaft timing a better chance to completely rid the combustion chamber of residual gases. Throughout the years all Ford high performance vehicles have been equipped with superior exhaust manifolds for this purpose. All of these manifolds are cast iron, which tolerates intense heat without warping and offers extreme quietness for street operation.

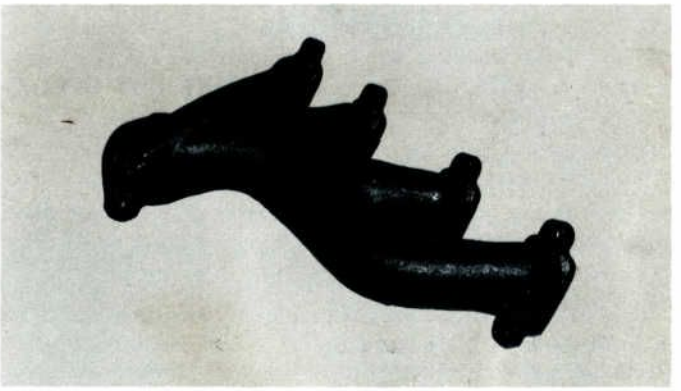
For the larger 352–390 engines mounted in 1960 to 1965 chassis, Ford offers two exhaust systems. The earlier type, which were used on our 1960-1962 high performance and police interceptor engines, are very efficient and of compact and lightweight design. These manifolds do an excellent job for engines producing approximately 400 horsepower.

The other type is the one utilized on Ford's 427 high per formance engine. These manifolds feature isolated branches that are tuned to exhaust impulses. By taking advantage of these impulses the extraction of exhaust gases is aided especially in the extremely high RPM areas.

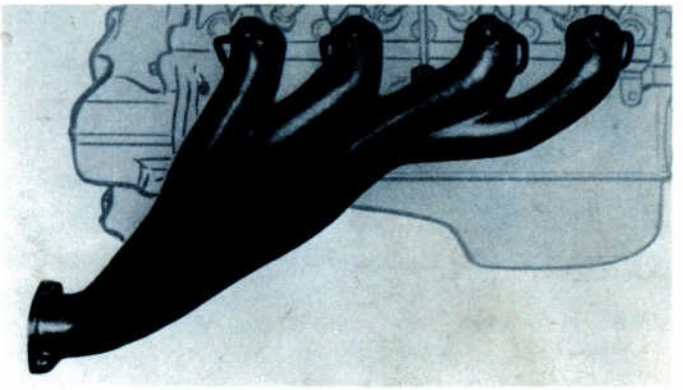
For the Fairlane series engines Ford offers the high performance manifolds found on the 289, 271 horsepower unit. These can be readily adapted to all other Fairlane engines, except those mounted in the Falcon chassis. These high performance manifolds offer larger inside dimensions plus extended runner lengths, all blending into a larger collection chamber. When used with larger extension pipes and adequate mufflers, an over-all gain of 10 to 15 horsepower over the standard system can be expected.



289 High Performance Exhaust Manifolds



406 and Police Interceptor Exhaust Manifolds



427 High Performance Exhaust Manifolds

INSTALLATION TIPS FOR EXHAUST SYSTEMS

289 High Performance Exhaust Manifolds C5ZZ-9430-A and C3OZ-9431-A

Installation of these manifolds is highly desirable when adding other performance items to any of the Fairlane series engines. They can be effectively utilized in all Mustang and Fairlane chassis. Will not readily adapt to Falcon chassis.

406 and Police Interceptor Exhaust Manifolds C3AZ-9430-E and C3AZ-9431-E

These manifolds are extremely efficient, lightweight and inexpensive. Should be used with engines producing up to 400 horsepower.

427 Exhaust Manifolds 1960-1964 – C3AZ-9430-C and C3AZ-9431-F 1965–C5AZ-9430-C and C5AZ-9431-C

These manifolds embody the latest in such features as impulse timing, and longer and larger runners, giving greater exhaust scavenge in the higher rev limits.

IGNITION

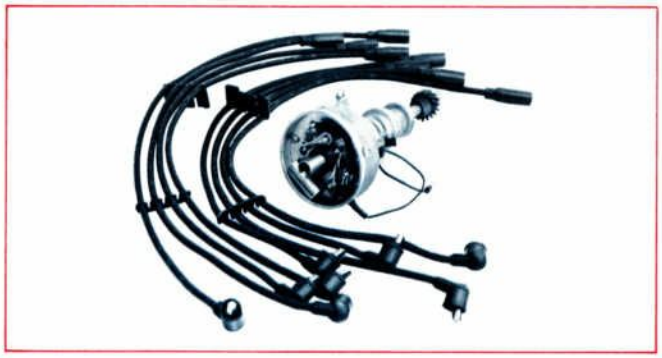
When considering the ignition system of the modern automobile with respect to the advantages of potential horsepower gains, we must recognize its primary function as that of igniting a fuel and air charge at the designated time.

High compression demands very high voltages to bridge across spark plug gaps. The modern 12-volt ignition system supplies adequate voltage for a very high order of compression. This voltage comes from an induction coil source and problems do not arise generally until beyond 5000 RPM's. At this point, the saturation of the coil begins to suffer from a standpoint of the time it has to effectively perform its task.

For engines capable of operating in the 5000 and over RPM range it is advisable to use Ford's high performance distributors, which utilize two sets of points in place of one set as used in the standard units. By so doing the effective cam angle of the breaker points is increased from an average of 27 degrees to 34 degrees producing greater ignition efficiency at high RPM ranges.

High performance distributors also employ special ignition points with added spring pressure so as to preclude point bounce. When properly set, Ford's high performance distributors can effectively take care of ignition needs to RPM's in excess of 6500. At the same time they offer complete reliability with a minimum of service.

In the case of the transistorized ignition system, the transistors will switch current flow faster than is possible with the normal systems which use a condenser. Consequently only one set of points is needed. Such systems are gaining more popularity year by year since they also reduce point burning by passing only very small amounts of current across the face of the breaker points.



IGNITION TIPS

1. Maximum spark lead is usually regulated by the compression ratio and by operating conditions.
2. Correct spark plug heat ranges can account for effective horsepower boost, especially with extra high compression ratios.
3. Ignition curves should be tailored to fit the requirements of a particular engine with regard to compression versus the RPM operating range.
4. High performance engines should utilize solid wire secondary cables.
5. Contact point spring pressure is highly critical in high performance ignition since it regulates RPM at which point bounce occurs. Factory specifications should be used.
6. It is desirable to use specialized distributor test equipment for accurate servicing.

GEARING

The selection of the ideal gear ratio is directly related to the factor of horsepower available, vehicle weight, and specific driving condition.

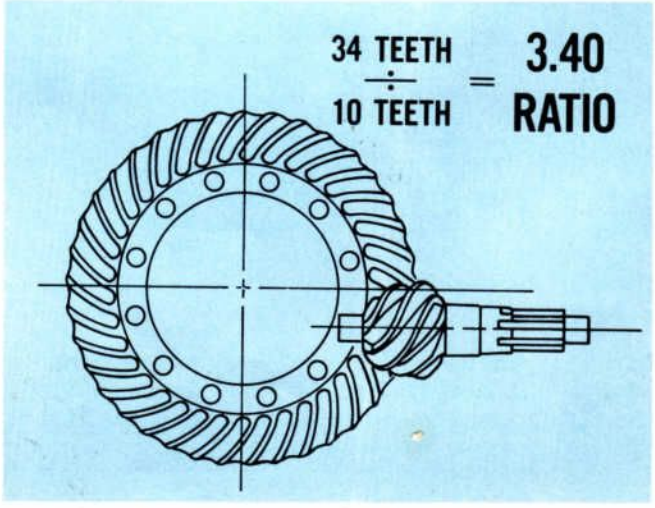
Production gear ratios generally are very well chosen for average driving conditions allowing for near maximum speeds with relatively low RPM, resulting in a high fuel economy.

When gearing for a specific event, such as the quarter mile drags, the ideal gear is one that allows crossing the finish line with the engine turning 200 to 500 RPM above the point of maximum horsepower. This helps in establishing a low elapsed time.

The selection of proper gearing for any given task or event is usually regulated by the point in the RPM range where maximum horsepower is reached in relation to the maximum speed of the chassis. For hauling heavy weights, if you wish to take advantage of the greatest pulling power in relation to road speed you should select a gear to match the average road speed with the RPM at which maximum torque occurs. In many cases the choice is one that requires a little experimentation for best results.

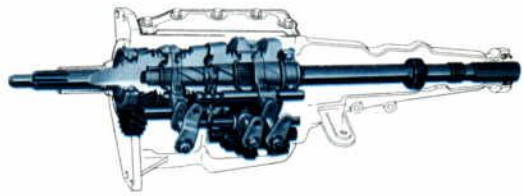
Another factor that influences gear ratio selection is tire size or diameter. This must all be figured into the total gear ratio picture. A tachometer is very helpful in the selection of an ideal gear ratio.

In general terms, the expression "low gears" is for ratios ranging from 4:00 to 6:00 to 1; combination gears are those that are generally accepted for limited performance plus normal city driving and they range from 4:00 to 3:50 to 1; and high gear ratios range from 3:20 to 2:80 to 1. These are, of course, general terms that do reflect with reasonable accuracy the three areas of gear ratios most often encountered.



TRANSMISSION—MANUAL

The following manual transmissions are currently available as factory production options. If other than standard production gear ratios are desired, then either gear-sets or complete transmissions must be changed.



CONSTANT-MESH, THREE-SPEED MANUAL TRANSMISSION GEAR RATIOS*

MODEL	1ST	2ND	3RD	REVERSE
Ford "289" V-8	2.99	1.75	direct	3.17
Fairlane "289" V-8 Falcon "289" V-8 Mustang "289" V-8	2.79	1.70	direct	2.87
Econoline "170" Six	3.41	1.86	direct	3.51
Ford "390" 4-V V-8	2.42	1.61	direct	2.33

*All ratios are to 1

FOUR-SPEED MANUAL TRANSMISSION GEAR RATIOS*

MODEL	1ST	2ND	3RD	4TH	REVERSE
Ford "390" 4-V V-8 "427" V-8 "428" V-8 Mustang "289" Hi-Perf. V-8	2.32	1.69	1.29	direct	2.32
Falcon, Fairlane, Mustang "289" V-8 (except Hi-Perf.) Fairlane "390" V-8	2.78	1.93	1.36	direct	2.78
Mustang "200" Six	3.16	2.21	1.41	direct	2.32

*All ratios are to 1

TRANSMISSION—AUTOMATIC

Three types of Cruise-O-Matic transmissions are used by Ford to cover the wide range of vehicle sizes, engines (except 427), axle ratios and tire sizes available. Each is similar in operation and design except the Cruise-O-Matic "Sports-Shift" used on the Fairlane GTA, which is modified to allow full manual or automatic shifting of gears.

The Cruise-O-Matic (model PCW-BA) used behind the 289 solid lifter high performance engine also has a number of modifications to the valve body, servo, bands and governor to permit higher pressures for faster clutch engagement and disengagement.

CRUISE-O-MATIC GEAR RATIOS*

TYPE	1ST	2ND	3RD	REVERSE	DESCRIPTION
I	2.46	1.46	direct	2.20	C4
II	2.40	1.47	direct	2.00	Cruise-O-Matic
III	2.46	1.46	direct	2.18	C6

*All ratios are to 1

CRUISE-O-MATIC TRANSMISSION USAGE

TRANSMISSION COVERAGE	ENGINE FOR 1966								
	170 1-V	200 1-V	240 1-V	289 2-V	289 4-V	352 4-V	390 2-V	390 4-V	428 4-V
	TYPE I								
				TYPE II					
							TYPE III		

Six diameter sizes of Ring Gear and Pinion Gear Sets are currently available as shown in the following charts. The 7¼ inch ring gear is used in the integral carrier type housing while the 7¾ and 8 inch gears are used in the removable carrier type housing. The 8¾, 9 and 9⅜ inch ring gears are also used in the removable type housing, but in a larger carrier.

Each size ring gear requires a different differential case assembly, which usually fit the same family of carrier assemblies. Four-pinion differential cases are recommended for high performance cars. Therefore, non-production usage of certain gear sets may also require a different carrier assembly and/or axle housing and associated parts.

Limited slip differentials are available as production options in cars equipped with the 428 engine and automatic transmission and in all cars with a 390 engine or less. Also 9", 9⅜" ring gears and the 8¾ ring gear of the high performance Mustang with limited slip differentials MUST USE pre-mixed lube (Ford Part Number C6AZ-19580-C), which has special anti-score additives. All standard differentials used in performance cars should use lube-additive (Ford Part Number C2AZ-19580-D).

7¼ Inch Ring Gear Ratios	7¾ Inch Ring Gear Ratios		8 Inch Ring Gear Ratios
2.83:1 3.20:1 3.05:1	2.80:1		3.00:1 3.25:1 3.50:1 3.80:1
8¾ Inch Ring Gear Ratios	**9 Inch Ring Gear Ratios**		**9⅜ Inch Ring Gear Ratios**
3.70:1 4.11:1 3.00:1 3.25:1 3.50:1 3.89:1	3.00:1 3.25:1 3.50:1 3.89:1 4.11:1 4.44:1 4.57:1	3.10:1* 3.40:1* 4.33:1* 4.71:1* 4.86:1* 5.14:1* 5.43:1* 5.67:1*	2.80:1 3.00:1 3.25:1 3.50:1

*High performance—available for service installation.

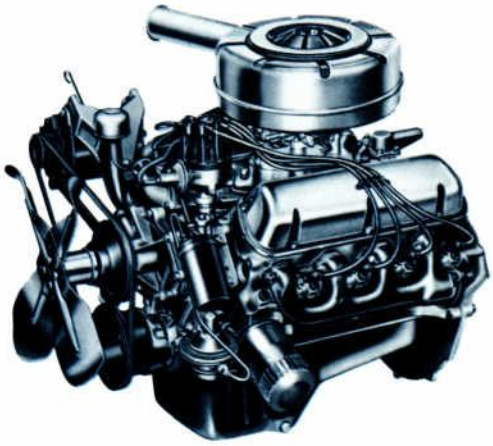
The Ford 221-260-289 Family of Lightweight Engines

The 221 V-8 used in the 1962 Fairlane was the first of Ford Motor Company's lightweight V-8 engines. It was later supplemented by 260- and 289-cubic-inch versions, forming a lightweight V-8 engine family. With the introduction of the larger lightweight engines, the usage was expanded to include the compact and standard-size cars to provide economical, smooth V-8 power.

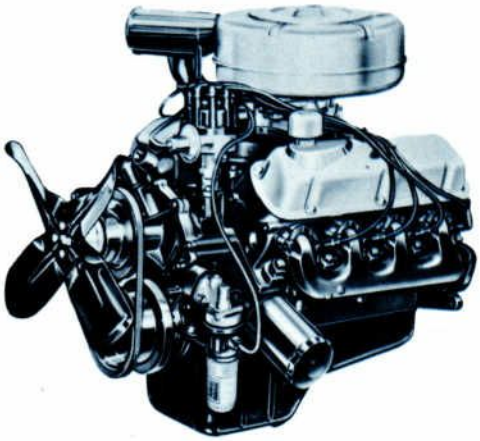
Due to their lightweight, cast-iron construction, small package size, and the known durability of Ford Motor Company products, many sports car manufacturers became interested in the 260 and 289 V-8 engines during 1962 and 1963. One of the first cars to use Ford Motor Company lightweight V-8's was the Shelby Cobra, which soon became a consistent winner in sports car events. In addition to the Cobra, some of the more famous European manufacturers, such as Lotus, Sunbeam, Lola and Cooper, have offered sports models equipped with these lightweight V-8 engines.

A natural addition to the lightweight V-8 engine family, the 289 high performance V-8 introduced sports-type performance to the Fairlane in 1963. While still retaining the durability of regular passenger car engines this engine incorporates many outstanding features, permitting maximum performance characteristics—high compression cylinder heads—11.6:1 maximum ratio . . . connecting rods with 300 per cent greater fatigue factor . . . competition-type exhaust headers . . . high-efficiency air cleaner . . . 4-venturi carburetor . . . high lift camshaft . . . solid valve lifters . . . and a 4-blade aluminum cooling fan.

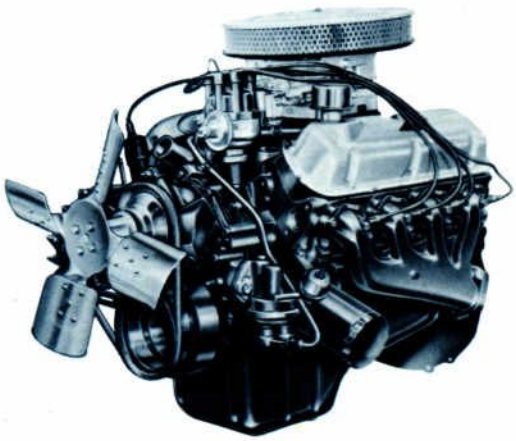
The 289 High Performance V-8 is a competition engine, capable of racing and winning against many of the best-known sports cars in the world, especially in acceleration events.



