

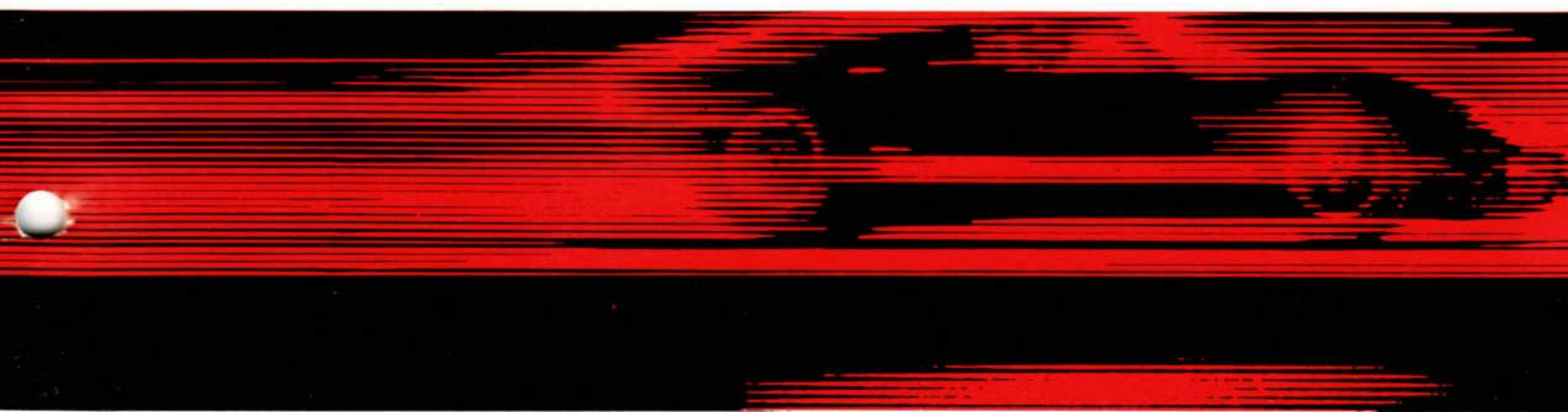
HOW TO MODIFY YOUR
FORD BIG BLOCK ENGINE
FOR STREET AND STRIP



HI-PER PARTS

SPECIAL HIGH PERFORMANCE PARTS FOR FORD 390, 406, 427 AND 428 C.I.D. ENGINES

Autolite 



INTRODUCTION

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WELCOME TO THE AUTOLITE-FORD WORLD OF HIGH PERFORMANCE

We have prepared this booklet for all performance enthusiasts . . . but especially for those who own, or would like to own, a Ford Motor Company car equipped with a 390, 406, 427 or 428 cubic inch engine. You will find detailed instructions on how to modify these popular production engines for peak power and performance . . . and a complete listing of competitively-priced, race-bred Autolite-Ford *Hi-Per* parts available through Ford and Lincoln-Mercury dealers.

All Autolite-Ford *Hi-Per* parts have been developed as part of the Ford Motor Company's active participation in nearly every major segment of automobile racing today. *Hi-Per* parts are designed exclusively for our engines by Ford high performance engineers who are constantly coming up with better performance ideas. Because their ideas are rigorously tested in the lab and on the track, under actual race conditions, you can be assured of exceptional value for your high performance parts dollar.

So, whether your interest is in drag racing, stock cars, road course racing . . . or simply in owning a finely-tuned, high-output engine whose insistent urging presses you back into your seat . . . we believe you will find this booklet both interesting and informative.

THE 428 COBRA JET

Perhaps the easiest way to the winner's circle these days is with a Ford or Mercury model powered by a 428 Cobra Jet engine.

The 428 Cobra Jet answers the call for a reliable, streetable high performance engine . . . yet it can be economically modified, from readily available factory parts, into a consistent winner at the track.

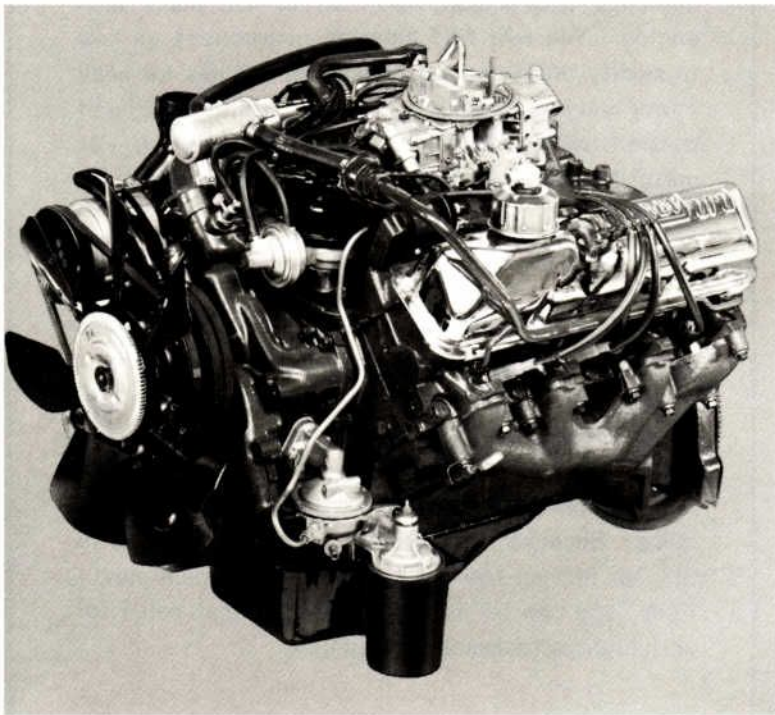


Figure 1 – 428 Cobra Jet

In absolute showroom condition – that's with stock engine, chassis and tires – a 428 Cobra Jet powered Mustang will turn the quarter mile in about 13.6 seconds E.T. and 103 mph. A street/production setup which runs that well is obviously a potent performer when modified. The record book proves just how good it really is.

Al Joniec, driving a specially prepared Mustang with a 428 Cobra Jet, took first place in SS/E class at the 1968 NHRA Winternationals and then came right back to beat all other Super Stock class winners and become Super Stock Eliminator. He also set a record of 11.49 seconds E.T. and top speed of 120.6 mph.

At both the NHRA 1968 Springnationals and the 1968 Nationals at Indianapolis, Jerry Harvey's Cobra Jet-powered Mustang took top SS/E Class honors.



All performance buffs can now give Al and Jerry a real run for the money because the same 428 high performance parts are now available at Ford and Lincoln-Mercury dealers. That's right. A whole host of factory high performance parts are available to everyone – beginning right now! The 428 Cobra Jet brings trophy winning runs within the reach of all – which should make for sensational competition at the tracks.



Al Joniec, 1968 Winternationals SS/E winner

The production 428 Cobra Jet is quiet . . . a docile street performer . . . and is low in cost, when compared to many competitive high performance engines.

It is a high volume, regular production engine that can turn in amazing performance right off the showroom floor, yet can be modified into a fully competitive strip winner. Let's see what makes the production 428 Cobra Jet such a potent performer, discuss the parts that can be used on other Ford big-inch wedges, and explain how to modify the 428 Cobra Jet for the strip.