221 CID Engine



260 CID Engine



289 CID High Performance Engine

SPECIAL FEATURES OF THE 289 HIGH PERFORMANCE ENGINE

The 289 high performance engine is ideally suited for performance modification. While it is light in weight and small on outside dimensions, it is long in the area of horsepower output and reliability. Horsepower figures of over 350 have been used successfully with complete reliability.

Ford engineers have designed extreme limits of endurance into this engine by utilizing the most modern concepts in foundry techniques and metallurgy. All reciprocating and rotating parts have been given special attention for the sake of reliability under extreme conditions. The main high performance features are a robust crankshaft, rods and main caps, heavy duty harmonic balancer, high performance camshaft and coordinated valve gear, improved cylinder heads and dual point ignition.

Externally, the engine offers improved exhaust headers and a specially designed induction system, which all adds up to an engine that has established a performance record that is the envy of the racing fraternity.

This basic 289 engine in the Cobra sports car secured for the United States its first world sports car racing title and also figured prominently in the development of Ford's famous Indianapolis "Indy" engine.

1966 289 HIGH PERFORMANCE ENGINE SPECIFICATIONS

GENERAL	
Type	8-cylinder 90° Vee, Overhead Valve
Displacement	289 Cubic Inches
Bore & Stroke	4.00″ x 2.87″
Compression Ratio	10.5:1
Brake Horsepower	271 @ 6000 rpm
Maximum Torque	312 lbs./ft. @ 3400 rpm
Valve Lifters	Solid
Carburetor	One 4-Venturi
Fuel	Premium
Cylinder Block Material	Precision-Cast Iron
Cylinder Head Material	Precision-Cast Iron
Oil Filter	Rotunda 6000 Mile Type Part Number C1AZ-6731-A (R1-A)

CRANKSHAFT	
Material	Precision-Molded Cast Iron
Main Bearings (5)	Steel-Back Copper-Lead Alloy Replaceable Inserts
Main Bearing Journal Diameter	2.2486″
Thrust Bearing	No. 3
Crankpin Journal Diameter	2.1232″

CAMSHAFT	
Material	Precision-Molded Special Alloy Iron
Bearings (5)	SAE 15 Lead Base
Camshaft Gear Material	Cast Iron

VALVE SYSTEM	
Operating Tappet Clearance	.016-.022 (hot). Hot setting to be made after a minimum of 30 minutes @ 1200 rpm (no load)
Intake Valve Opens	30° BTC
Intake Valve Closes	72° ABC
Duration	282°
Exhaust Valve Opens	78° BBC
Exhaust Valve Closes	24° ATC
Duration	282°
Valve Opening Overlap	54°

INTAKE VALVES	
Material	SAE 1047 Aluminized Head
Overall Length	4.863″
Overall Head Diameter	1.788″—1.773″
Angle of Seat	44° 30′—45°
Lift	.4574″ @ .020 Lash
Spring Pressure & Length	88 lbs. @ 1.77″ (valve closed) 247 lbs. @ 1.32 ″ (valve open)

EXHAUST VALVES	
Material	21-4 Forged Steel
Overall Length	4.863″
Overall Head Diameter	1.457″—1.442″
Angle of Seat & Face	Seat—46° 30′—45° Face—45° 30′—45° 45′
Lift	.4574″ @ .020 Lash
Spring Pressure & Length	88 lbs. @ 1.77″ (valve closed) 247 lbs. @ 1.32″ (valve open)

PISTONS	
Material	Aluminum Alloy with Steel Struts—Cam Ground

PISTON RINGS	
No. 1 Compression	Cast Iron Alloy, Straight Face, Chrome Plated
No. 2 Compression	Cast Iron Alloy, Straight Face, Scraper Groove, Phosphate Coated
No. 3 Oil Control	Multi-Piece, Two Rails & One Spacer Expander Steel Rails—Chrome Plated, Oxide Coated Expander—Blued Steel
Width—No. 1	0.0774″—0.0781″
No. 2	0.015″—0.078″
Gap—Nos. 1 & 2	0.010″—0.020″
No. 3	0.015″—0.055″ Rails Only

PISTON RINGS	
Type	Press-Fit in Rod
Material	SAE 5015 Alloy Steel, Heat Treated
Length	3.010″—3.030″
Diameter	0.9118″—0.9124″

CONNECTING RODS	
Material	SAE 1041 Forged Steel
Weight (oz.)	20.49—20.92
Length (center to center)	5.155″

CONNECTING ROD BEARINGS	
Material	Steel-Back Copper-Lead Alloy—Replaceable Inserts
Overall Length	.721″
Clearance Limits	.0015″

TUNING FOR MAXIMUM PERFORMANCE—289 HIGH PERFORMANCE ENGINE

Engine Specifications

1. Maximum Compression Ratio

Minimum allowable combustion chamber volume is 47.7 cc. It takes approximately .0085″ stock milled off to remove 1 cc. on 1963½-1964 heads and approximately .007″ milled off per 1 cc. on 1964½-1965 heads.

B. *Cylinder Block*
Minimum allowable dimension from block to top plane of piston is .0015″.

2. Valve Springs

A. Installed minimum allowable length is 1.77″.
B. Spring loads (without flat-wound damper)
. 93 lbs. (maximum) at 1.77″
.260 lbs. (maximum) at 1.32″

3. Running Clearances

A. Piston to Cylinder Bore: .006″-.007″
B. Connecting Rod Bearing to Crankpin: .0015″-.0025″
C. Connecting Rod End Play: .014″-.024″
D. Main Bearings to Crank Journals: .0015″-.0027″
E. Valve Lash: Intake .018″ hot and running
Exhaust .020″ hot and running

4. Engine Electrical

A. Spark Plugs:
Street BF-32 Autolite (Ford Part No. C0AZ-12405-A)
Drag Strip BF-22 Autolite (Ford Part No. C3AZ-12405-A)
B. Distributor: 26° advance @ 7200 RPM, Breaker Gap .018″ to .022″
C. Timing: Stock is 10° BTDC at 750 RPM
Standard settings give 36° total advance at 7200 RPM. If racing, vary initial setting between 8 and 14 degrees to determine optimum.

5. Carburetion

When running without an air cleaner, increase jets three or four sizes to maintain correct fuel-air ratio. Exact amount of increase will also be a function of temperature, altitude, humidity, etc.

6. Cooling Fan

Thermo-modulated viscous drive fan.

7. Head Gaskets

Steel shim head gaskets, Part No. C5ZZ-6051-A

8. Camshaft

A. Timing: .020″ lash.
B. Intake: Opens (°B.T.C.) 30° Closes (°A.B.C.) 72°
C. Exhaust: Opens (°B.B.C.) 78° Closes (°A.T.C.) 24°
D. Duration degrees: 282°
Overlap: 54°
Lift: .457″

Driveline

1. Clutch

Non-weighted clutch pressure plate.

2. Transmission

Make sure shift linkage and actuating mechanism is adequately lubricated.

3. Axle

Following combinations for Fairlane and Mustang vehicles may be tried:
A. 4.86:1 axle ratio with 8.00 x 14 x 6½ tread tires.
B. 5.14:1 axle ratio with 8.50 x 14 x 6½ tread tires.
C. 5.43:1 axle ratio with 9.00/9.50 x 14 x 7 tread tires.
These ratios are obtainable from Ford Dealers and are standard Galaxie size gears.

Cobra Kits...for 221, 260 and 289 Engines

If you own a Falcon, Fairlane or Mustang powered by a 221, 260, or 289 2-V engine, you can have more power and sparkle! Check out the new Cobra Kits shown on the following pages. Inspired by the championship performance of Ford-powered Cobras, these kits are designed to give your engine stepped-up performance, plus a gleaming, customized appearance.

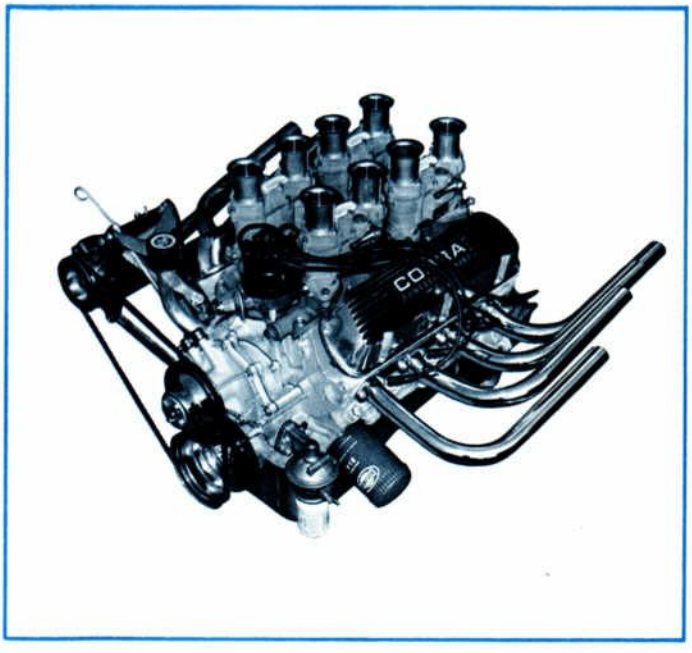
The basic Fairlane engine is a natural for power-increase modifications because it's designed for high volumetric efficiency and has the advantages of low piston speeds and short-stroke compactness. The strength and rigidity inherent in Fairlane engine design has permitted output to be boosted to the present 271 horsepower—a dramatic demonstration of its built-in strength. These amazing boosts in power were made by modifying, without altering, the engine's basic compact dimensions.

The performance-minded motorist who doesn't want to go all-out on these kits will find it possible to get a substantial power increase by using just the equipment appropriate to his budget or driving needs. For instance, if you wanted only a moderate 10 to 14 horsepower boost, the single 4-V induction kit would do the job. On the other hand, if you were after all-out performance, the ultimate, of course, would be the Cobra/Weber 4-2V induction kit. By careful selection one can pick out kits that will produce the performance desired at a reasonable cost.

In addition to parts that deliver greater performance, there are other items for your safety and your engine's too: The high-carbon, cast-steel clutch housing (scatter shield) is designed to provide increased stability and protection. The increased capacity of a competition oil pan provides an extra safety margin for cooler lubrication of a high performance engine. Appearance hasn't been forgotten either as Cobra dress-up kits can make your car's engine a real eye-catcher.

Cobra kit variety and the sturdy reliability of the basic design of these engines facilitate custom modification of Fairlane V-8's to almost any degree of performance and appearance desired.

The opportunity to obtain additional power from your engine without going to the cost of radical machining is presented to you through Ford's wide selection of tested and proven Cobra Kits. All you have to do is install them, tune'er up, and enjoy winning performance with a touch of the throttle.



Cobra Kits on Fairlane 289 V-8 with special exhaust header pipes

CONVERSION NOTES—221 CID ENGINE

Cobra Kits and other 289 High Performance equipment can be installed on the 221 CID engine to produce better than 200 horsepower. However, the smaller displacement of this engine will not allow the power boosts obtainable from larger 260 or 289 CID engines.

260 CID ENGINE

The stock 289 High Performance camshaft and solid valve lifters can be used with 260 cylinder heads, and the 289 High Performance heavy-duty valve springs can be used with the stock 260 retainers. Screw-in rocker arm studs are not necessary if operation is held below 6000 RPM.

(Caution, the 260 CID cylinder block cannot be bored-out to equal the four-inch bore of the 289 CID block.)

The Cobra Induction Kits should be used in combination with the 289 High Performance camshaft kit and heavy-duty valve springs to best obtain maximum engine speed, power and reliability.

289 CID ENGINE

Although the High Performance 289 V-8 is delivered with a 4-V carburetor, additional carburetion is available if premium performance is desired. Since many performance features are a part of this engine's standard equipment, modification is largely a matter of choosing the proper induction system for the type of operation planned for the car.

TIPS AND PRECAUTIONS FOR ALL ENGINES

Although the Cobra Kit line is actually a series of kits, they have been designed for maximum compatibility with each other. The kits provide a wide choice as well as separating the equipment into Street and Competition or All-Out Competition packages. Development emphasis, however, is for the enthusiast who uses his car for both normal street driving and occasional competition.

Factory clearances, stock High Performance camshaft and a conventional mechanically operated distributor are used to obtain significant power increases. Nevertheless, certain preparations—as well as specific precautions—are desirable no matter with which engine you're working.

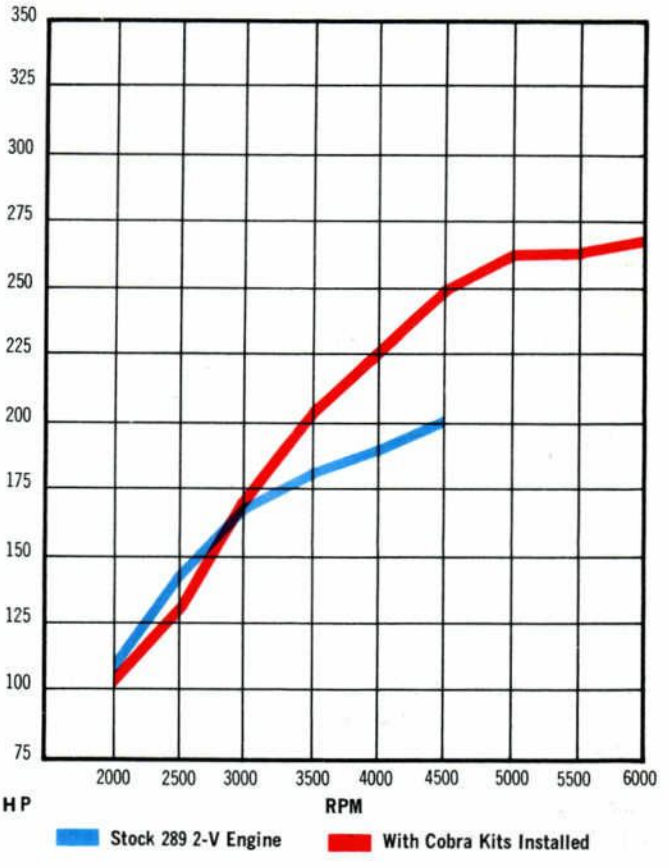
- The Cobra dual-point distributor kit with solid wire spark plug leads should be installed to draw the best performance from any of the other Cobra Kits.
- For all-out performance compound valve springs are necessary and should be matched as closely as possible using a spring tester and shim stock.
- An altered crankshaft assembly should be rebalanced before installation. If the High Performance clutch kit is used, it should be attached before rebalancing.
- For top efficiency a dual exhaust system should be installed.
- The 289 High Performance connecting rods are desirable for modified 221, 260 and 289 2-V engines (rebalancing of the crankshaft assembly is required).
- The 289 High Performance cylinder head and valve assembly may be used without the specially designed "eyebrowed" pistons if the correct stock head gaskets are used.
- When fitting 289 High Performance cylinder heads to a 289 2-V, 260 or 221-inch block, be sure to use the stock gasket for the engine block, not the heads.
- The 289 High Performance camshaft can be used in all other engines, and without the High Performance cylinder heads, but care must be taken to use the proper head gasket (proper for the block) to provide sufficient valve clearance.
- The High Performance cylinder heads are stock, production line parts and are not ported, relieved or polished, but may be machined if desired.
- 289 High Performance exhaust manifolds are not recommended for Falcon installations; extensive re-working of the engine compartment is required.
- In assembling your improved engine, remember to use standard head gaskets designed for your engine block. Thinner ones can cause serious valve and piston damage unless additional clearance is provided by matched or eyebrowed pistons.

Torque sequence and ratings are extremely important to proper installation of both manifold and cylinder heads.

The Weber carburetor induction system is recommended for a "competition-only" application.

The Cobra Combination Engine Performance Kit should not be used in cars equipped with automatic transmissions, unless the Mustang heavy duty automatic (Part No. C6ZP-7000-C) is installed.