Hubert Platt, 1968 Winternationals SS/E

THE PRODUCTION 428 COBRA JET ENGINE

The 428 Cobra Jet (C.J.) is derived from the 428 Thunderbird engine introduced in 1966 Fords and Thunderbirds. Only Ford models continue to use it because Thunderbirds now are equipped with the new 429 engine. Except for the engine block, however, little similarity exists between the 428 Thunderbird and 428 Cobra Jet engines. From the 428 Thunderbird engine block design, Ford engineers carefully selected several regular production parts and added some new high performance parts to come up with the 428 C.J.. Costs were thus kept to a minimum. This also accounts for Ford's ability to offer the 428 C.J. as a regular production option, rather than a limited production high performance engine. And, as we will discuss later, this allows the use of many 427 high performance parts for modifying the 428 C.J.. The following chart lists some of the important specifications for the production 428 C.J..



Roger Caster, 1968 NHRA High Point leader in SS Division 4



Jerry Harvey, 1968 Nationals SS/E winner

428-4V COBRA JET

Type	8-Cyl. 90 V OHV
Displacement	428 Cu. In.
Bore	4.13
Stroke	3.98
Maximum Compression Ratio	11.0:1
Brake Horsepower @ Specified rpm	335 @ 5200
Maximum Torque (lb. ft.) @ Specified rpm	440 @ 3400
Idle rpm (Adjust with lights on)	
Manual Transmission	700-750
Automatic Transmission	650-700
Valve Lifters	Hydraulic
Fuel	Premium
Carburetor	735 Cfm 4V
Spark Plug	Autolite BF-32
Spark Plug Gap	0.028" -0.035"
Firing Order	1-5-4-2-6-3-7-8
Distributor Point Gap	0.017" (A/T) 0.016" (S/T)
Ignition Timing (BTDC) (Vac disconnected)	
Manual Transmission	6°
Automatic Transmission	6°
Valves	
Intake	Solid Stem 2.097" Dia.
Exhaust	Solid Stem 1.660" Dia.

THE 428 COBRA JET

428 C.J. BLOCK

The 428 C.J. features a controlled microstructure, improved cast iron block. This is the same type of alloy cast iron that is used in 427 blocks to provide higher strength characteristics. Standard 2-bolt main bearing caps are used (Fig. 3), instead of the cross-bolted main bearing caps employed in the 427. Cross-bolted bearings contribute to durability in high speed, long distance races, and in certain dragsters such as the supercharged fuel eliminators. They are not necessary, however, for the type of operating conditions for which the 428 C.J. was designed – street use or stock and super stock drag competition. It should be noted, however, that the 428 C.J. only winds up to the 5,000-6,000 rpm range, as opposed to the 7,000-plus range of the 427. The 428 Cobra Jet is basically a street engine, but one that can be modified to run in the classes which the average performance buff can afford – the stock and super stock classes. The 2-bolt bearing caps provide plenty of strength for this usage.

Dimensions of the 428 C.J. block are identical to the 428 Thunderbird engine, and similar to other big-block Ford engines. The cylinder heads, intake manifold, and oil pan all bolt on without any machining. The oil pump shown in Figure 3 is the heavy-duty type used in the 428 Police Interceptor engine and is geared for high output.

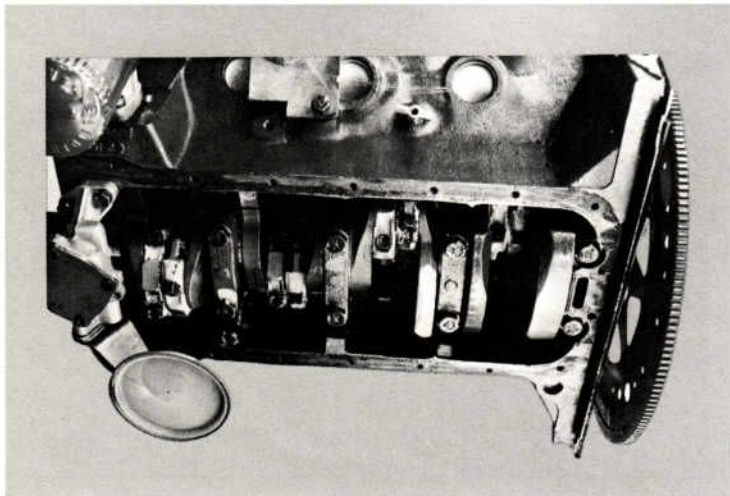


Figure 3 – 428 Cobra Jet Block

428 C.J. CRANKSHAFT

The crankshaft (Fig. 4) is made of "nodular controlled" cast iron for high strength characteristics. The bearing journals are drilled to provide good lubrication during high rpm, high load conditions. The oil groove in the middle of each main journal, which is recommended only for the strip, will be discussed in the modification section. The groove does not appear on production crankshafts.

Main bearing journal diameters and connecting rod bearing journal diameters are identical to 427 journals. However, instead of the special thin-wall type bearings used in the 427, standard type steel-backed, copper/lead insert bearings are used in the production 428 Cobra Jet. Use of the thin-wall type bearings will be covered under modifications.

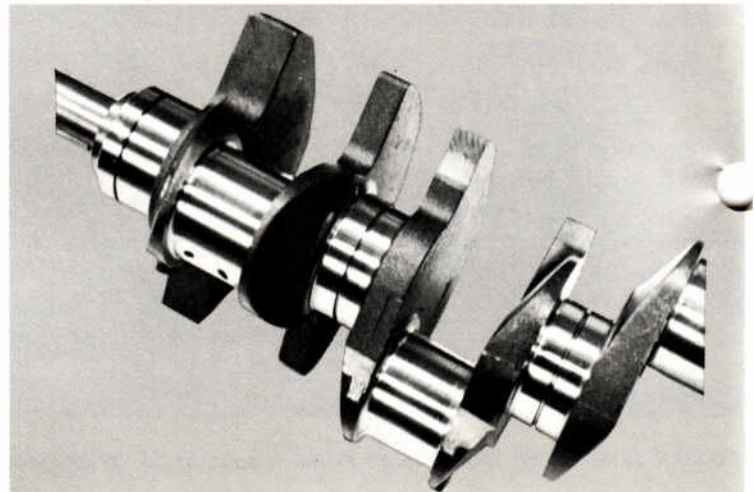


Figure 4 – 428 C.J. Crankshaft

By comparing the bore and stroke dimensions (Fig. 5) of Ford's big-block engines, it can be seen that no other crankshaft can be used in the 428 C.J. unless special rods and pistons are also used.

BORE AND STROKE COMPARISONS		
Engine	Bore	Stroke
352 CID	4.00"	3.50"
390 CID	4.05"	3.78"
406 CID	4.13"	3.78"
427 CID	4.23"	3.78"
428 CID	4.13"	3.98"
429 CID	4.36"	3.59"

Figure 5 – Critical Dimensions – Big Block Ford V-8's

428 C.J. CONNECTING RODS

The connecting rods (Fig. 6) are a special high strength type used in 428 Police Interceptor engines. Bearing caps are retained with a larger 11/32" diameter bolt and nut. Forged steel 427 type rods that retain the bearing cap with a bolt, instead of a bolt and nut design, are also used in the 428 C.J.