COBRA KITS ON THE STOCK 289 2-V ENGINE

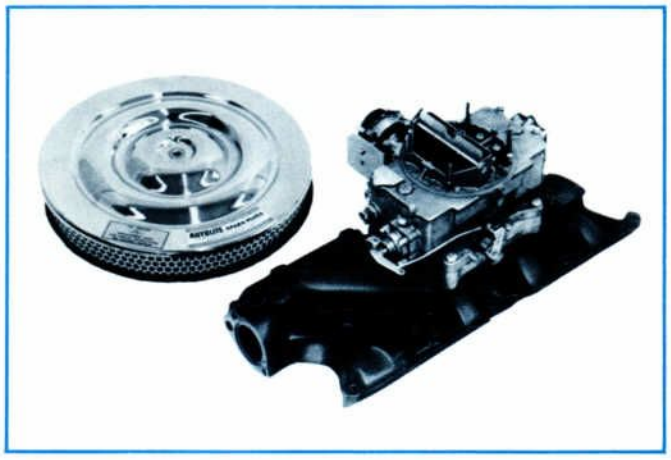


Increased horsepower made available by the installation of Cobra Kits on the standard 289 2-V engine. Part Numbers: Engine Performance Kit C5AZ-6A044-B; Distributor C4DZ-12050-A; and 4-V Induction Kit C6AZ-6B068-A. Note slight penalty in horsepower up to mid range where superior breathing of components takes over and pushes horsepower up at a rapid rate. Solid lifter camshaft extends horsepower curve to 6000 RPM over the hydraulic camshaft used in the stock 289 2-V engine. With the hydraulic cam, valve bounce generally occurs in the area of 5000 RPM. See following pages for additional horsepower obtainable with other Cobra induction kits.

SINGLE 4-V INDUCTION KIT

The Single 4-V Induction Kit offers a simple method of boosting power for all Fairlane series engines (221-260-289). Without drastic modifications, it will deliver 7 to 10 horsepower above the standard 2-V induction system.

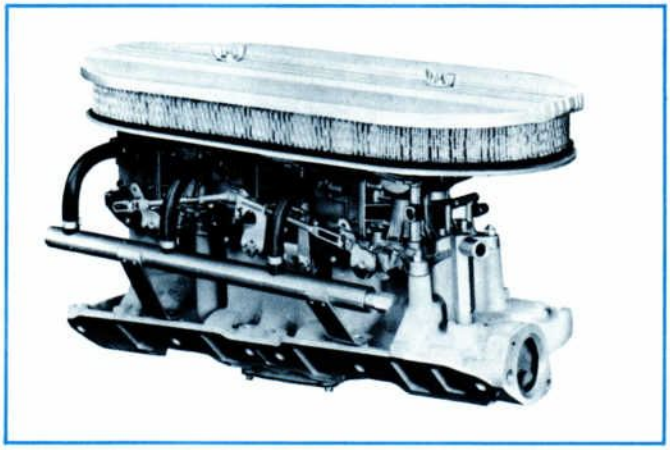
YEAR AND MODEL	ENGINE C.I.D.	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1962-66 Fairlane, Mustang, Falcon	221, 260, 289	C6AZ-6B068-A	$117.90



THREE 2-V INDUCTION KIT

If your engine is presently equipped with the 4-V Induction Kit, and you would like a moderate boost in horsepower while still retaining smoothness and flexibility, then try the Three 2-V Kit. It offers good idle and low speed characteristics and is capable of delivering approximately 12 to 15 horsepower over the 4-V Induction Kit.

YEAR AND MODEL	ENGINE C.I.D.	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1963-64 Fairlane, Falcon (3 & 4 speed S/T) 1965 Mustang	260	C4DZ-6B068-A	$219.50
1963-66 Fairlane, Falcon 1965-66 Mustang	289	C4DZ-6B068-B	219.50
ACCELERATOR CONTROL KITS			
1963 Falcon	260	C3DZ-9B843-A	$ 8.40
1963-65 Fairlane	260, 289	C4OZ-9B843-A	8.40
1964 Falcon 1965 Falcon	260	C4DZ-9B843-A	8.40
1965-1966 Mustang (S/T)	260, 289	C5ZZ-9B843-A	8.40
1965 Mustang (Auto. Trans.)	260, 289	C5ZZ-9B843-B	8.40
1966 Fairlane, Falcon (S/T)	289	C6OZ-9B843-E	8.40
1966 Fairlane, Falcon (Auto.)	289	C6OZ-9B843-F	8.40
1963 Fairlane	289	C4OZ-6A603-A	6.70



Three 2-V carburetors, aluminum intake manifold, low restriction air cleaner, Cobra medallion kit, seals, gaskets, emission reduction parts, studs and screws.

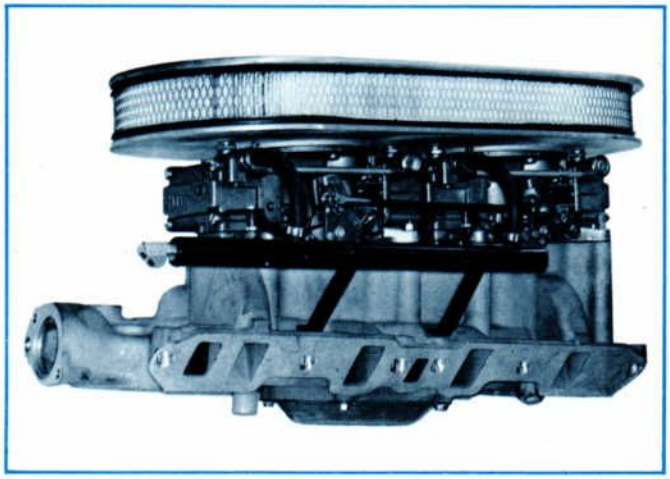
To complete conversion, an Accelerator Control Kit is necessary.

TWO 4-V HIGH RISER INDUCTION KIT

(Available June, 1966)

The latest and greatest in induction systems for the 289 engine is similar to the famous High Riser 427 induction system. It has extra large and long runners for greater horsepower over a broader range. Throttle arrangement features progressive primary operation plus automatic secondary control. Adds 30 to 35 horsepower over the 4-V induction kit.

YEAR AND MODEL	ENGINE C.I.D.	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1966 Falcon, Fairlane, Mustang	289	C6ZZ-6B068-A	$249.50



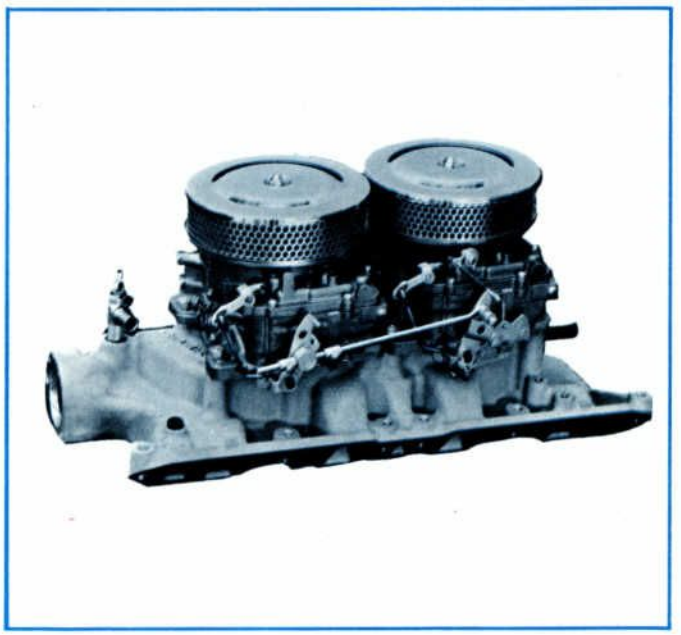
Two 4-V carburetors, one low restriction air cleaner, special high riser cast aluminum intake manifold.

To complete conversion, an Accelerator Control Kit is needed.

TWO 4-V INDUCTION KIT

For those desiring greater efficiency in induction for combination street and strip use, this is it! Special feature is the latest progressive throttle linkage with secondary operation controlled by velocity-operated throttle blades. The carburetors on this kit are matched and balanced for the Fairlane series engines and will deliver approximately 25 to 30 horsepower over the 4-V Induction kit.

YEAR AND MODEL	ENGINE C.I.D.	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1963-66 Fairlane, Falcon, Mustang	260, 289	C4OZ-6B068-E	$240.15
ACCELERATOR CONTROL KITS			
1963-65 Fairlane (auto. trans.) 1964-65 Falcon (auto. trans.)	260, 289 260, 289	C5DZ-9B843-A	$ 8.40
1963-65 Fairlane (std. trans.) 1964-65 Falcon (std. trans.)	289 289	C4OZ-9B843-B	8.40
1965-66 Mustang (std. trans) 1966 Mustang (auto. trans.)	260 289	C5ZZ-9B843-D	8.40
1965 Mustang (auto. trans.)	260, 289	C5ZZ-9B843-E	14.85
1966 Fairlane, Falcon (C4 auto. trans.)	289	C6OZ-9B843-A	14.85
1966 Fairlane, Falcon (std. trans. & overdrive)	289	C6OZ-9B843-B	8.40



Two 4-V carburetors, two low restriction air cleaners, special cast aluminum intake manifold, and two Cobra medallions.
To complete conversion, an Accelerator Control Kit is needed.

FOUR 2-V WEBER INDUCTION KIT

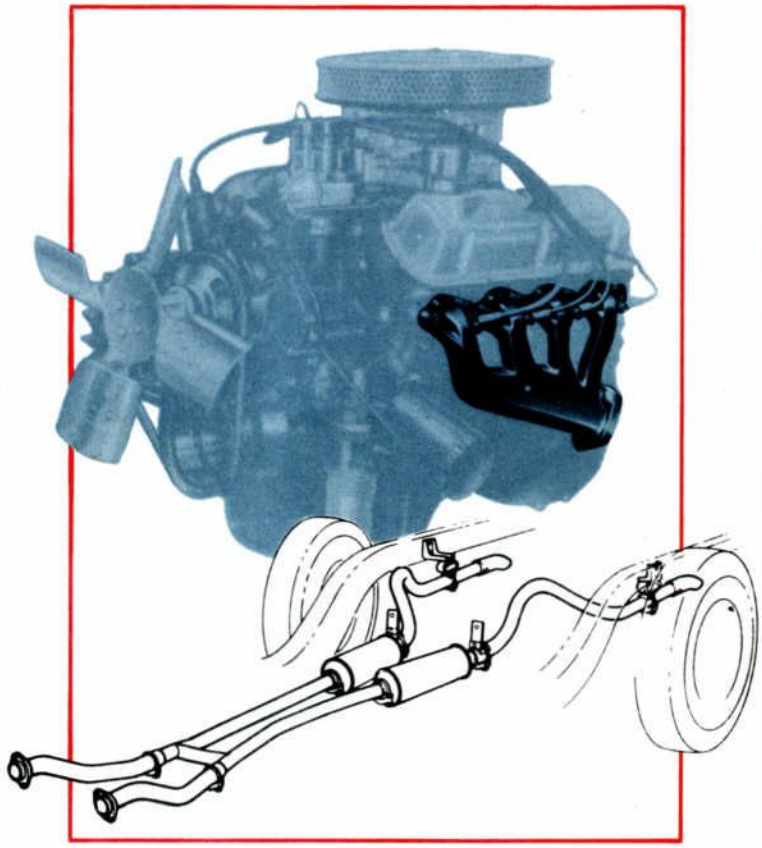
The Four 2-V Weber Induction Kit is the ultimate all-out induction system that tries to push the back of the seat into your spine! It should be used only for competition events—not recommended for general street usage. Adds more than 40 horsepower over the 4-V induction kit.

YEAR AND MODEL	ENGINE C.I.D.	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1963-66 Fairlane, Mustang, Falcon (3 & 4 Speed S/T)	260, 289	C5OZ-6B068-A	$695.00
ACCELERATOR CONTROL KITS			
1963-65 Fairlane (S/T) 1964-65 Falcon (S/T)	260, 289 260, 289	C5OZ-9B843-A	$ 56.15
1965-1966 Mustang (3 & 4 Speed S/T)	289	C5ZZ-9B843-C	$ 8.40
1966 Fairlane & Falcon (S/T & Overdrive)	289	C6OZ-9B843-C	$ 8.40

Intake manifold, 4-2-V carburetors, fuel and water manifold, basic linkage, medallion kit, plus necessary seals, gaskets, studs and screws.
To complete conversion, an Accelerator Control Kit is necessary.

EXHAUST SYSTEM KITS

After you have selected the induction kit to fit your particular needs, you should consider the exhaust side of the engine for improving the breathing capacity through the utilization of the high performance exhaust manifolds with dual exhaust outlets. (High performance exhaust manifolds will not fit in Falcon chassis.)



HIGH PERFORMANCE EXHAUST MANIFOLDS

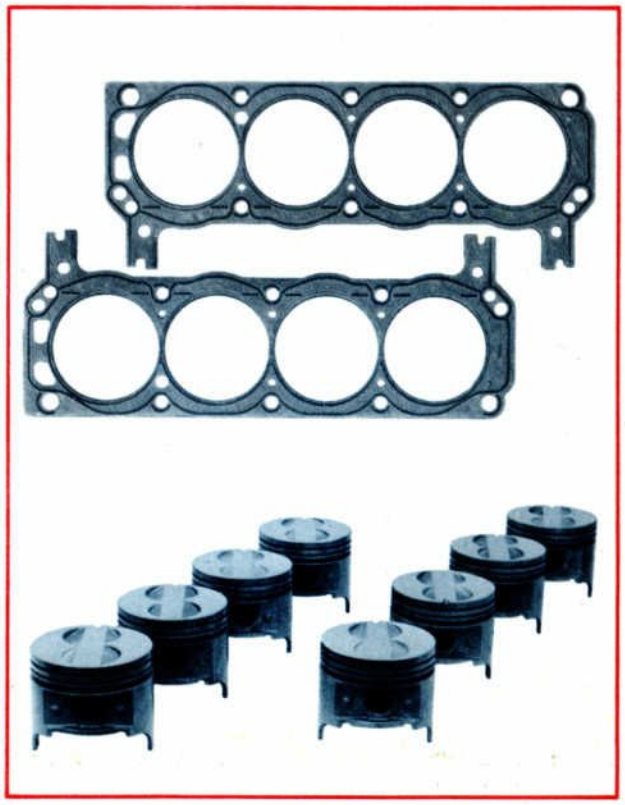
YEAR AND MODEL	ENGINE C.I.D.	DESCRIPTION	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1965-66 Mustang 4-V 1965 Fairlane 4-V	289	R.H.	C5ZZ-9430-A	$15.65
1963-65 Fairlane 4-V 1965-66 Mustang 4-V	289	L.H.	C3OZ-9431-A	15.65

DUAL EXHAUST SYSTEM KIT

1965-66 Mustang 4-V	260, 289		C5ZZ-5210-A	58.45
1963-64 Falcon	260		C4DZ-5210-A	58.45

HEAD GASKETS AND PISTONS

Having taken care of the inlet and exhaust portions of the engine, we should consider our next step–increasing compression. One simple alternative is the use of the Steel Shim Head Gaskets (available only for the 289 engine). They will increase compression by half a point. Another method would be installation of the Piston and Pin Kit. This will also add a half point compression in the 289 4-V engine and 1.2 in the 289 2-V engine. Another method of adding compression, is milling the cylinder heads. Recommended maximum: .040. See Head Milling Charts on Page 8 for proper amounts to be removed from inlet manifold in conjunction with head milling.



YEAR AND MODEL	ENGINE C.I.D.	DESCRIPTION	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1963-66	289	Steel Shim Head Gasket Set (for competition use only)	C5ZZ-6051-A	$ 5.50
1966 Ford, Fairlane, Mustang (2-V, 4-V prem. fuel) 1966 Mustang (4-V)	289	Piston and Pin Set—Standard Red (8 pistons and pins)	C6AZ-6108-AE	47.35

Comments by Ak Miller

HIGH PERFORMANCE CAM KIT

The next logical step would be to install the High Performance Cam Kit. This cam kit assembly offers a reasonable idle with a strong power curve having maximum RPM's in the 6000+ RPM range, making it especially desirable for combination street and competition use. By extending the horsepower curve to 6000 RPM, we can expect a further gain of approximately 25 to 30 horsepower. High performance springs and retainers must be used with this cam.

SPECIFICATIONS

Intake opens 30° BTC — Exhaust closes 24° ATC
Intake Closes 72° ABC — Duration 282°
Exhaust opens 78° BBC — Valve Lift .457" .020" Lash

YEAR AND MODEL	ENGINE C.I.D.	DESCRIPTION	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1963-64 Falcon 1962-66 Fairlane, Falcon, Mustang 1966 Ford	260 221, 260, 289 289	Consists of: 1—Camshaft 16—Tappets 1—Cobra Medallion Kit	C4OZ-6A257-A	$ 72.50
SPRINGS AND RETAINERS FOR ABOVE CAMSHAFT KIT:		Valve Spring (16 required) Valve Spring Retainer (16 required) Lock Key—Valve Spring Retainer (32 required)	C3OZ-6513-A C3OZ-6514-A 7HA-6518-A	1.50 ea. .50 ea. .08 ea.