Figure 6 – 428 C.J. Connecting Rod

428 C.J. PISTONS

Figure 7 illustrates the "dished with eyebrows" type piston used in the production 428 C.J.. The piston is cast aluminum and is attached to the connecting rod with a full floating pin and locked in with two retainers. The eyebrows provide clearance for the valves when the piston is near the top of its stroke. With most Ford cams, the critical area is 6°-8° after TDC (Top Dead Center). Two sets of eyebrows are cut in the piston so that the piston may be used in either the right or left bank. This piston gives a compression ratio of 10.7:1 and a maximum of 11.0:1. A high performance piston is also available: a "pop-up with eyebrows" type providing a compression ratio of 12.5:1.

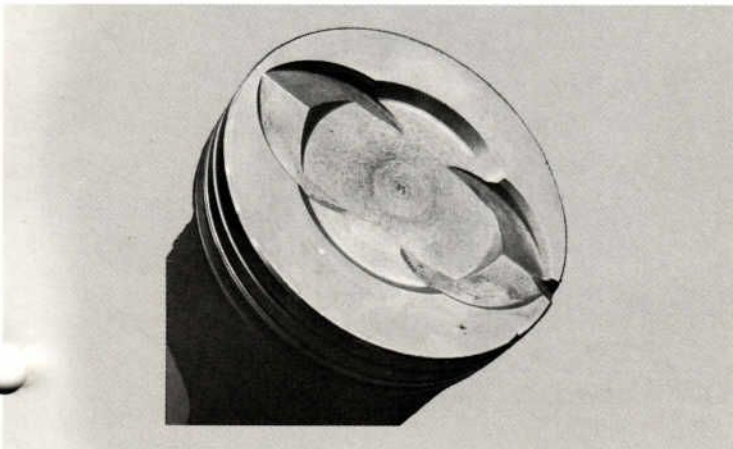


Figure 7 – 428 "Dished with Eyebrows" Piston

428 C.J. CYLINDER HEADS

Cylinder heads (Fig. 8) are cast iron with conventional rectangular intake ports, measuring 2.34" x 1.34". This is a significant increase over 390 heads (1.84" x 1.28") and even slightly larger than non-tunnel port 427 heads (2.06" x 1.34"). As can be expected, these large port dimensions greatly assist the free breathing capabilities of 428 C.J. engines. A check of the critical dimensions in Figure 5 reveals that this head will bolt directly on 390, 406 and 427 engines. However, no other heads will fit the 428 C.J. without bore chamfering to provide certain sufficient valve clearance.

A steel shim head gasket is used between the cylinder heads and the block. Figure 9 illustrates the shape of the combustion chambers with the valves installed.

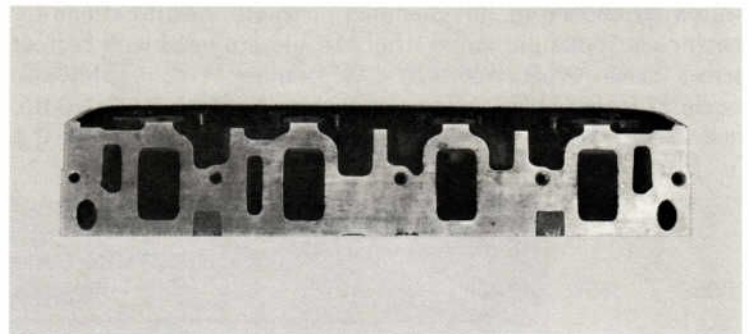


Figure 8 – 428 C.J. Cylinder Head

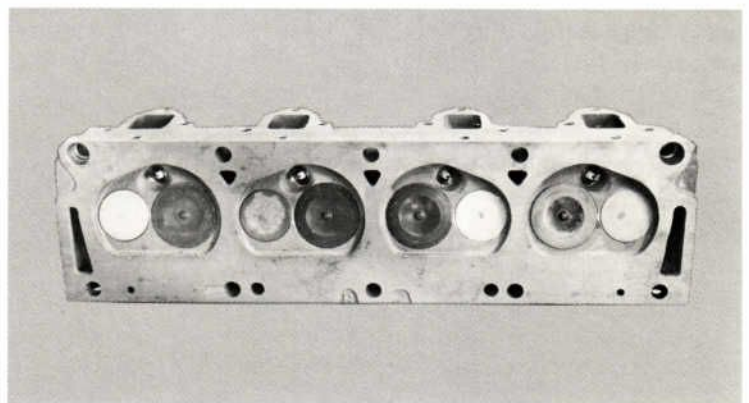


Figure 9 – 428 C.J. Cylinder Head with Valves Installed

THE 428 COBRA JET

428 C.J. VALVES

Solid stem intake valves (Fig. 10) are used. They are made of a special silchrome alloy steel and feature big 2.097" diameter heads. Seat angle is 30°. Exhaust valves (Fig. 10) are also solid stem, but are made of forged steel. Seat angle is 45° and head diameter 1.660". These dimensions are somewhat larger than those for the standard 428 Thunderbird engine (2.022" - intake and 1.551" - exhaust) for improved breathing.

The valve dimensions also compare favorably with the 427 non-tunnel port heads (2.195" - intake and 1.733" - exhaust). Lightweight valves are available for the 428 C.J. and will be discussed under modifications.

428 C.J. CAMSHAFT

Two camshafts are available for the production 428 C.J.. The following chart (Fig. 11) contains complete specifications for each cam. Hydraulic valve lifter tappets are used with both of these cams. Production 428 C.J. engines also employ two types of rocker arms: the standard non-adjustable 1.73:1 ratio, and the adjustable 1.76:1 ratio used in 427 engines.



Figure 10 – 428 C.J. Intake and Exhaust Valves

PRODUCTION CAMSHAFT SPECIFICATIONS				
	STREET		STREET and STRIP	
Camshaft Part Number	C60Z-6250-B		C8AX-6250-C	
Lifter Type	Hydraulic		Hydraulic	
Rocker Arm Ratio	1.73:1 Non-Adj. 1.76:1 Adj.		1.73:1 Non-Adj. 1.76:1 Adj.	
TIMING	Intake	Exhaust	Intake	Exhaust
Checking Clearance	0°	0°	0° 0.100" lift	0° 0.100" lift
Opens (BTC) (BBC)	18° (BTC)	82° (BBC)	24° (BTC) 22° (ATC)	82° (BBC) 34° (BBC)
Closes (ABC) (ATC)	72° (ABC)	28° (ATC)	78° (ABC) 30° (ABC)	34° (ATC) 18° (BTC)
Overlap	46°	46°	58° 40°	58° 40°
Duration	270°	290°	282° 188°	296° 196°
VALVES				
Head Diameter (Max.)	2.097"	1.660"	2.097"	1.660"
Angle of Seat & Face	30°	45°	30°	45°
Lift (Max. at Valve)	0.481" (1.73) 0.487" (1.76)	0.490" (1.73) 0.495" (1.76)	0.500" (1.73) 0.509" (1.76)	0.500" (1.73) 0.509" (1.76)
SPRINGS				
Outer Valve Closed (Max.)	90 lbs. @ 1.82"	90 lbs. @ 1.82"	90 lbs. @ 1.82"	90 lbs. @ 1.82"
Outer Valve Open (Max.)	281 lbs. @ 1.32"	281 lbs. @ 1.32"	305 lbs. @ 1.32"	305 lbs. @ 1.32"
Inner Valve Closed (Max.)				
Inner Valve Only (Max.)	Damper Only Damper Only		Damper Only Damper Only	

Figure 11 – Camshaft Specification Chart

428 C.J. INTAKE MANIFOLD

The intake manifold (Fig. 12) is a cast iron duplicate of the free-breathing aluminum manifold used on Police Interceptor 428's. Though the production setup is a 4-bbl. induction system, it will be pointed out in the modifications section that any manifold which fits the 427 (except 427 tunnel port engines) will also work on the 428 C.J..

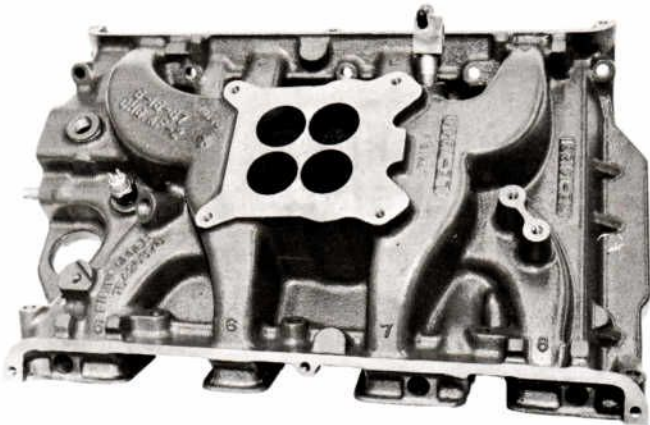


Figure 12 – 428 C.J. Intake Manifold

428 C.J. CARBURETION

A 4-bbl. carburetor (Fig. 13) tops the intake manifold. It is flow rated at 735 cfm (cubic feet per minute). Primary jets are number 67's and secondary jets number 79's. Manual transmission cars come with a C80Z-9510-AA carburetor. C80Z-9510-AB is used on cars with automatic transmissions. Because just about all the big-block manifolds fit the 428 C.J., there are a number of large 4-bbl. setups and multi-carb units that can be used with the 428 in modified form.

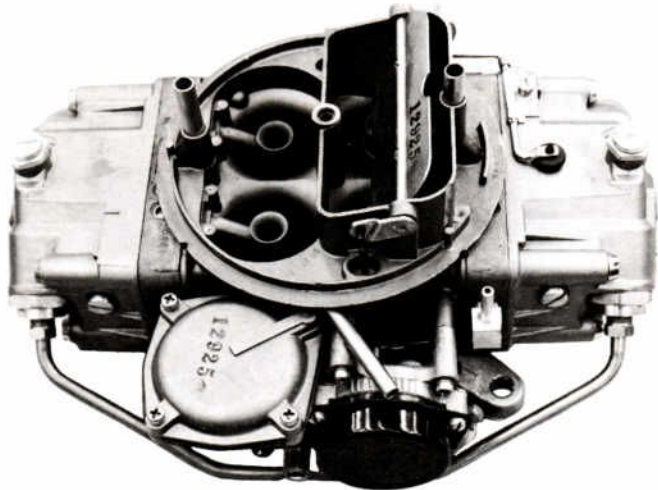


Figure 13 – 735 cfm 4V Carburetor

428 C.J. EXHAUST MANIFOLDS

New, low restriction, cast iron exhaust manifolds (Fig. 14) are used on the production 428 C.J.. While these are more efficient than the standard type of exhaust manifold, they are still not as efficient as the special tube type headers for strip competition. The recommended dimensions for competition headers will be covered under modifications.



Figure 14 – New, Low Restriction Exhaust Manifolds

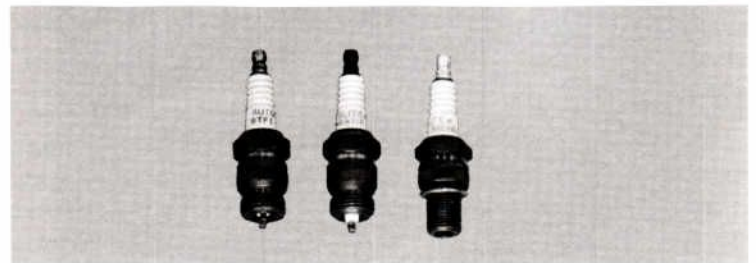
428 C.J. IGNITION

A single point, dual-advance type distributor is used on the production 428 C.J.. The ignition timing curve is:

Distributor rpm	250	500	1000	1500	2000
Distributor degrees	0°	3°	10.5°	12.5°	14.5°

Breaker point gap is set at 0.017" on both manual and automatic transmission equipped cars. A dual point, centrifugal advance 427 distributor is used for strip competition.

Autolite BF-32 spark plugs are installed at the factory and gapped to 0.028" - 0.032". BF-22, BF-12 and BTF-1 are recommended alternates, depending upon operating conditions.



Autolite Hi-Per plugs. Left to right, Standard Gap . . . Power Tip . . . and Racing Gap

THE 428 COBRA JET

COLD AIR PACKAGE — MUSTANG/COUGAR ONLY

A special air cleaner package design (Fig. 15) comes only on Mustangs and Cougars. The door in the duct, at the right front of the air cleaner, is actuated by the carburetor air temperature. It closes during engine warmup, much like the automatic choke, but the door opens when the engine carburetor air temperature reaches 130 F.

Additionally, a door in the air cleaner cover is activated by intake manifold vacuum. When manifold depression reaches 5 inches of mercury, the door opens and cold air is directed through the functional hood air scoop (Fig. 16) into the carburetor.

Cold air contains more power-producing oxygen than warm air, so it increases 428 C.J. performance even further.

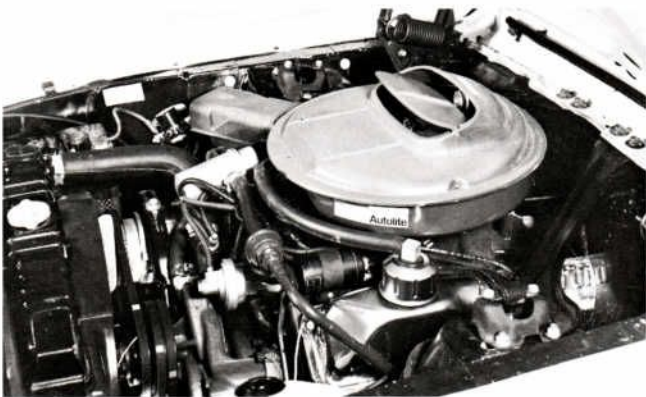


Figure 15 – Cold Air Package Air Cleaner

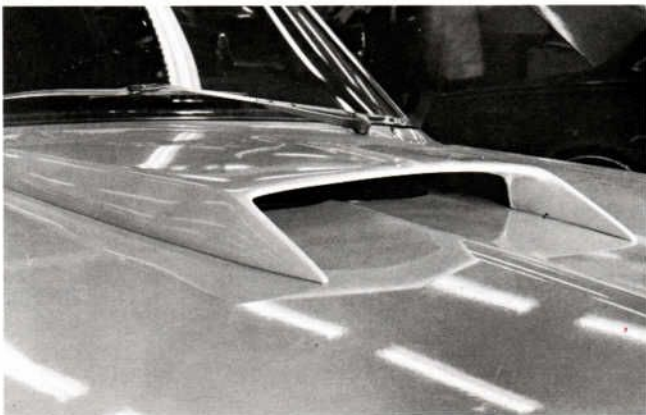


Figure 16 – Mustang Functional Hood Air Scoop

MODIFICATIONS

Modifications involving the 428 Cobra Jet will be covered under three general categories: (1) Using 428 C.J. components to modify earlier engines such as the 352, 390, 406, 427 and 428, (2) Modifying the 428 to run in "stock" drag competition, and (3) Using certain 427 parts to run "super stock" drag competition.