DISTRIBUTOR KIT

Since the high performance cam gives extended usable RPM, it should be accompanied with the proper ignition equipment. This is best accomplished by the installation of the High Performance Distributor Kit, which features dual points for better coil saturation. The spark curve is ideally suited for high performance engines. Also featured is solid core wiring for maximum voltage delivery to spark plugs.

YEAR AND MODEL	ENGINE C.I.D.	CONSISTS OF	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1963-66 Ford, Fairlane, Falcon, Mustang	260, 289	1—Distributor Assy. 2—Wire & Brkt. Assy. (Distr. to Spark Plug) (1 R.H., 1 L.H.) 1—Brass Plug—⅜"—24	C4DZ-12050-A	$ 48.80

ELECTRIC FUEL PUMP

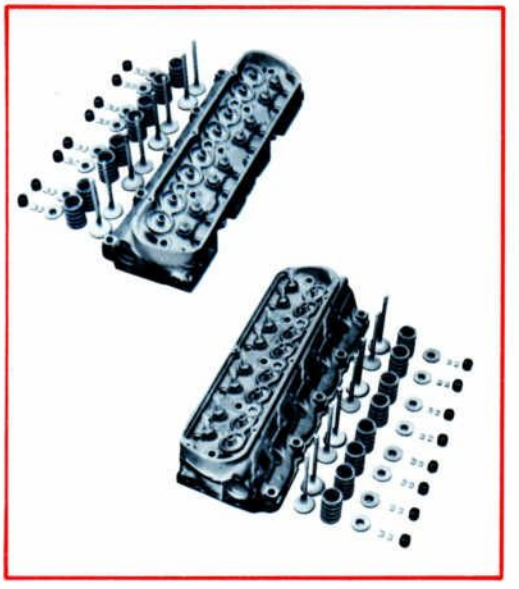
The Cobra Electric Fuel Pump provides the faster, steadier fuel flow you may need for maximum performance in competition events. It can be used on all engines with 12-volt systems, and operates efficiently regardless of the demands of the carburetor.

YEAR AND MODEL	ENGINE C.I.D.	PART NUMBER	MFRS. SUGG. RETAIL PRICE
All with 12-volt system	All	C6AZ-9350-A	$ 36.65

CYLINDER HEAD AND VALVE KIT

The Cylinder Head and Valve Kit offers several advantages over the normal heads for high performance work. These advantages are valve spring stabilizing sets, larger intake valves and heavy duty threaded rocker studs insuring reliability for extreme RPM loads, plus springs and retainers that offer longer life and maximum spring pressures. These heads are very effective on all Fairlane engines.

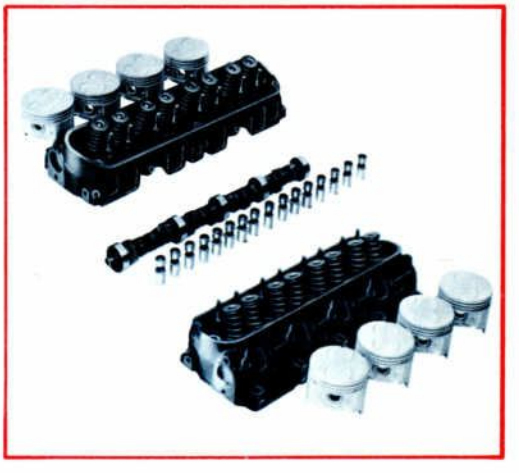
YEAR AND MODEL	ENGINE C.I.D.	CONSISTS OF	PART NUMBER	MFRS. SUGG. RETAIL PRICE
62-63 Fairlane 63-65 Fairlane, Falcon 64-66 Ford, Fairlane Mustang, Falcon (2-V) 63-66 Fairlane, Mustang Specials (4-V) 65-66 Fairlane, Mustang (4-V reg. or prem. fuel)	221 260 289 289 289	2—Cylinder Head 8—Exhaust Valve 8—Intake Valve 16—Valve Spring 16—Valve Spring Retainer 32—Valve Spring Ret. Lock Key 16—Valve Stem Seal 1—Cobra Medallion Kit	C5AZ-6C056-A	$219.80



ENGINE PERFORMANCE KIT

If you should decide to go all the way, the Cobra Engine Performance Kit offers the ultimate. In one operation we are adding compression, a good cam and assembly, and larger cylinder heads for better breathing, when topped off by the carburetion kit of your choice. This kit on a 289 2-V engine utilizing the 4-V Induction Kit, results in approximately 70 additional horsepower.

YEAR AND MODEL	ENGINE C.I.D.	CONSISTS OF	PART NUMBER	MFR'S SUGG. RETAIL PRICE
1964-66 Ford, Fairlane Mustang, Falcon	289	1—Cam Kit 1—Cylinder Head & Valve Kit 8—Pistons	C5AZ-6A044-B	$338.70



HIGH PERFORMANCE CLUTCH KIT

When engine horsepower is increased, related components are automatically taxed. One such item is the clutch. For this reason the use of the High Performance Clutch Kit is strongly recommended.

YEAR AND MODEL	ENGINE C.I.D.	CONSISTS OF	PART NUMBER	MFR'S SUGG. RETAIL PRICE
1963-66 Fairlane, Falcon, Mustang (with S/T and O/D)	221, 260, 289	1—Clutch Disc 1—Pressure Plate	C3OZ-7A537-A	$ 50.45

COMPETITION OIL PAN

When continuous high speed running is contemplated, the use of the special Competition Oil Pan is very beneficial in keeping oil temperatures at a reasonable level. The primary function of oil is to lubricate, and its secondary function is to cool all of the high friction areas such as bearings and pistons.

YEAR AND MODEL	ENGINE C.I.D.	CONSISTS OF	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1962-65 Fairlane, Mustang, Falcon 1963-66 Fairlane (Special 4-V) 1965 Mustang, Falcon	221, 260 289 289	Finned aluminum, extra-capacity oil pan assembly, including 18¼"—20 x 1" screw and lockwasher assembly and 4⅝"—18 x 1¼" screw and lockwasher assembly	C4OZ-6675-A	$ 78.35

SCATTER SHIELD

When engaging in competitive events such as drag racing, a scatter shield is mandatory. This is a heavy-duty clutch housing which is designed to contain fragments in case of clutch or flywheel explosions.

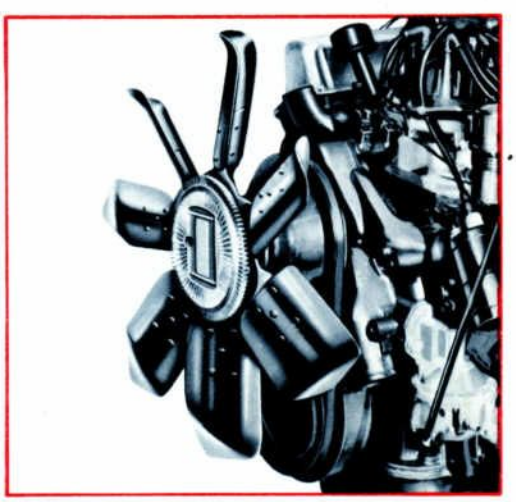
YEAR AND MODEL	ENGINE C.I.D.	DESCRIPTION	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1963-64 Falcon (Std. 3 & 4 speed & O/D trans.)	260	Use with engines with 5 attaching bolt holes	C4OZ-6394-A	$104.65
1962-65 Fairlane, Mustang (Std. 3 & 4 speed & O/D trans.)	221, 260, 289			
1965-66 Mustang, Falcon (3 & 4 speed)	289	Use with engines with 6 attaching bolt holes	C5ZZ-6392-A	104.65

VISCOUS DRIVE FAN

An increase of up to 2% of rated engine horsepower can be obtained by installing a Viscous Drive Fan in place of a standard cooling fan. Since the speed of the Viscous Drive Fan is determined by the temperature of the air passing through the radiator, the fan speed is reduced at high speeds, thus providing more power to the engine.

YEAR AND MODEL	ENGINE C.I.D.	DESCRIPTION	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1965-66 Mustang, Fairlane, Ford	289	Fan Assembly Clutch Assembly	C4OZ-8600-D C6OZ-8A616-D	$ 10.50 21.85
1966 Falcon 1966 Fairlane	390	Fan Assembly Clutch Assembly	C6OZ-8600-F C6OZ-8A616-C	10.50 21.85
1960-66 Ford	352 390 428	Fan Assembly Clutch Assembly	C5AZ-8600-B C4SZ-8A616-A	13.05 21.85

NOTE: 4—358716-S2 Screws and 4—380288-S2 Screws are required with each of the above installations.



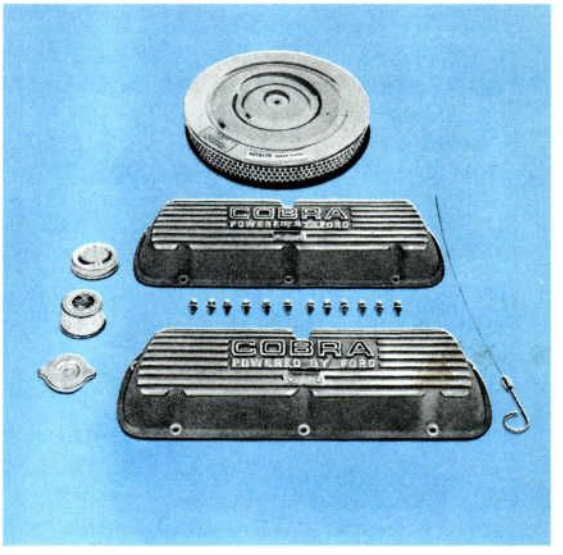
Cobra Kits...for 221, 260 and 289 Engines

ENGINE DRESS-UP KIT

Adds a racy "Cobra" look to your engine. This stylish kit includes finned, polished aluminum valve covers; long-lasting chrome dip stick, radiator cap, master cylinder cap,* oil filler cap, air cleaner cover and filter.

*Will not fit cars with disc brakes.

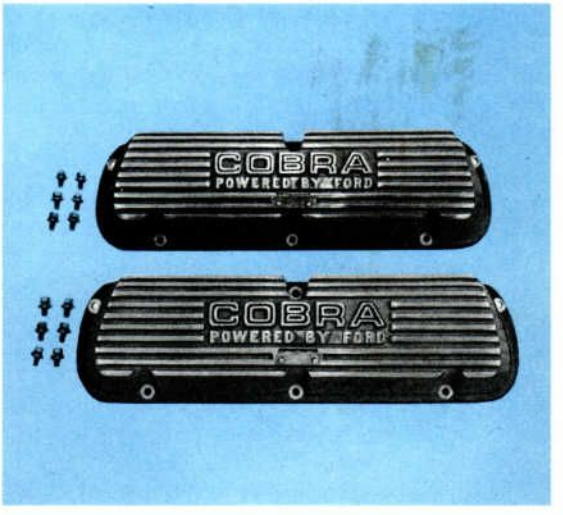
YEAR AND MODEL	ENGINE C.I.D.	DESCRIPTION	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1962-64 Fairlane, Falcon (2-V) 1963-64 Fairlane Special (4-V) 1965 Mustang (2-V) 1965 Mustang (4-V Regular Fuel)	221, 260, 289 221, 260, 289 260 289	Not used with closed emission reduction system.	C4OZ-6980-A	$ 79.20
1966 Ford, Fairlane, Mustang, Falcon (2-V & 4-V Prem. Fuel) 1966 Mustang Special	289 289	Includes parts for closed emission reduction system.	C6AZ-6980-A	$ 79.65



VALVE COVER KIT

Featuring polished aluminum valve covers, these kits include 2 valve cover assemblies, 12 chrome bolts and 12 chrome washers.

YEAR AND MODEL	ENGINE C.I.D.	DESCRIPTION	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1962-63 Fairlane 1963 Falcon 1965 Mustang	221, 260, 289 260 260, 289	Use with non-emission reduction or intake manifold type emission reduction system.	C3OZ-6A547-A	$ 41.00
1964 Falcon 1964 Fairlane 1965 Mustang	260 260, 289 260, 289	Use with non-emission reduction or rocker arm cover type emission reduction system.	C4OZ-6A547-A	$ 46.70
1966 Ford, Fairlane, Mustang, Falcon (Oil fill hole in rocker arm cover)	289	Use with non-emission reduction or rocker arm cover type emission reduction system.	C5AZ-6A547-A	$ 46.70



Authentic Cobra Medallions

A pair of these colorful and attractive Cobra medallions are included in the following Cobra Kits.

The Cobra medallions can be mounted anywhere on your car by using the spring nuts provided.

Part Number	Cobra Kit
C5AZ-6A044-B	Engine Performance Kit
C5AZ-6C056-A	Cylinder Head and Valve Kit
C4DZ-6B068-A	Three 2-V Induction Kit
C4DZ-6B068-B	Three 2-V Induction Kit (289 Eng.)

Part Number	Cobra Kit
C5ZZ-6B068-A	Single 4-V Induction Kit
C6AZ-6B068-A	Single 4-V Induction Kit
C4OZ-6B068-E	Two 4-V Induction Kit

Part Number	Cobra Kit
C5OZ-6B068-A	Four 2-V Weber Induction Kit
C4OZ-6A257-A	Cam Kit

The Ford 352-390-428 Family of Engines

Of the several larger-bore Ford V-8 engines available for high performance use, the famous 427 offers the maximum in power and durability. Fortunately, many of the 427 engine components can be adapted to the 352, 390 and the new 428 engines for healthy gains in horsepower, making these engines good candidates for improved performance application except for all-out competition.

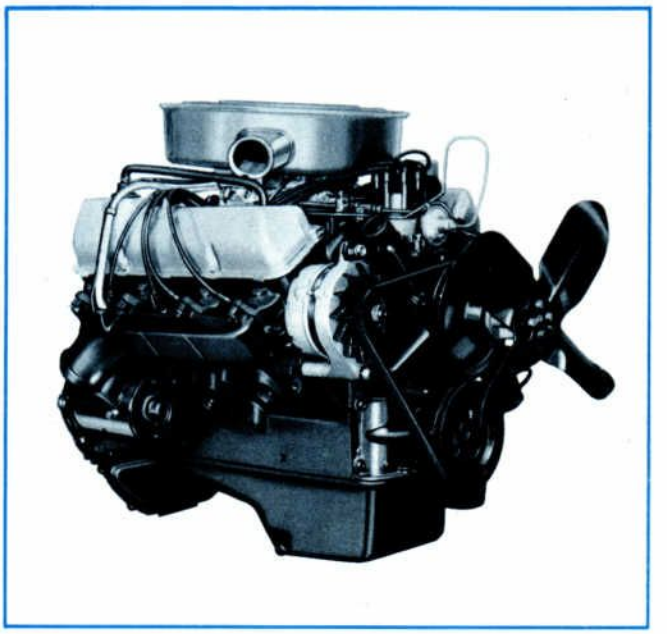
The 352 and 390 engines described on this page are the 1966 models; however, earlier versions of these engines are equally adaptable to high performance modifications.

352 CID 4-V THUNDERBIRD V-8

Combined with the Cruise-O-Matic 3-speed automatic transmission, the "352" Thunderbird V-8 is offered as an option on all Ford cars except the 7 Litre model. Delivering 250 brake horsepower and operating on regular fuel despite the 9.3 to 1 compression ratio, this efficient engine is the first in a line of big V-8's offered for 1966. A 4-V carburetor and free-flow intake manifold, plus high-efficiency wedge-shape combustion chambers, make this a logical choice for lively performance at minimum cost.

390 CID 4-V THUNDERBIRD SPECIAL V-8

Completely re-engineered for 1966, the Thunderbird "390" 4-V V-8 is now offered in the Fairlane line. Unexcelled for performance and economy, this engine has been refined through the redesign of the 4-V carburetor, completely new cylinder heads, a modified intake manifold featuring an exhaust heated chamber for smooth warm-up and operation, and a modified cam and recalibrated valve springs. An in-line fuel filter now provides full-flow protection for the engine. A redesigned crankcase features a four-quart capacity and baffles to give cooler oil for longer engine life. When used with the Fairlane an optional 390-cubic-inch 4-V Thunderbird Special V-8 equipped with a modified cam, redesigned valve springs, special carburetor, and a special distributor, boosting the horsepower to 335—a new high in Fairlane performance is attained. A chrome dress-up kit, featuring a chrome-plated air cleaner, valve covers, oil filler, dipstick, and radiator cap, is furnished with each Fairlane GT and GTA installation.



THE NEW 428 CID 4-V ENGINE

NEW 428 CID 4-V THUNDERBIRD 7 LITRE V-8

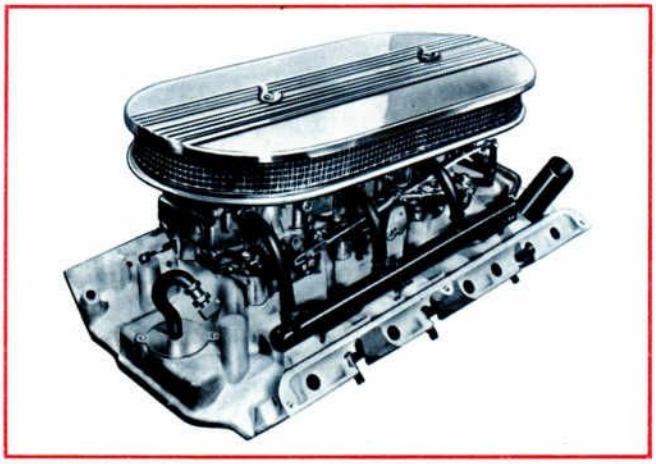
Latest in the Ford line of production V-8's is the 428, which starts with the basic 390 and adds such things as increased bore and stroke, plus other refinements, to rate a healthy 345 horsepower at 4600 RPM.

Although not to be construed as an all-out racing mill, the 428 is another engine which combines lively performance with quiet, solid operation and minimum maintenance. Lightweight pistons, smooth intake and exhaust passages, high-life, long duration cam, and many other performance features provide this engine with velvety power at any speed. Coupled with either the Cruise-O-Matic or 3-speed manual transmissions, the 428's high-torque capabilities mean more power at starting and continued high output throughout the driving range.

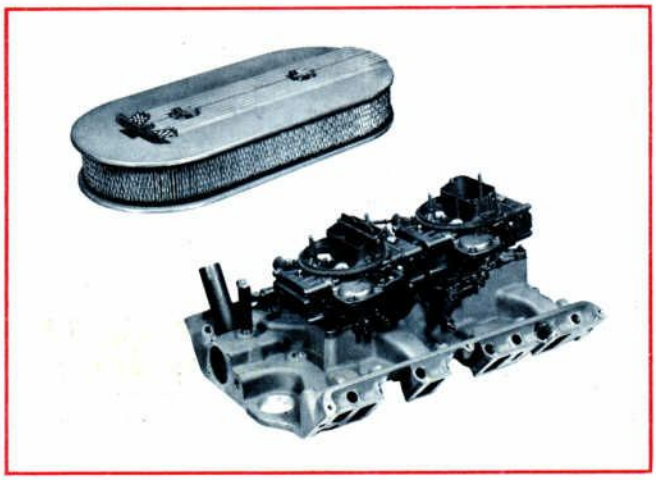
GENERAL SPECIFICATIONS

1966 ENGINE	352 CID 4-V	390 CID 4-V	428 CID 4-V
Type	8-cyl., 90°V, OHV	8-cyl., 90°V, OHV	8-cyl., 90°V, OHV
Displacement (cubic inches)	352	390	428
Bore and Stroke (inches)	4.00 x 2.50	4.05 x 3.78	4.13 x 3.98
Compression Ratio	9.3 to 1	10.5 to 1	10.5 to 1
Brake Horsepower	250 @ 4400 RPM	315 @ 4600 RPM 335 @ 4800 RPM**	345 @ 4600 RPM
Maximum Torque (lbs.-ft.)	352 @ 2800 RPM	427 @ 2800 RPM 427 @ 3200 RPM**	462 @ 2800 RPM
Valve Lifters	Hydraulic	Hydraulic	Hydraulic
Carburetor	Automatic choke, 4-venturi	Automatic choke, 4-venturi	Automatic choke, 4-venturi
Fuel	Regular	Premium	Premium
Exhaust	Dual*	Dual*	Dual*

*Single exhaust on station wagons
**Engines used with Fairlane only



NOTE: This Three 2-V Induction Kit will not fit on 1966 Ford and Fairlane 390 and 428 engines with C6AE-6049-A and C6AE-6049-J cylinder heads. The cylinder head number is located between the No. 2 and 3 spark plugs.



TWO 4-V INDUCTION KIT

(Available June, 1966)

If you want to increase the breathing capacity of your 352, 390 or 428, here is just the induction kit for you. Two four-venturi carburetors, with a combined rating of 1,200 cfm, mounted to a specially designed cast-aluminum intake manifold.

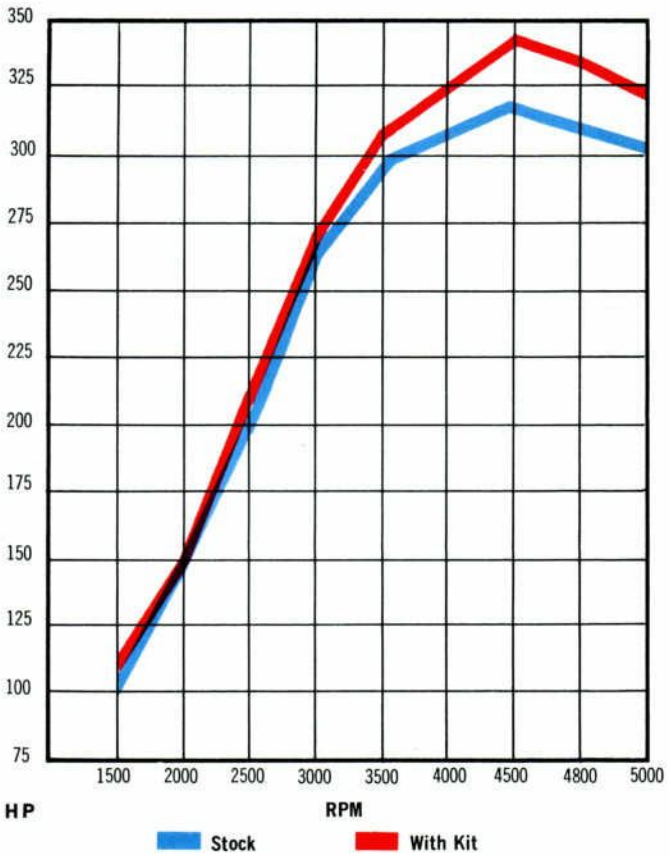
NOTE: The Two 4-V Induction Kit will not fit 1966 390 and 428 CID engines with C6AE-6049-A and C6AE-6049-J cylinder heads. The cylinder head number is located between the No. 2 and 3 spark plugs.

YEAR AND MODEL	ENGINE C.I.D.	PART NUMBER
1966 Ford S/T 1966 Fairlane S/T, A/T	390, 428	C6AZ-6B068-B
ACCELERATOR CONTROL KITS		
1966 Ford S/T	390	C6AZ-9B843-A
1966 Fairlane S/T, A/T	390	C6OZ-9B843-G

THREE 2-V INDUCTION KIT

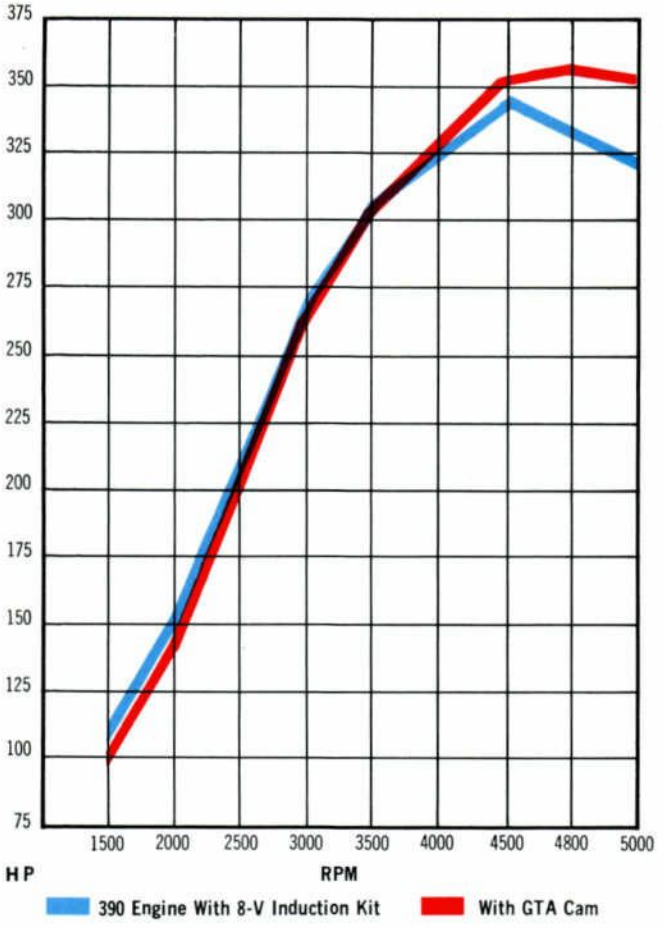
Specially designed to give 352, 390, 406, 427 and 428 C.I.D. Ford blocks more power and performance, this kit features three 2-venturi carburetors on a precision cast aluminum intake manifold—plus a special air cleaner. Mechanically operated linkage lets you "run on one" for economy and cut in the other two for maximum "go."

YEAR AND MODEL	ENGINE C.I.D.	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1961-63 Ford Special (4-V & 6-V, S/T & O/D) 1964 Ford (with emission reduction) S/T & O/D 1964 Ford Special (4-V & 8-V with emission reduction; S/T & O/D)	390, 406 390 427	C4AZ-6B068-A	$202.55
1963-64 Ford (auto. trans.)	352, 390	C4AZ-6B068-B	166.65
1966 Fairlane (2-V & 4-V)	390	C6OZ-6B068-A	202.55
1965-66 Ford (2-V & 4-V S/T)	352, 390, 428	C5AZ-6B068-B	202.55
1965-66 Ford (2-V & 4-V C/M, C6)	352, 390, 428	C5AZ-6B068-C	202.55



Horsepower curve showing ideal power gain throughout a broad range on a stock 390 engine; attributed to installation of the 8-V Induction Kit. The maximum horsepower gain of 25 speaks very highly of this setup, making it an attractive bolt-on item. (Induction Kit Part Number C6AZ-6B068-B.)

Comments by Ak Miller

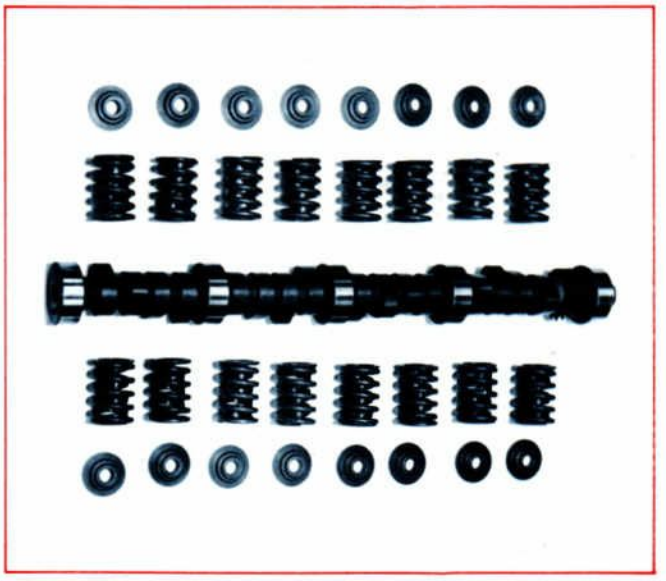


Power gained from the use of the GTA Hydraulic Camshaft No. C6OE-6250-A on a 390 engine equipped with the 8-V Induction Kit. Of special interest is the steady power line nearly paralleling that of the stock cam in the lower and intermediate ranges where high performance cams generally show a decline in horsepower. This indicates the GTA cam is well suited for cars equipped with automatic transmissions and higher gear ratios.

ENGINE DRESS-UP KIT

Give your 352, 390, 406 or 427 engine a sparkling "show" appearance with this stylish kit. Includes gleaming valve covers, air cleaner cover and oil breather cap, brake master cylinder cap, oil dip stick and radiator cap, fuel filter and fan guard. All components are finished in shining satin-chrome.

YEAR AND MODEL	ENGINE C.I.D.	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1964 Ford 1964 Ford Special (4-V)	352, 390 427	C4AZ-6980-A	$48.70
1965-66 Ford	352, 390	C5AZ-6980-A	$79.65



390 GT CAM KIT

Here is a smooth, quiet hydraulic cam that's ideal for either street or strip use. Can be used with manual or automatic transmission. Excellent low speed torque characteristics. Maximum torque occurs at 3200 RPM. Usable RPM range to 5200. Increases horsepower 15-18 over stock engine.

SPECIFICATIONS

Intake Opens	18° BTC	Duration	270°
Intake Closes	72° ABC	Valve Overlap	40°
Exhaust Opens	68° BBC	Valve Lift	0.480 Zero Lash
Exhaust Closes	22° ATC		

MAKE AND MODEL	ENGINE C.I.D.	DESCRIPTION	PART NUMBER	SUGG. RETAIL PRICE
1966 Ford, Fairlane (except GT & GTA)	390, 428	Consists of: 1—Camshaft 16—Dual Valve Springs 16—Retainers	C6AZ-6A257-A	$59.00

TACHOMETERS

A Model To Meet Every Performance Requirement

One of these precision engineered Tachometers should be high, if not first, on the list of "must" equipment items for every car with a transmission that can be shifted manually. The tach's easy to read RPM's let you know the best shift points . . . helps you get top performance from your engine, and makes driving more economical and exhilarating. All are illuminated for night driving . . . Cobra tachs have an adjustable red line . . . can be used with standard or transistorized ignition . . . and come complete with installation instructions.

9000 RPM 4-inch Face

1 Ideal for all 8 cylinder engines with 6 or 12-volt systems capable of developing high RPM's. Adjustable "red line" pointer can be set for any desired shift point. Full sweep 250° dial gives easy-to-see, accurate readings through entire range. Tach head mounts in instrument panel (chromed case and bracket are included for external mounting). Hooks up to ignition inside passenger compartment. Fully insulated and sealed from dust and moisture.

Part Number C6AZ-17A326-C 8 cylinder $47.00

6000 RPM 4-inch Face

2 Recommended for 6 or 8 cylinder standard "street" engines with 6- or 12-volt systems. Otherwise same as 9000 RPM Tach.

Part Number C6AZ-17A326-A 8 Cylinder . . $43.10
C6AZ-17A326-B 6 Cylinder . . $43.10

9000 RPM 4-inch Face

3 Sun model for 8 cylinder high performance cars with 12-volt system. Full sweep 250° dial gives easy-to-see, accurate readings through the entire range. Adjustable "red line" pointer can be set for any desired shift point. Completely sealed and insulated from dust and moisture. Tach head mounts in instrument panel. Can also be mounted to steering column or top of instrument panel by using case and bracket kit C4AZ-17368-A.

Part Number C4AZ-17A326-A $58.10

Case and Bracket Kit

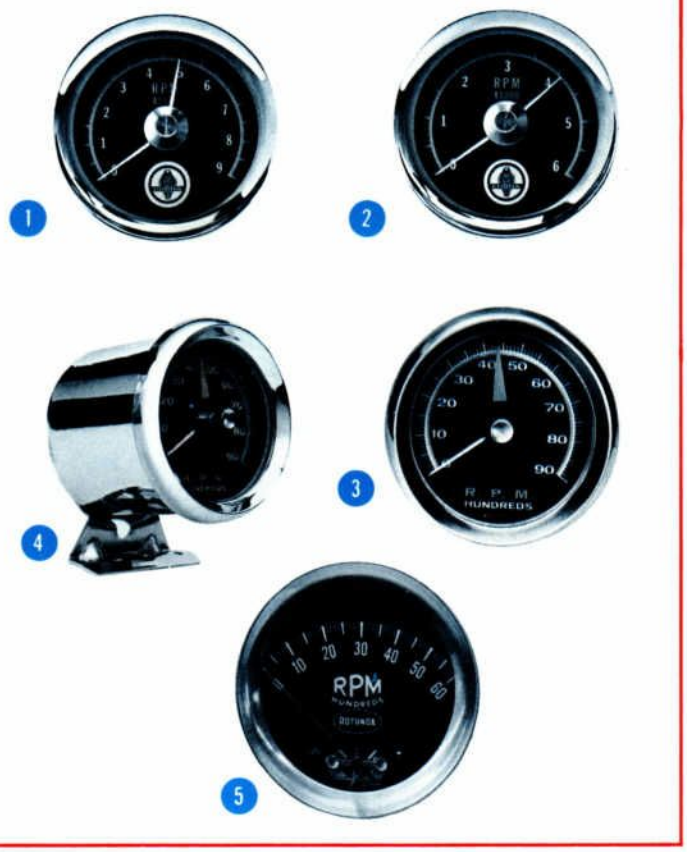
4 For mounting 9000 RPM Tach. (C4AZ-17A326-A) on steering column, flat or curved surface. Satin Chrome finish.