MODIFYING EARLIER BIG BLOCK ENGINES

Many 428 Cobra Jet parts fit other Ford big-block engines because the 352, 390, 406, 427 and 428 are all based on the same general block design. Although bore and stroke dimensions may vary, bore spacing and main bearing journal diameter (2.438") are the same for all engines. Using 428 C.J. components in 352-428 engines may not necessarily make them strip winners, but it certainly should make them more lively street performers.

CRANKSHAFT

The 428 C.J. crankshaft (Ford Part No. C6AZ-6303-B) fits the standard 428 without any modifications. If production bore and stroke are to be maintained on the 406, then special rods are necessary; special rods pistons are required for the 352 and 390.

NOTE: The 428 C.J. crankshaft is balanced with the flywheel installed. A statically unbalanced flywheel (weighted with 28.2 inch-ounces at the factory as shown in Figure 17) is necessary to obtain a dynamically balanced assembly. This should be taken into account any time modifications involve the crankshaft, pistons or connecting rods.



Figure 17 – Balance Weight on 428 C.J. Flywheel

CAMSHAFT

Both of the 428 C.J. production cams (Ford Part No.'s C60Z-6250-B and C8AX-6250-C) will fit any big-block Ford engine that uses a hydraulic cam. They work equally well with either manual or automatic transmissions. Both have excellent low to mid-range torque characteristics, with maximum torque occurring at 3400-3600 rpm. Remember, however, that both are designed for hydraulic lifter tappets only. Also, be sure to use new springs, retainers, and seats, whenever a new camshaft is installed. This will assure that specified spring height and pressure specifications are met.

CYLINDER HEADS

Cobra Jet 428 heads (Ford Part No. C80Z-6049-F, Casting No. C8AE-6090-J) also fit all big-block Ford wedge engines. Their big intake port dimensions (Fig. 18) and larger valves provide better breathing characteristics for 390, 406, 427 and 428 engines.



Figure 18 – Large Intake Ports – 428 Cylinder Head

INTAKE MANIFOLD

The production 428 C.J. aluminum intake manifold (Ford Part No. C6AZ-9424-H, casting number C7AE-9425-F) and the production cast iron manifold (Ford Part No. C80Z-9424-A, casting number C80E-9425-A) will bolt right on any 352 through 428 Ford wedge. It will improve the breathing of any of these engines and take a number of 4-bbl. carburetor setups.

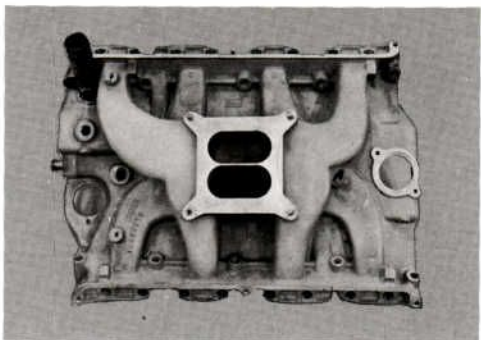


Figure 19 – Cobra Jet Aluminum Intake Manifold

CARBURETOR

If you decide to use the 428 C.J. 735 cfm 4V carburetor, be sure to match it to the type of transmission used. C80Z-9510-AA must be used with a manual transmission; C80Z-9510-AB must be used with an automatic transmission. The type of carburetor can be identified by a metal tag on the carburetor body.

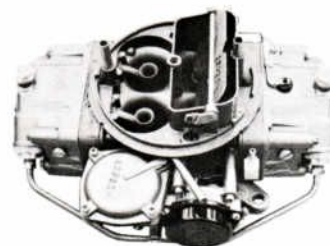


Figure 20 – Cobra Jet 735 cfm 4V Carburetor

MODIFYING THE 428 COBRA JET

One of the big advantages of the 428 Cobra Jet is that a long list of factory high performance parts can be used for modifications. Our customers can be assured that Ford high performance equipment is designed to be compatible with other Ford components and they are readily available – at competitive prices – through Ford and Lincoln-Mercury dealers. The following are some suggestions that will make 428 Cobra Jet powered Mustangs, Cougars, Fairlanes and Montegos run with the best in stock and super stock drag competition.

1968 NHRA DRAG RACE RULES

Before explaining how to modify a 428 C.J., let's first see exactly what constitutes a stock or super stock dragster.

So that competition may be conducted on an equitable basis, dragsters are divided into several classes by the National Hot Rod Association (NHRA). Stock and super stock are the classes most similar to a showroom or production car. Only limited degrees of engine, body and chassis modifications are allowed. In comparison, the "funny cars" are almost completely reworked, and the "rail" dragsters are all-new vehicles and bear no resemblance to stock cars. Stock and super stock cars are divided into classes according to their weight-to-horsepower ratio. The chart below shows the various 1968 NHRA stock and super stock classes. To determine the class of a car, divide the car's shipping weight by the advertised horsepower (or the horsepower as factored by the NHRA). Class rules change frequently, so check with your local drag strip for the latest classifications.

UNDER THE HOOD VENOM ...

MODIFYING THE 428 C.J. FOR "SUPER STOCK" COMPETITION

Basically, super stock classes allow:

- non-production camshaft
- lightweight valves and valve train components
- special pistons that conform to the production design
- an intake manifold that is of the same general configuration as the production manifold
- dual point distributor
- headers
- several other modifications as shown in the chart on page 16.

NHRA STOCK and SUPER STOCK CLASSIFICATION GUIDE

Classes		Weight-to-Power Ratio
MANUAL Transmission	AUTOMATIC Transmission	Lbs. per Advertised Horsepower
SUPER STOCK		
SS/A	SS/AA	0.00 to 5.99 lbs.
SS/B	SS/BB	6.00 to 6.99 lbs.
SS/C	SS/CA	7.00 to 7.69 lbs.
SS/D	SS/DA	7.70 to 8.69 lbs.
SS/E	SS/EA	8.70 to 9.47 lbs.
SS/F	SS/FA	9.50 lbs. or more
STOCK		
A/S	A/SA	8.00 to 8.49 lbs.
B/S	B/SA	8.50 to 8.99 lbs.
C/S	C/SA	9.00 to 9.49 lbs.
D/S	D/SA	9.50 to 9.99 lbs.
E/S	E/SA	10.00 to 10.49 lbs.
F/S	F/SA	10.50 to 10.99 lbs.
G/S	G/SA	11.00 to 11.49 lbs.
H/S	H/SA	11.50 to 11.99 lbs.
I/S	I/SA	12.00 to 12.49 lbs.
J/S	J/SA	12.50 to 12.99 lbs.
K/S	K/SA	13.00 to 13.99 lbs.
L/S	L/SA	14.00 to 14.99 lbs.
M/S	M/SA	15.00 to 15.99 lbs.
N/S	N/SA	16.00 to 16.99 lbs.
O/S	—	17.00 to 18.99 lbs.
P/S	—	19.00 to 20.99 lbs.
Q/S	—	21.00 to 22.99 lbs.
R/S	—	23.00 to 24.99 lbs.
T/S	—	25.00 to 26.99 lbs.
U/S	—	27.00 lbs. or more

BLUEPRINTING

As with all competition engines, the first step is to completely disassemble the engine, clean all parts in degunking fluid, check for and remove all burrs, scratches or cracks, and then Magnaflux the block. Check the bottom end for trueness. If necessary, have it line-bored to be sure everything about the crankshaft centerline is within specifications. During assembly of the engine, be sure to adhere to the clearance, torque and balance specifications shown in the Blueprinting Specification Chart shown on page 16.