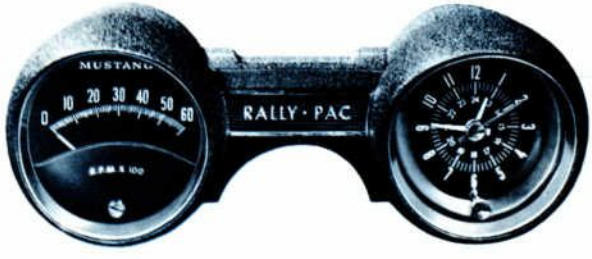
Part Number C4AZ-17368-A . . . $5.95

6000 RPM 4-inch Face

5 Here is a moderately-priced 6000 RPM Rotunda quality tach designed to operate with either 6 or 12-volt systems. Can be installed in or on the instrument panel. Includes case and bracket.

Part Number C6AZ-17A326-D (8 cyl.) . . $29.95





MUSTANG RALLY PAC

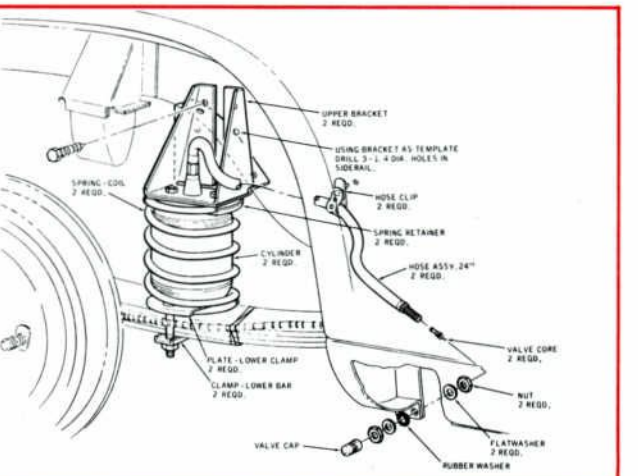
Unique twin-pod Rally Pac combines 6000 RPM (6-cylinder) or 8000 (8-cylinder) tach and precision clock with a sweep second hand. Dials in each hooded pod are illuminated for night time use. Sporty black "camera case" finish. Mounts on steering column.

MODEL APPLICATION	PART NUMBER	MFRS. SUGG. RETAIL PRICE
1965 Mustang (except GT) 8-cyl. with indicator lights	C5ZZ-10B960-C	$74.10
1965-66 Mustang (Before 2-1-66) 8-cyl. with indicator lights	C5ZZ-10B960-D	$74.10
1966 Mustang (From 2-1-66) 6-cyl. with indicator gauges	C5ZZ-10B960-G	$74.10
1966 Mustang (From 2-1-66) 8-cyl. with indicator gauges	C5ZZ-10B960-F	$74.10

AUXILIARY AIR SPRING KITS

Drag racers take note. Here is a quick, easy way to pre-load your rear wheels for faster starts off the line and lower e.t. By putting more air in the right-hand air cylinder you can offset the natural lift to the right side to even up the loads on the two rear wheels. With Auxiliary Air Springs you'll find that acceleration is faster and handling, stiffer and more sure, too. The two air cylinders can be quickly installed. Any tire pump can supply the units with air pressure to suit your requirements.

Part Number—C6AZ-5A589-A (Ford) $38.90
C6DZ-5A589-A (Falcon) 49.50
C6OZ-5A589-A (Fairlane) 49.50
C6ZZ-5A589-A (Mustang) 49.50

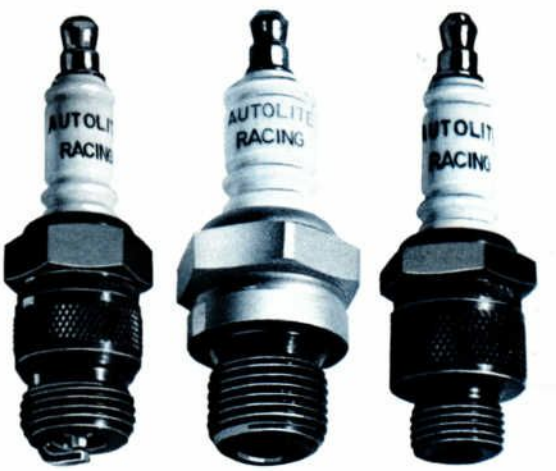


AUTOLITE RACING SPARK PLUGS

These plugs have sparked winners from Riverside to Daytona. And no wonder! They have special high-temperature alloys in both side and center electrodes for greater efficiency, quicker starts and smoother performance. They also resist highest combustion chamber temperatures. Autolite Racing Plugs' power tips heat up rapidly at lower speeds to burn away performance-cutting deposits and guard against preignition overheating.

Part Numbers	18 MM TAPERED SEAT
C2AZ-12405-A	Standard Gap Racing Plug (colder) (Autolite BF 601) Gap Setting—.023"/.027"
C2AZ-12405-B	Standard Gap Racing Plug (warmer) (Autolite BTF 1) Gap Setting—.023"/.027"
C3AZ-12405-A	Self-Cleaning Power-Tip Plug (warmer) (Autolite BF22) Gap Setting—.028"/.032"
C3AZ-12405-B	Self-Cleaning Power-Tip Plug (colder) (Autolite BF 12) Gap Setting—.028"/.032"

Each $1.05



SOLID WIRE CORE SPARK PLUG WIRES

These wiring kits are of the "universal" type and can be "tailored" for use on 1949 and later vehicles. An installation procedure is included with each kit. Because this type of wiring is not radio resistant, Radio Interference Suppression Kits (part numbers C4AZ-18827-A or -B) should be used with this type of wiring.

Part Numbers

A9AZ-12259-C (6 Cyl. Wire Kit)	$5.70
A9AZ-12259-D (8 Cyl. Wire Kit)	$8.35
C4AZ-18827-B (6 Cyl. Suppression Kit)	$6.15
C4AZ-18827-A (8 Cyl. Suppression Kit)	$7.90

RACING MIRROR

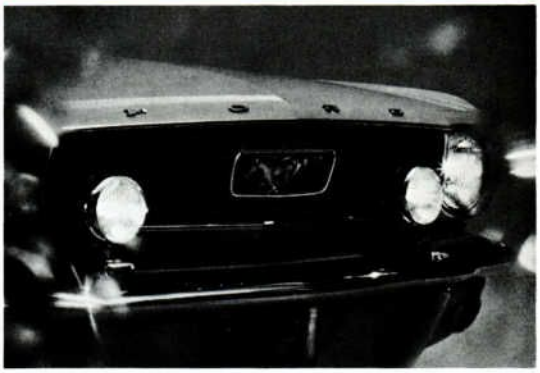
Add a look of high performance with this sporty, European-type racing mirror. Fits either side of the car . . . features chromed "first-surface" glass and dual nickel chrome plating to retain a sparkling appearance. Easy outside adjustment. Fits all makes and models.

Part Number C5RZ-17696-A $6.95

ROAD LAMPS

Give your car a GT flair with these slim-silhouette, polished-chrome road lamps. Available with clear or amber lenses to give maximum illumination for high-speed night driving, or in storm or fog. Lamps operate independently of standard headlamps and fit all makes and models with a 12-volt electrical system. Other features include illuminated instrument panel switch to show when lamps are on and a universal bumper mounting bracket.

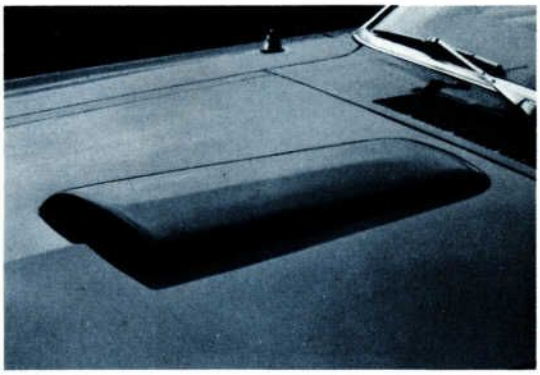
Part Numbers: Clear Lenses–C5RZ-19B532-A–Pair $24.40
Amber Lenses–C5RZ-19B532-B–Pair $24.40



ORNAMENTAL HOOD AIR SCOOP

Here's an easy way to create a racing image with any car. Just bolt this simulated air scoop to the car's hood and watch the glances turn your way. Easily painted to match the car finish.

Part Number–C5ZZ-16C630-A $25.50



RACING STRIPE KITS

For that racy look Ford offers two types of racing stripe kits: There's a 1966 Fairlane Triple Accent Stripe like the one used on the Fairlane GT. This one comes in three colors (black, red and white) and can be used with the Fairlane GT emblem to fill out the front segment of the stripe.

Part Numbers–C6OZ-6320000-A–Black $3.90
C6OZ-6320000-B–White 3.90
C6OZ-6320000-C–Red 3.90

There's also a racing stripe kit available for all Mustangs and Falcons. Each kit contains three vinyl stripes (specially pre-measured and spaced for fast application), a squeegee for easy installation, and an installation sketch for either offset or center mounting.

Part Numbers–C5ZZ-19E504-A–Red $10.00
C5ZZ-19E504-B–White 10.00
C5ZZ-19E504-C–Blue 10.00

WIRE WHEEL COVERS

One of two hot new items in wheel covers is this set of Wire Wheel Covers with real spokes (not simulated) complete with "knock-off" spinner hub. Made of durable stainless steel, these beauties are easily installed and securely held with powerful spring "teeth."

Part Numbers–C6ZZ-1130-D (14″) (Set of Four) $98.25
C6AZ-1130-E (15″) (Set of Four) 98.25

"MAG" WHEEL COVERS

For that truly customized look these "Mag" Wheel Covers are the ticket. Spoke and hub are of heavy die-cast, chrome-plated construction; rim and backing plate are rust-proof stainless steel. Like the Wire Wheel Cover, they're held securely with extra strong spring "teeth."

Part Numbers–C6OZ-1130-J (14″) (Set of Four) $81.15
C6AZ-1130-J (15″) (Set of Four) 81.15

STYLED STEEL WHEELS

If you really want to add style to your car, these brightly finished wheels are just the thing. Their sporty design adds a real look of performance and excitement and are easy to install. Available in 14″ wheel size only.
Wheel with Cap and Lugs . . . . . $35.73 each

Part Numbers–C5ZZ-1007-A (Wheel)
C5ZZ-1012-A (Hub Nut)
C5ZZ-1130-G (Hub Cap)

CHROME WHEEL NUTS

Chrome wheel nuts are available to fit all cars, and they add a "high performance" accent to any vehicle. Furnished in a package of 5, they're just right for that extra sporty touch.

Part Number–C4GY-1012-A . . . . . 60¢ each

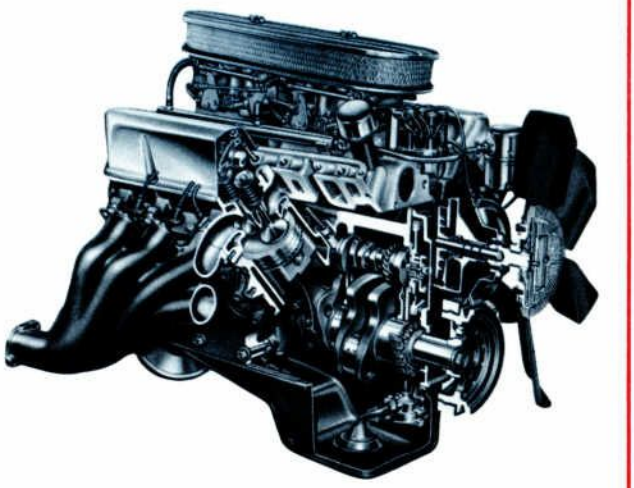
Since its introduction, the Ford 427 cubic inch wedge-head High Performance V-8 engine has been a winner. It offers owners the ultimate in all-around performance—and is as much at home on the street as on the track.

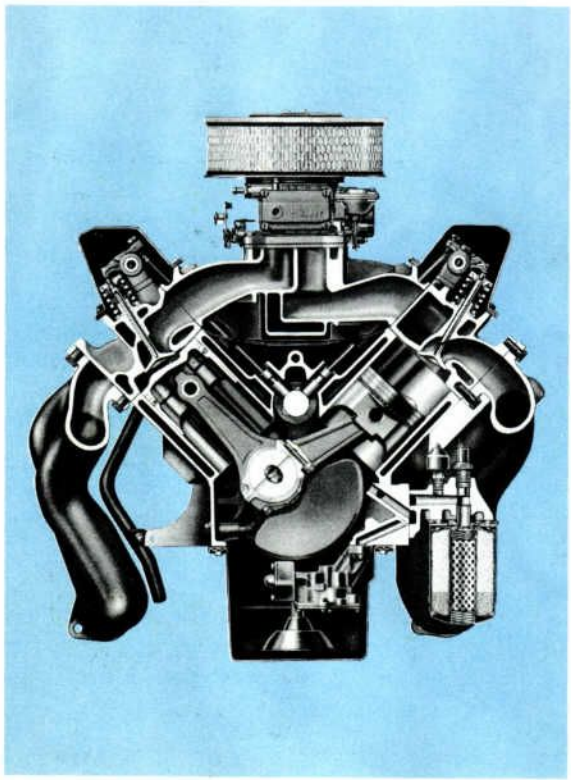
The latest 427 wedge-head engine is the result of years of intensive development and modification which has brought about tremendous horsepower gains as well as a reliability factor that rates it the best in its class.

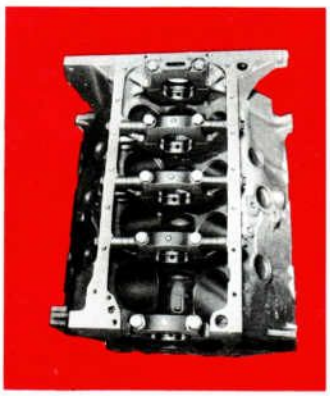
The 1966 427 features a special cylinder block with large oil galleys, special main bearing caps, and it pioneered the use of cross-bolting main bearing caps. The latest 427 features special pistons and rods developed for the 7000 RPM range. The camshaft and all valve gear components have been designed to operate in the ultra-high RPM brackets. Special cast cylinder heads with extra large ports and detailed combustion chambers all aid in making this the most potent and reliable mass produced engine on the market today.

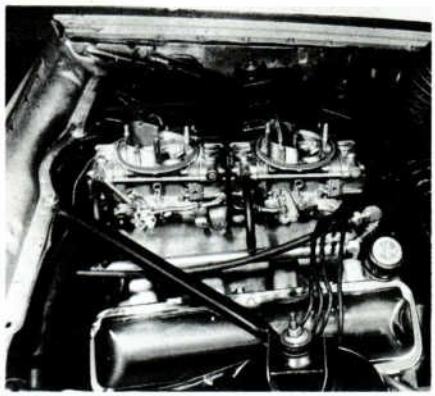
Externally, the 427 features an 8-V induction system and a special high flow exhaust header system; which all add up to one of the best bargains on the high performance market. To complete the competition appearance of the 427 engines, such parts as the air cleaner, valve rocker arm covers, dipstick and oil breather caps are chrome plated in the 1966 models.

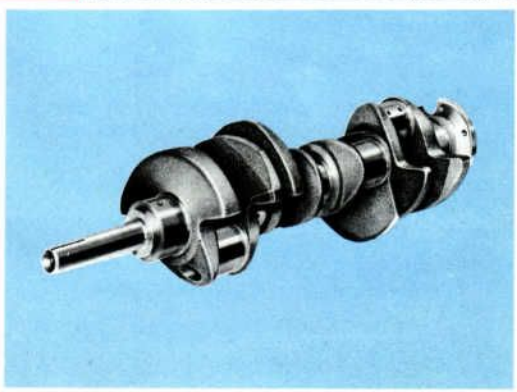
For maximum road performance from the 1966 engines, they are made available only with the optional manual 4-speed transmission. In addition, all 1966 cars equipped with these engines include these standard features: heavy-duty front suspension, heavy-duty rear suspension, modified transmission output shaft and universal joints, heavy-duty driveshaft, heavy-duty differential and axle shafts.











427 HIGH PERFORMANCE ENGINE SPECIFICATIONS

GENERAL	
Type	8-cylinder 90 degree Vee, Overhead Valve
Displacement	427 Cubic Inches
Bore & Stroke	4.2346″ x 3.784″
Maximum Torque (lbs.-ft.)	480 @ 3700 RPM
Compression Ratio (Nominal)	12.0:1
Brake Horsepower	4V-410 @ 5600 RPM 8V-425 @ 6000 RPM
Valve Lifters	Solid
Carburetor	Two 4-venturi
Fuel	Super Premium
Exhaust	Dual
Cylinder Block Material	Precision-Cast Iron
Cylinder Head Material	Precision-Cast Iron
CRANKSHAFT	
Material	Forged Steel
Main Bearings (5)	Steel-Back Copper-Lead Alloy Replaceable Inserts
Main Bearing Journal Diameter	2.7488″
Thrust Bearing	No. 3
Crankpin Journal Diameter	2.4380″-2.4388″
CAMSHAFT	
Material	Precision-Molded Special Alloy Iron
Bearings (5)	Steel-Back Babbitt Inserts
Camshaft Gear Material	Molded Nylon or Aluminum Die Cast
VALVE SYSTEM	
Operating Tappet Clearance	0.027″ (hot)
Intake Valve Opens	8° 30′ ATC*
Intake Valve Closes	36° 30′ ABC *
Duration	324° Theoretical
Exhaust Valve Opens	39° 30′ BBC *
Exhaust Valve Closes	11° 30 ′ BTC*
Duration	324° Theoretical
Valve Opening	96° Theoretical
INTAKE VALVES	
Material	Special Alloy Valve Steel with Chrome Plated Stem
Overall Length	5.446″
Overall Head Diameter	2.195″-2.185″
Angle of Seat & Face	Seat—30°—30° 30′; Face—29° 15′—29° 30′
Lift (@ zero lash)	.524″
Spring Pressure & Length	80-90 lbs. at 1.82″ (valve closed) 255-280 lbs. at 1.32″ (valve open)
EXHAUST VALVES	
Material	21-4N Forged Steel—Chrome Plated Stem
Overall Length	5.426″
Overall Head Diameter	1.723″—1.733″
Angle of Seat & Face	Seat—45° 0′—45° 30′ Face—29° 15′—29° 30′
Lift (@ zero lash)	.524″
Spring Pressure & Length	80-90 lbs. at 1.82″ (valve closed) 255-280 lbs. at 1.32″ (valve open)
PISTONS	
Material	Extruded Aluminum Cam Ground
Weight	23.31 oz.
PISTON RINGS	
No. 1 Compression	Cast Iron Alloy Chrome Plated
No. 2 Compression	Cast Iron Alloy Chrome Plated
No. 3 Oil Control	Multi-Piece—Two Chrome Plated Steel Rails and One Blued Steel Expander
Width—No. 1 No. 2	0.0774″—0.0781″ 0.0930″—0.0940″
Gap—Nos. 1 & 2 No. 3	0.010″—0.020″ 0.015″—0 .055″—Rails only
PISTON PINS	
Type	Full Floating Tubular
Material	Alloy Steel
Length	3.207″
Diameter	0.9750″—0.9753″
Bushing	Bronze
CONNECTING RODS	
Material	Forged Steel
Weight	27.08 oz.
Length	6.486″—6.490″ Center to Center
CONNECTING ROD BEARINGS	
Material	Steel-Back Copper-Lead Alloy Inserts
Overall Length	0.736″—0.746″
Clearance Limits	.0009—.0029

*Measured at .100 cam lift

ENGINE 427—8V LOW PROFILE

Series 1 Non-Machined Combustion Chambers and Bumper Pistons

Head volume—recommended	63.87 cc
—legal minimum	61.46 cc
Block deck clearance—recommended	.015″
—legal minimum	.010″

Distributor—maximum safe full advance—38°. If preignition or detonation prevails, retard lead as necessary.
Install intake manifold gaskets with blocked heat risers.
Part No. C3AZ-9441-B

Series 1A Non-Machined Combustion Chambers and Pop-Up Pistons

Head volume—recommended	73.31 cc
—legal minimum	66.00 cc
Block deck clearance—recommended	.015″
—legal minimum	.010″

Distributor—maximum safe full advance—34°. If preignition or detonation prevails, retard lead as necessary.

Carburetors and Fuel System

600 cfm
62 main metering jets
.070″ secondary jets
.038″ top bleed holes in secondary plates
.021″ pump discharge nozzles
Stock .039″ power valve passage
Adjust accelerator pump diaphragm to allow maximum displacement
Slightly preload accelerator pump arm
Install 1½″ bowl vent tubes
Back off automatic chokes
Try removing accelerator pump arm on rear carburetor
Install electric fuel pump at tank to obtain 5½-6 psi at fuel filter
Install truck flex line between steel fuel line and fuel pump
Cut one end off and slip over and clamp to the steel line
Part No. C1TZ-8493-F

ENGINE 427—8V HI-RISER

Series 2 Machined Combustion Chambers and Pop-Up Pistons

Head volume—recommended	73.31 cc
—legal minimum	66.00 cc
Block deck clearance—recommended	.015″
—legal minimum	.010″

Distributor—maximum safe full advance—38°. If preignition or detonation prevails, retard lead as necessary.

Carburetors and Fuel System

715 cfm
77 main metering jets
71 secondary jets
Block primary and secondary power valves
Seal primary and secondary bowl vents
Install .021″ pump discharge nozzles
Adjust accelerator pump diaphragm to allow maximum displacement
Slightly preload accelerator pump arm
Install 1½″ bowl vent tubes
Back off automatic chokes
Try removing accelerator pump arm on rear carburetor
Install electric fuel pump at tank to obtain 5½-6 psi at fuel filter
Install truck flex line (Ford Part No. C1TZ-8493-F) between steel fuel line and fuel pump
Cut one end off and slip over and clamp to the steel line

ENGINE 427—8V MEDIUM RISER

Series 2A Machined Combustion Chambers and Pop-Up Pistons

Head volume—recommended	73.31 cc
—legal minimum	66.00 cc
Block deck clearance—recommended	.015″
—legal minimum	.010″

Distributor—maximum safe full advance—38°. If preignition or detonation prevails, retard lead as necessary.

Carburetors and Fuel System

715 cfm
77 main metering jets
71 secondary jets
Install electric fuel pump and set for 5½-6 psi at fuel filter

Camshaft

Intake opens	40° BTDC	Exhaust opens	72° BBDC
Intake closes	72° ABDC	Exhaust closes	40° ATDC

.500″—lift at valve
.025″—valve lash, both intake and exhaust
Valves—lightweight, 7000 r.p.m.—intake and exhaust
Lifter and Push Rods—special lightweight
Crankshaft—heavy-duty steel
Rods—heavy-duty with special rod bolts
Block—oil galley relocated to left side

ALL ENGINES

Critical Dimensions

Piston skirt clearance	.007″
Rod bearing clearance	.0025″
Main bearing clearance	.0025″
Rod end clearance	.025″
Wrist pin clearance	.0007″
Valve spring height closed	1.820″ - .010″
Valve spring pressure closed	90# @ 1.82″
Valve spring pressure open	280# @ 1.32″
Valve seat and face angle—intake	30°
—exhaust	45°

Valve seat width
intake–.035″ at outer edge of valve (drag strip racing only –.070″ for street use)
exhaust–.050″ at outer edge of valve (drag strip racing only–.080″ for street use)
Hand hone cylinder wall approximately 5 minutes per cylinder with 150-180 grit stone
Install viscous drive fan
Install lightweight fabricated headers
Install BF-32, BF-22, BTFI, or BF-601 spark plugs depending upon heat range required. Gap at .035″

Critical Bolt Torques

Bolt–Cylinder Head	100 ft. lbs.
(Tighten in following steps: 30 ft. lbs., 50 ft. lbs., 70 ft. lbs., 85 ft. lbs. and 100 ft. lbs. max.)	
Bolt–Intake Manifold	28 ft. lbs.
Nut–Connecting Rod	58 ft. lbs.
65 ft. lbs. On Series 2A	
Cross Bolt–Main Bearing Cap	42 ft. lbs.
Refer to shop manual for cylinder head and cross bolt torque sequences.	
Vertical Bolt–Main Bearing Cap	105 ft. lbs.
Bolt–Rocker Shaft Hold Down	50 ft. lbs.

Balance

Critical Static Weights
Piston–658 gms
Connecting Rod–762 gms (pin end–235 gms, crank end–527 gms)
Weight of oil in crankcase end–4 gms

Series 2A Engine
Connecting Rod–795 to 806 gms (pin end–243 to 249 gms, crank end–552 to 557 gms)
Weight of oil in crankshaft end–4 gms
Have dynamic balancing performed.

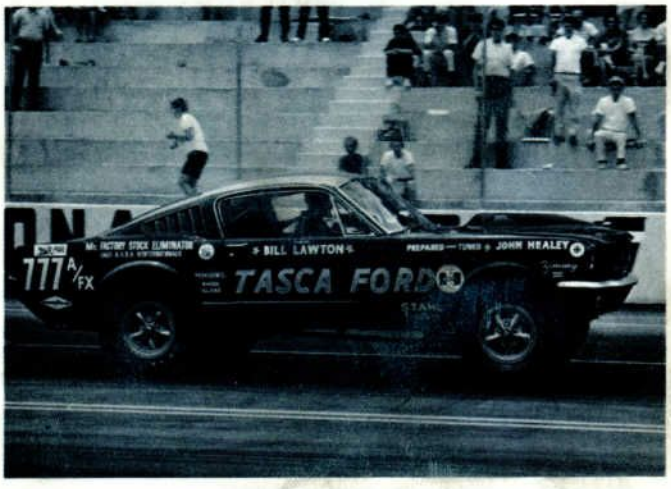
DISTRIBUTOR CURVE

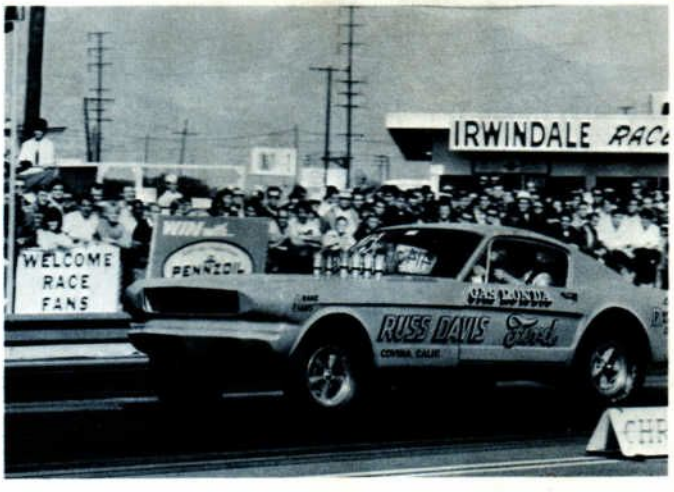
Dist. R.P.M.	250	750	800	1125	2000
Dist. Degrees	0°	0°	2½°	5°	9°

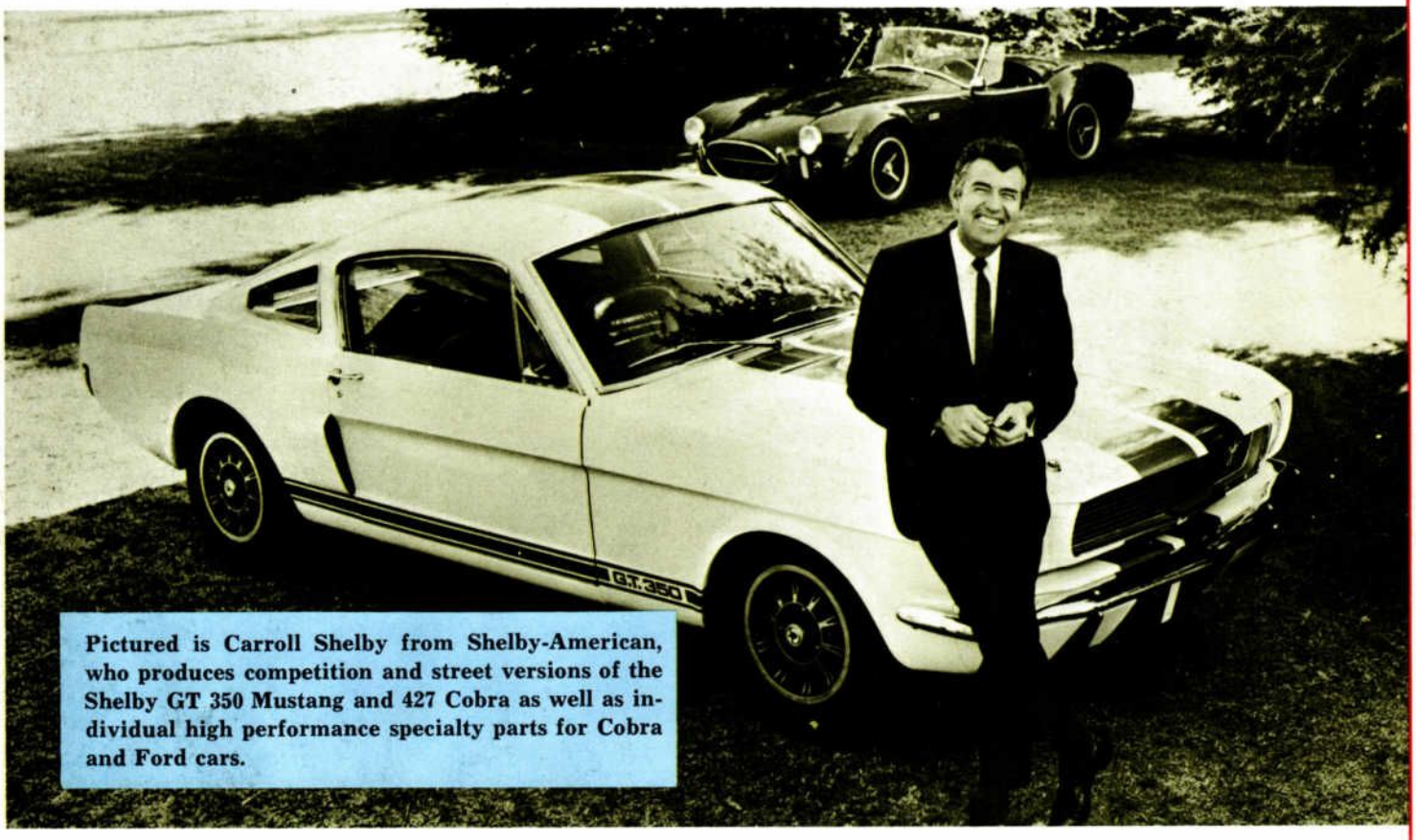
Rear Axle

Select proper gear and tires to obtain 6500 engine r.p.m. at last timing light for Series 1, 1A, and 2; 7000 r.p.m. for 2A.

Use limited slip differential and Ford high performance differential lube–Ford C2AZ-19580-D (M2C57-A).







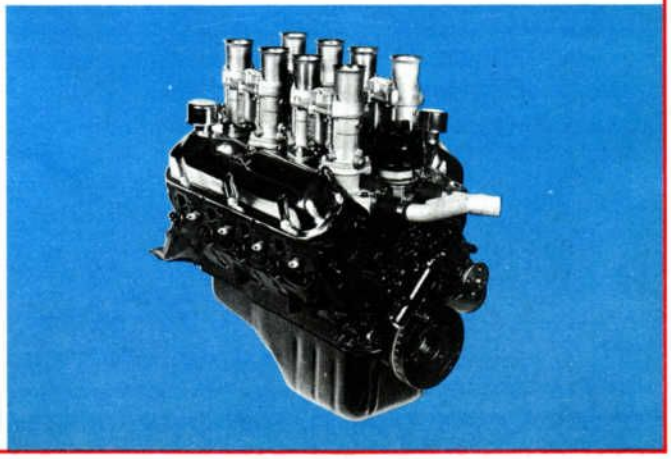
Pictured is Carroll Shelby from Shelby-American, who produces competition and street versions of the Shelby GT 350 Mustang and 427 Cobra as well as individual high performance specialty parts for Cobra and Ford cars.

The impressive track record and engineering know-how of former racing driver Carroll Shelby have long been admired by high performance enthusiasts. This same experience has been the basis of his success as a producer of outstanding performance vehicles and equipment options, designed for use on Cobra and Ford-built cars.