PISTONS

Special "flat top with eyebrows" type forged aluminum pistons (Fig. 21) are recommended for super stock competition. These pistons feature a slipper type skirt for greater strength and provide a compression ratio 11.6:1 when used with a combustion chamber that has a total volume (cyl. head, gasket, deck clearance and piston) of 80.00 cc. Deck clearance should be *below* the top of the block. The chart below illustrates important specifications for the production and performance pistons.

MODIFYING THE 428 C.J. FOR "STOCK" COMPETITION

This class allows the fewest modifications. Most engine components must be production or dimensionally equivalent. The engine and cam, however, can be blueprinted. In other words, a new cam can be used, but it must agree dimensionally with the production cam. By the way, the preferred cam for stock class competition is C8AX-6250-C. A dual point, centrifugal advance 427 distributor and exhaust headers are permissible. A complete list of suggested modifications is shown in the chart on page 16.

VOLUMETRIC COMBUSTION CHAMBER SPECIFICATIONS (c.c.)						
Piston	Piston Volume	Deck Ht. & Block	Cyl. Head	Head Gasket	TOTAL	Comp. Ratio
(Dished)	8.75(+)	12.00(+)	68.00	7.72	87.72	11.0:1
(Flat top)	1.25(+)	4.28(+)	68.00	7.72	80.00	11.6:1

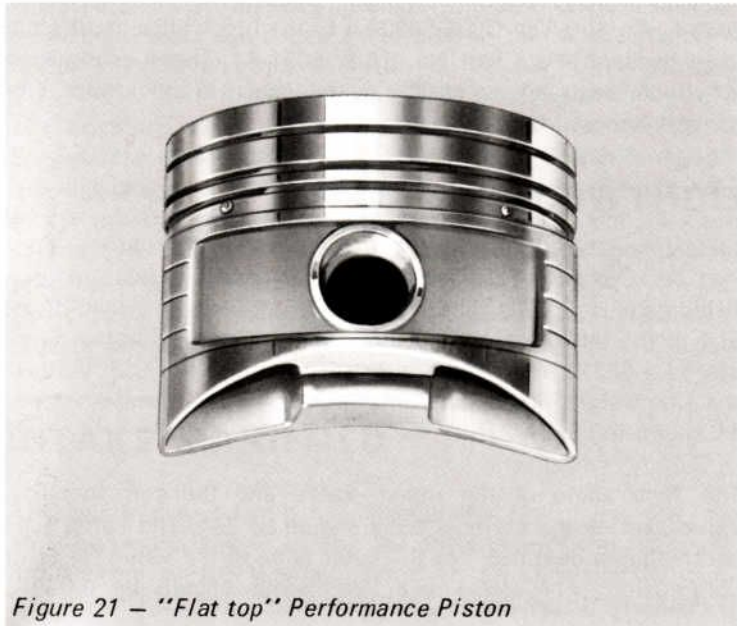


Figure 21 – “Flat top” Performance Piston

Individually fit each piston to a cylinder. Then mark or stamp the piston to show the cylinder number for which the piston was fitted. Piston skirt clearance should be 0.007" - 0.009", measured evenly with the pin boss and perpendicular to the piston pin. Fit the full floating type pins to each connecting rod with a clearance of 0.0007" to 0.0009". Use stock Ford piston pin retainers (Ford Part No. C3AZ-6140-B).

CONNECTING RODS

Install forged-steel 427 connecting rods (Ford Part No. C5AZ-6200-D). Both the 427 connecting rod and the 428 Police Interceptor rods are used in the 428 Cobra Jet, even though there is a 0.200" difference in these engines' stroke dimensions. This is possible, of course, because the rod is connected 0.200" nearer the top of the 428 piston than to the 427 piston. Check to see that the rod is free from all burrs and pits. Polish the full length of the shank to remove all surface irregularities. When assembled to the crankshaft, rod side clearance should be a minimum of 0.030" - 0.035". Because the production specification is 0.010" - 0.020", it will be necessary to machine the inner facing surfaces of the rods.

CRANKSHAFT

Install a production 428 C.J. crankshaft (Ford Part No. C6AZ-3303-B). It should be balanced, Magnafluxed and checked for straightness. To provide improved lubrication under high load conditions, a 3/64" radius groove may be cut in the center of each main journal (Fig. 22). Be sure the edges of the groove are free from all burrs.

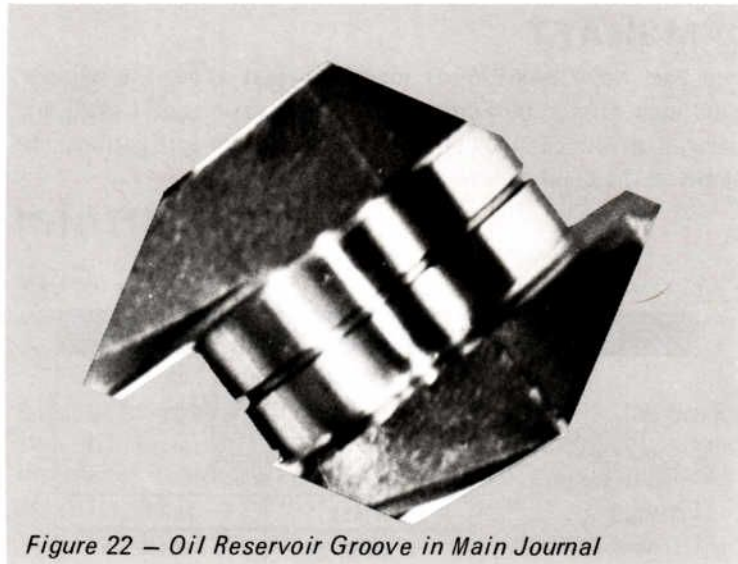


Figure 22 – Oil Reservoir Groove in Main Journal

BALANCING

Remember that the 428 C.J. crankshaft must be balanced with the flywheel installed. This is explained on page 10, under "Crankshaft." The connecting rod assembly must also be balanced before attaching it to the crankshaft. Note that the critical balance weights, shown on page 16, are for *production parts only*. If other than factory installed parts are used, *new* balance weights must be determined.

BEARINGS

Install thin-wall type 427 main and connecting rod bearings. Thin-wall bearings have the clearances built in, so the journals don't have to be ground to get the 0.003" - 0.0035" clearance for competition engines. The 0.003" - 0.0035" specification applies to both main and connecting rod bearings. For street applications, drop the clearance down to 0.0025" to 0.003". Ford Part Numbers for the main bearings are C5AZ-6333-AA (lower) and C5AZ-6333-AB (upper). Center main bearing part numbers are C5AZ-6337-AA (lower) and C5AZ-6337-AB (upper). Ford Part Number C5AZ-6211-G is the one to order for the connecting rod insert bearing.

Torque the rod bearings to 58 foot-pounds and the main bearings to 105 foot-pounds. Tighten in increments of 10 foot-pounds. This is no place to see how fast you can get the job completed, so easy does it. If you apply pressure and the bolt doesn't feel right, STOP, and find out why. Check for burrs or nicks that can cause binding. If a bolt suddenly seems to tighten too easily, there's a good chance it's beginning to fatigue. That can mean an unnecessary tear-down, so take it easy when assembling the engine.

THE 428 COBRA JET

CAMSHAFT

Ford Part No. C8AX-6250-D identifies just about the wildest grind ever offered by Ford. It's a long duration job (330°) and features a whopping 0.600" lift. Complete specifications are shown in the chart below.

CAMSHAFT SPECIFICATIONS		
Camshaft Part Number	C8AX-6250-D	
Lifter Type	Mechanical	
Rocker Arm Ratio	1.76:1 Adjustable	
TIMING	INTAKE	EXHAUST
Checking Clearance	0° 0.100" lift	0° 0.100" lift
Opens	60° (BTC) 13° (BTC)	94° (BBC) 47° (BBC)
Closes	90° (ABC) 39° (ABC)	56° (ATC) 5° (ATC)
Overlap	116°	116°
Duration	330°	330°
VALVES		
Head Diameter (Max.)	2.097"	1.660"
Angle of Seat & Face	30°	45°
Lift (Max. with lash, at valve)	0.600"	0.600"
SPRINGS	Special valve springs, lifters, and retainers are required.	
Outer Valve Closed (Max.)	Spring pressure and installed spring height specifications included with kit	
Outer Valve Open (Max.)		
NOTE: Timing and lift specifications must be those found at the Cam when checking clearances are set as specified above.		

Special valve springs, lightweight pushrods, retainers and solid lifters are recommended with this cam. Your Ford or Lincoln-Mercury dealer can help you obtain these parts.

If the special valve spring retainers are not used, 0.100" must be milled off the top of the cylinder head valve guide bosses. This is to prevent an interference condition due to the ultra-high lift (0.600") characteristics of the cam.

Install mechanical valve lifter tappets (Ford Part No. C4AZ-6500-B), adjustable rocker arms (Ford Part No. B8A-6564-B), push rods (Ford Part No. B8AZ-6565-C) and springs (Ford Part No. C3AZ-6513-B). Note: *Springs heavier than the C3AZ-6513-B are preferred for strip use.*

CYLINDER HEAD

Assemble the production cylinder heads (Ford Part No. C80Z-6049-F, Casting No. C80E-6090-H) to the block with steel shim head gaskets (Ford Part No. C6AZ-6051-A). These heads have a cylinder head volume of 68 c.c. (minimum) in stock form. The gaskets account for 7.72 c.c.

LIGHTWEIGHT VALVES

Install special lightweight, hollow stem intake valves (Ford Part No. C8AX-6507-B) and lightweight, hollow stem, sodium-filled exhaust valves (Ford Part No. C8AX-6505-A). Head diameter of the intake valve is 2.097" and the exhaust valve diameter is 1.660". In comparison to the standard 428 C.J. valves, the lightweight intake and exhaust valves are chrome plated, as shown in Figure 23.

The face angle of the intake valve and the corresponding valve seat on the cylinder head should be 30°. The valve seat width should be 0.035" at the outer edge of the valve for strip competition. For street use, the width should be 0.070".

The face angle of the exhaust valve and the corresponding valve seat on the head should be 45°. The valve seat width should measure 0.050" at the outer edge of the valve for strip competition. The width can be increased to 0.080" for street use only.

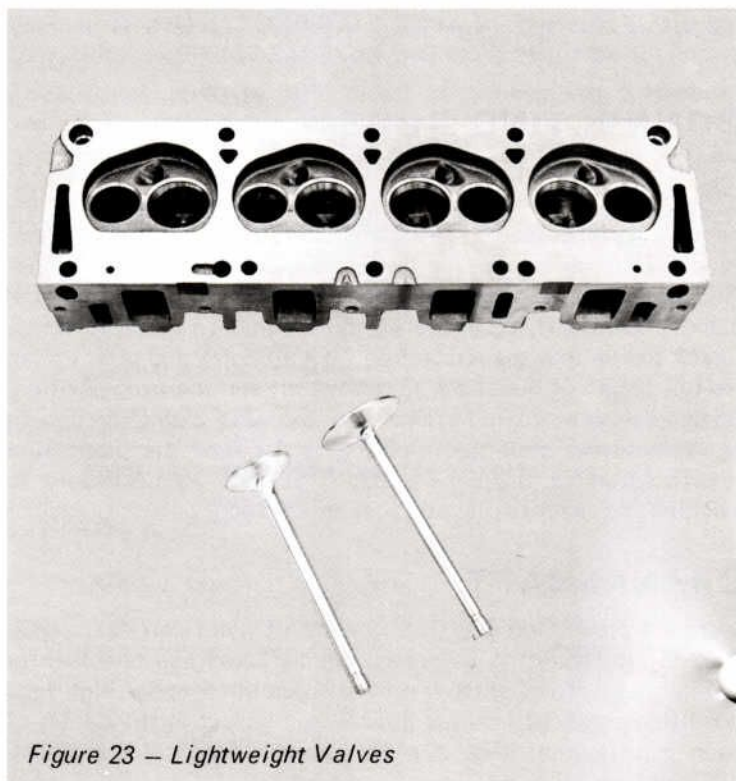


Figure 23 – Lightweight Valves

PISTON—TO—VALVE CLEARANCE

With the camshaft and timing chain in place, and the pistons, rods, crankshaft and heads assembled to the block, check the piston-to-valve clearance. Again, this is a *MUST* operation.

The absolute minimum piston-to-valve clearance is 0.120". Because the clearance is 0.120" and the valve lash is 0.025", a feeler gauge of 0.145" inserted between the valve stem and rocker arm can be used to check the clearance. Manually turn engine over twice. If the piston does not hit the valve, you have the proper minimum clearance. Check all eight cylinders. The pistons may have to be flycut around the eyebrows to provide adequate clearance.

INTAKE MANIFOLD

Any manifold that fits a 427, except the 427 tunnel port, can be used on the 428 C.J.. To take advantage of the "ram air" arrangement on the Mustang, however, an aluminum 4V manifold (Ford Part No. C6AZ-9424-M, Casting No. C7AE-9425-C) is recommended. It's a low-profile, single plane type manifold. It features offset, equal length balanced runners that provide excellent free breathing characteristics.

CARBURETOR

Install the production 735 cfm 4-bbl. carburetor (Ford Part No. C80Z-9510-AA (manual transmission) or C80Z-9510-AB (automatic transmission)). Use of this carburetor doesn't require any modification to the accelerator linkage.

When running without an air cleaner, some experimentation with the jets is usually necessary to obtain the optimum air/fuel ratio. The proper mixture is a function of temperature, altitude, humidity, etc. As a starter, it's recommended that jetting begin with number 67's in the main metering (primary) jets, and with 79's in the secondary jets.