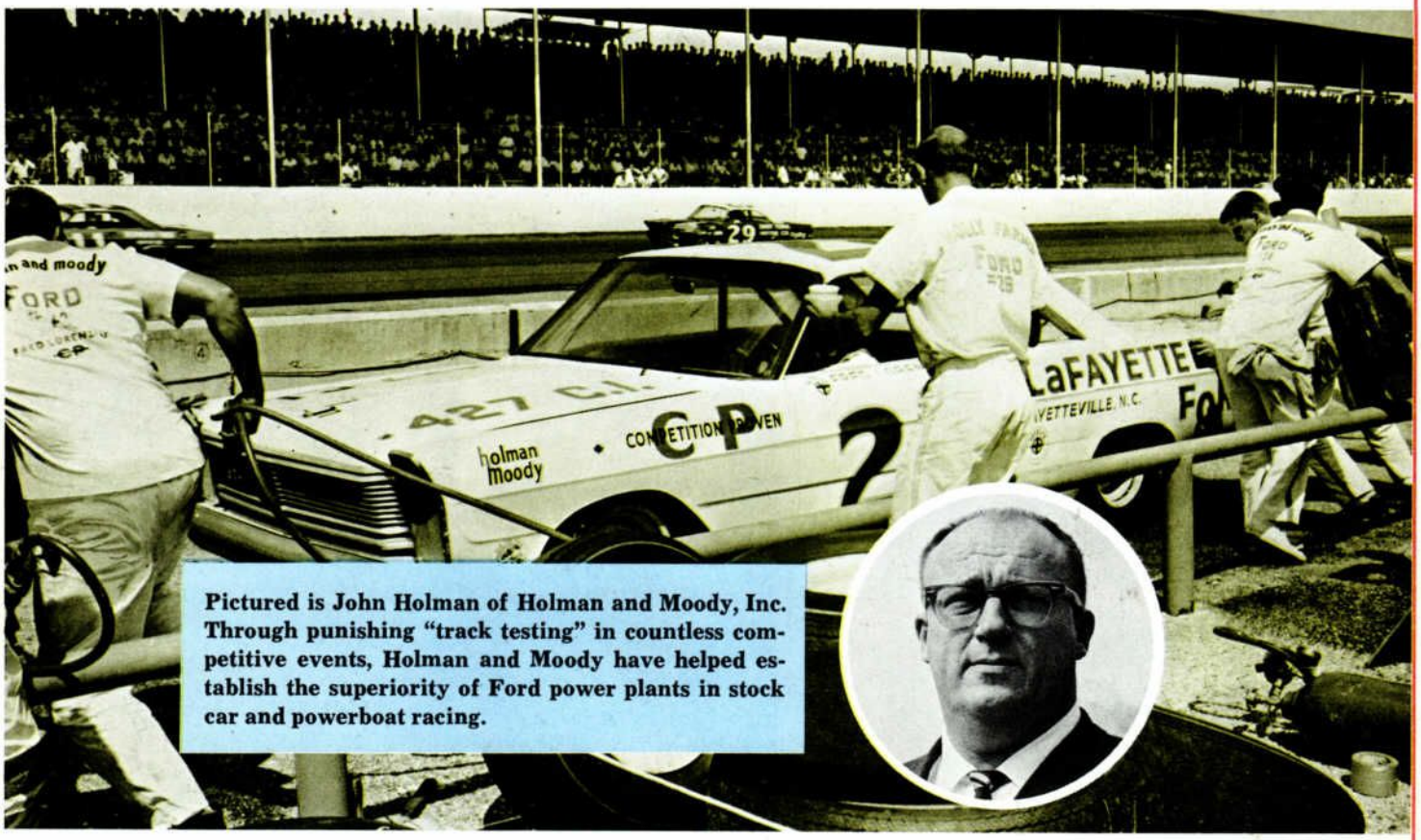
The racy Ford-powered Cobra was Shelby's original idea and quickly proved its merit on the racing circuits of the world. Now, both competition and street versions of the Cobra are available through selected Ford Dealers. Among them is the sensational street model 427 Cobra which delivers 425 horsepower and has an acceleration curve that's as close to vertical as you can get. For example, one of Shelby's drivers did zero to a hundred to zero in 13.5 seconds, *with street tires!*

The Shelby GT 350 Mustang is another Shelby project which is designed to produce 306 horses from a Ford 289 engine. If called on to do so, this road hungry fastback can go from zero to sixty in 5.7 seconds.

Along with these exotic vehicles, Shelby-American, Inc. offers a wide variety of high performance equipment ranging from GT 350 Hood Pin Kits to Weber Induction Systems to fully modified race engines. In fact, most of the high performance options developed for the GT 350 and the Cobra are available for the standard Mustang. See your Ford or Shelby-American Dealer for details.



YOUR SERVICE, TOO



Pictured is John Holman of Holman and Moody, Inc. Through punishing "track testing" in countless competitive events, Holman and Moody have helped establish the superiority of Ford power plants in stock car and powerboat racing.

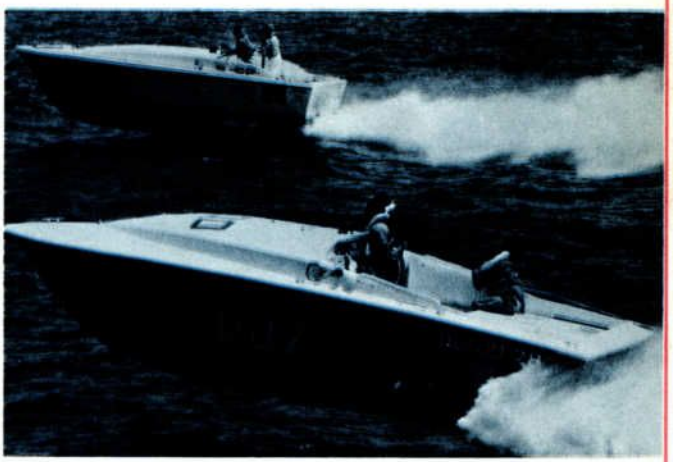
Stock car racing has benefitted the entire automotive industry because it demands the very best of engines and vehicles. However, the need for a stock engine to be in the best condition possible is very evident to anyone who has seen the stocks run.

Making sure that stock Ford engines perform at their peak is the business of Holman and Moody, Inc. As stock car and marine engine specialists they are experts at detecting and eliminating any possible human error that may have occurred in building an engine. This is called "blueprinting" an engine and involves measuring and checking all dimensions and making them conform to blueprint specs. It requires close machining of valve seats, head and block facings, honing of cylinder walls and piston pins and hand fitting of piston rings. Other engine components are carefully checked and sonic cleaned, and the engine is reassembled after balancing. After reassembly the unit is mass balanced, tuned and run in on a dynamometer, and power checked.

This work brings the engine up to optimum specifications to deliver its maximum performance.

As proof of their highly specialized skills, Ford-powered cars and powerboats prepared by Holman and Moody have won literally hundreds of events on the major race courses of the country. In addition, Holman and Moody, Inc., offers a full line of equipment from pit chalk to complete engines blueprinted for competition or high performance, as well as a full line of Competition Proven Marine Engines.

For more information, contact your Ford Dealer.



PERFORMANCE TERMINOLOGY

A

ALKY—Alcohol used as automotive fuel.

ALL-OUT—Full scale competition car; maximum car speed.

AT SPEED—Operation of a car at its highest speed.

B

BAD CAR—Hot rodders' term for a very fast car.

BASH—Race or event.

BEAST—A high performing hot rod; also difficult car to drive.

BIG BORE—Engine with larger than normal bore (cylinder diameters).

BINDERS—Brakes.

BIRD CAGE—1. Large racing car cockpit design with unusually good visibility. 2. Nickname for Maserati competition car so designed.

BLOWER—Supercharger.

BLOW OFF—To pass a car decisively when racing.

BOMB—Car of exceptional performance.

BOOT—(verb) To apply extra speed while driving at an already fast rate.

BORE OUT—To increase engine displacement and power by increasing cylinder diameter beyond stock specifications.

BOTTOM GEAR—Lowest driving gear.

BOX—Abbr., for gearbox; usually used in reference to manual transmission.

BUSINESS FOOT—Race driver's accelerator foot.

C

C'd FRAME—Frame with side rails lowered and axle kickup areas raised.

CALIFORNIA TILT—Hot rod and custom car alteration where front axle is lowered, and larger rear tires are installed.

C.C.—Abbr., cubic centimeter; European measurement basis for engine displacement. 1000 c.c.=1 liter=62 cubic inches.

CHANNEL—(verb) To modify a car body so it can be dropped down and around the frame.

CHAUFFEUR—Slang for racing driver.

CHECK POINT—That point on the route of a road rally at which officials log in car, driver and navigator, and impart information relative to the next leg of the rally.

CHEATERS—Slick tread rear tires used in drag racing.

CHICANE—A sports car race course with tight turns grouped close together.

CHOPPED—Cut down.

CLOCK—Slang for speedometer or tachometer; also to time a car's performance.

COBBLED—Temporary modification.

D

DECKED—Reworked rear deck and/or trunk area of custom car.

DEUCE—Hot rod term for '32 Ford.

DICE—(noun) A driving competition. (verb) To compete.

DIFF—Slang abbr., for differential case.

DIG OUT—To accelerate rapidly from a standing start.

DOWNSHIFT—To descend through gears from higher to lower.

DRAFTING—Stock car racing term for following closely on the heels of the car ahead, to lower wind resistance and conserve fuel while maintaining speed.

DRAG STRIP—Quarter-mile race course with deceleration area; also, any paved area used for straight-line acceleration contests.

DRIFT—Maintaining a slight but controlled skid in curves, to keep speeds high in racing. See "hang out the rear."

DUAL QUAD—Carburetor setup using two carburetors each with four throats.

E

ELIMINATOR—Drag car that wins by eliminating other cars in its class by running at higher speed.

E.T. (e.t.)—Abbr., elapsed time used in drag racing, road races, rallies.

F

F.I.—Abbr., fuel injection, a system where fuel is sprayed directly into engine cylinders rather than through a carburetor.

FISHTAIL—Lateral sway in the rear of a car when racing; also, to drive in such fashion.

FLAT OUT—Driving at top speed.

FLAT SPOT—A point at which an accelerating engine momentarily fails to gain RPM and speed.

FLOG—Slang; to drive a car badly or hard.

FLYING START—In racing, a start made at speed after a pace lap.

FOUR SPEED—Abbr., four speed manual transmission; also "four-on-the-floor."

FOUR THROAT—A four-venturi carburetor.

FULL HOUSE—A car (or engine) with all possible performance modifications short of supercharging. Also called "full race."

G

GINGERBREAD—Slang; chrome ornamentation.

GO BUTTON—Slang for accelerator pedal.

GOODIES—1. Hot rod accessories. 2. Engine modifications. 3. Rare or valuable auto parts.

GOOK WAGON—Hot rod term for over-chromed stock car with no performance refinements.

GT—Abbr., gran turismo, a car usually sized for two people and luggage which is equally applicable to fast over-the-road touring or class racing.

GYMKHANA—A competitive meet to test driving powers consisting of timed contests in backing, parking and avoiding obstacles; a road-e-o.

H

HAIRPIN—A turn that is greater than 90 degrees.

HAIRY—A car that is a potent performer; also, a difficult race course.

HANG OUT THE REAR—To take a corner or curve with the rear wheels in a controlled skid position.

HEADER—Racing type of exhaust manifold or exhaust tubes (headers).

HEEL-AND-TOE—A sports car downshifting technique wherein the right toe brakes while the right heel remains on the accelerator to maintain adequate engine speed for downshifting.

HEMI—Abbr. for competition engine with hemispherical combustion chamber design.

HONKER—Drag term for potent performing car; a winning car.

I

IDIOT BOX—Derogatory term for automatic transmission.

INDEX OF PERFORMANCE—An evaluation system in racing which mathematically considers engine size, car weight, efficiency and finishing position in relation to each other; thus a car may win "on index" without being the overall race winner.

IRON—Slang for conventional cars (as opposed to sports and high performance cars).

J

JUG—Slang for carburetor.

K

KNOCK-OFF—Quickly removable wheel lug.

L

LEADFOOT—Fast driver.

LE MANS START—Drivers are across the track from their cars. At start, drivers run across the track, enter and start their angle-parked cars. Eliminates assigning of favored track positions.

LITER (Litre)—Metric measure of cubic cylinder displacement, equalling 1,000 cubic centimeters or 62 cubic inches.

LOUD PEDAL—Accelerator.

M

MAGS—Magnesium wheels.

MILL—1. Slang for engine. 2. (verb) To remove metal from the base of cylinder head to make combustion chamber smaller and thus increase compression ratio.

MOON GAS—Hot rod term for fuels with large nitromethane content.

O

OFF THE PEG—Sports car term for pushing engine rpm beyond the upper limit of the tachometer.

OFFICE—Slang for driver's compartment of a racing car.

OVER-REV—To run an engine too fast.

OVERSQUARE—When engine bore is greater than stroke.

OVERSTEER—The tendency of a car rear to swing out and thus help "steer" in going around corners.

P

PEAKING SPEED—The engine RPM (and conversely, vehicle speed) at which peak performance is reached.

PEEL—Also "peel rubber." To accelerate so that rear tires deposit rubber on the roadway.

PORT—1. (verb) To enlarge valve passages for improved engine breathing. 2. (noun) The openings in the block through which fuel enters and exhaust leaves an engine.

POWER HOP—Tendency of rear wheels to shudder or hop under full-bore acceleration. Known also as axle tramp, wheel hop.

PROGRESSIVE LINKAGE—Linkage for multiventuri and multiple carburetion systems designed to permit greater flow of fuel as engine RPM increases.

Q

QUAD—Four-venturi carburetor.

R

RACK—(verb) To damage or wreck a car. Also "rack up."

RAG TOP—Convertible.

RAIL JOB—Dragster with little or no body and exposed frame rails.

RAKE—Tilt of a car caused by front being lower than rear, or vice versa.

S

SANITARY—1. Slang for a car of unusual cleanliness despite competition potential. 2. A car unusually well prepared for competition.

SCOOP—Opening in body to deliver cool air to engine, brakes or cockpit.

SCREAMER—1. A high RPM engine. 2. A fast car. 3. A supercharged car.

SECTION—(verb) Customizing term for removing horizontal metal area from body and rejoining the two parts, for a lower silhouette. See also "Chopped", "Channel."

SET-UP—(verb) 1. To prepare a car for racing. 2. To modify a car for racing.

SLEEPER—1. Racing car which performs better than expected. 2. A car of stock appearance concealing better-than-stock performance.

SLICK—Smooth, treadless racing or drag tire of wide cross section.

SLINGSHOT—Drag car with driver's compartment placed behind rear wheels.

SPIN OUT—Rotating end around end on a turn without overturning.

SPONGE—(noun) A car with disappointing performance.

STACKS—Slang term for tubular carburetor intake pipes and/or short individual exhaust pipes.

STANDING QUARTER—In drag racing, a quarter mile time race begun with vehicle at rest.

STICK—Abbr., Manual transmission. Also "stick shift."

STOCKER—Stock car owner or driver.

STRAIGHT BOX—Three speed manual transmission.

STROKER KIT—Crankshaft and connecting rod assembly engineered to increase engine displacement by lengthening the stroke of the piston.

SUPER STOCK—Production car with special engine and chassis modifications.

T

THROAT—Carburetor venturi.

TIME TRAP—Distance between two synchronized timing devices which record the time required by a car to travel between them. Also "trap" or "the traps." "Go through the traps" is to compete in time trials.

TOP END—Power output at high rpm or at end of quarter-mile.

U

UNDERSTEER—Condition wherein a car requires more steering angle in relation to speed in order to hold a given radius, as the rear wheels do not contribute to steering effect. (See "oversteer")

UNGLUED—Slang for a broken part or assembly. Also "come unglued."

V

VALVE FLOAT—The RPM at which valve springs cannot shut the valves in time to maintain compression. Known also as "valve crash."

VENTURI—Fuel passageway in the carburetor, narrowed to increase velocity of fuel-air mixture.

W

WHEELIE—Picking up the front wheels off the ground when coming off the line.

WILD—A car that deviates greatly from stock appearance and/or performance.

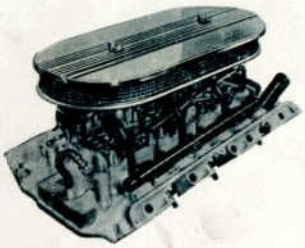
ROTUNDA

FoMoCo
GENUINE PARTS

GTA

AUTOLITE

Ford



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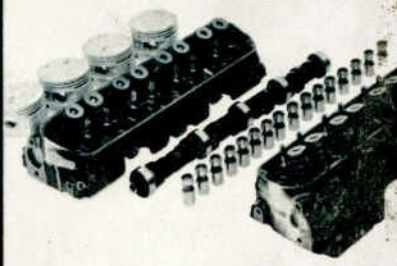

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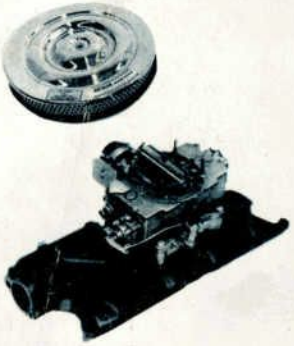

HIGH PERFORMANCE
289