EXHAUST MANIFOLD (HEADERS)

Install a set of smooth, lightweight, tube-type headers to help exhaust the increased volume of air/fuel charge and exhaust gases resulting from the engine modifications discussed above. This step alone usually adds from 10 to 15 horsepower over the standard exhaust system.

Here are some critical dimensions to assist in fabricating a good set of headers:

Material I.D.	2"
Head face to Collector	36"
	or as short as possible
Collector I.D.	3-1/2"
Extension from Collector	12" - 16"

IGNITION

Replace the production Autolite spark plug (BF-32) with one of the following Autolite spark plugs, depending on operating conditions: BF-12, BF-22 or BTF-1. Gap to 0.028" - 0.032".

Be sure to replace the single point distributor on the production 428 C.J. with the 427 dual point, centrifugal advance distributor (Ford Part No. C0AZ-12127-L). Use the following curve for maximum performance.

Distributor rpm's	250	750	1000	2000	3000
Distributor degrees					
(automatic)	0°	2½°	4°	8°	13°
(manual)	0°	1½°	2½°	6°	10°

LUBRICATION

The production oil pump (Ford Part No. COAE-6600-C), which is a heavy duty type from the 428 Police Interceptor engine, is recommended for most applications. For a little more capacity, however, the 427 pump (Ford Part No. C3AZ-6600-B) can be used. A special oil pickup (Ford Part No. C5AE-6622-B) and a deep sump 7 qt. oil pan (Ford Part No. C8AX-6675-A) are definitely recommended. This added capacity keeps oil away from the crankshaft throws. With the deep sump oil pan and filter, you can run 8-quarts of oil. A low restriction oil filter is also recommended.

MODIFYING THE 427 FOR STREET/STRIP

The famous Ford 427 CID engine has earned a reputation as one of the strongest production-type high performance engines ever built. One of the reasons for its success is its "wedge-head" design. The term "wedge" arises, of course, from the shape of the cylinder head cross section (Fig. 1). It produces a highly efficient "swirling" action of the incoming combustion gases for smooth operation. The wedge-head design also has proven to be a strong, economical and dependable design — which indeed goes for the whole 427 engine. In other words, Ford builds plenty of performance into the 427 for street use, yet there's lots of room to modify for the kind of performance you want on the strip or track. This makes the 427 an ideal engine for the performance enthusiast . . . a fact that has made it a winner on the street and in competition since its introduction in 1963.



Figure 1 — Wedge-shaped Combustion Chamber

The 427 features a deep, super-strong "Y" shaped block of precision-cast alloy iron . . . reinforced for precise bearing alignment and greater rigidity with Ford-pioneered "cross-bolted" main bearing caps (Fig. 2), large oil galleys, and an oil pressure safety relief valve (Fig. 2) to help prevent excessively high oil pressure during cold engine operation.

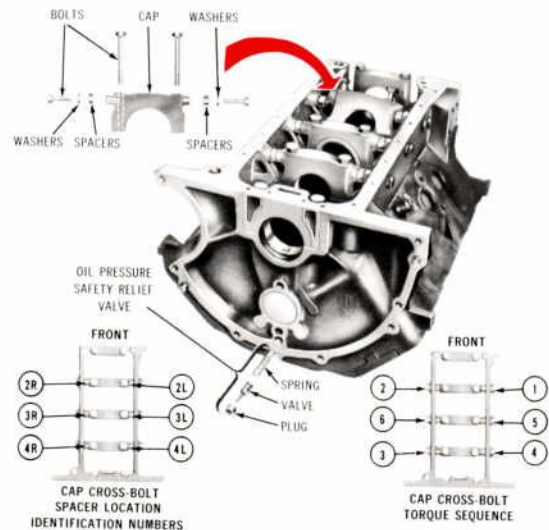


Figure 2 — 427 Cylinder Block



Figure 3 — Impact-extruded Piston and Special Connecting Rod

To withstand the 427's high torque output, the crankshaft is of forged steel for greater durability . . . with special steel-backed, copper-lead alloy replaceable bearing inserts. Impact-extruded pistons and special forged-steel connecting rods (Fig. 3) . . . together with a precision ground, high lift-type cam and lightweight valve train . . . lets the 427 operate easily in the ultra-high 7000 rpm range.

Excellent breathing characteristics, achieved by means of cylinder heads with smooth, extra-large ports and fully machined combustion chambers, round out just a few of the leading features that make Ford's 427 wedge one of the most potent and reliable production performance engines on the market today.

MODIFYING THE 427 FOR STREET/STRIP

Since its introduction in 1963, the 427 has come in one basic block design – with cross-bolted main bearings. Improvements and minor modifications have been made from time to time, but most are rated about the same as the present versions . . .

	4V	8V
HORSEPOWER	410 @ 5600 rpm	425 @ 6000 rpm
TORQUE	476 @ 3400 rpm	480 @ 3700 rpm

. . . and remember, that's strictly stock – just as they come in the crate from the factory.

If you want more "go" than the production 427 provides, exotic modification and expensive components aren't necessary . . . thanks to a wide range of Ford performance equipment, available at Ford and Lincoln-Mercury dealers. This is the best part of owning a 427, namely, the availability of factory performance equipment the average enthusiast can afford.

STREET AND STRIP PERFORMANCE

High performance and high rpm's generally go together. The camming and carburetion required for performance, however, usually don't contribute to a smooth-running car at relatively low street rpm's. But as previously pointed out, the 427 wedge-head design lends itself to smooth street performance – even with a solid lifter cam. Overall smoothness drops only slightly with the following modifications:

❶ Every engine to be used in competition should undergo a comprehensive check of clearances, balancing, Magnafluxing and a "boilout" in degunking fluid. For street use, these steps are recommended but not required; for strip use, they are mandatory. The stress and strain created within an engine when popping the clutch off the line at the strip, and running through the gears around 7000 rpm, is something else again. The best insurance for peak performance and durability under these conditions is to clean, check and blueprint the engine.

❷ If you have a used block, boil it and have it Magnafluxed. Take a close look at the webbing, main bearing caps, cap bolts, and the cylinder head area around the head bolts for stress cracks. Either eyeball it very carefully, or use one of the spray-on crack finders. Nicks and scratches should be smoothed from all machined surfaces. Check for flatness with a steel straight-edge. Grind away any casting flashings, clean all oil galleys with a wire brush and check tapped holes. Balance parts and assemblies. The specification chart on page 21 lists several critical balance weights. If the block is new, you can skip the boiling operation, but not the Magnafluxing. One last thing. Check the block for trueness in the

bottom end. If it's out of specifications, have it line bored. Remember, this is a racing engine and everything about the crankshaft centerline must be right on the money.

❸ Install special 12.5:1 high compression "eyebrow" pistons (Ford Part No. C8AX-6110-A with Dyke ring), stock cylinder heads (Ford Part No. C5AZ-6049-C) and 0.015" thick steel shim head gaskets (Ford Part No. C3AZ-6051-B) to obtain a compression ratio of 12.5:1. Piston-to-deck height (Fig. 4) should be 0.025" with a 90 cc. cylinder head volume. This combination is acceptable for the street and strip.

Individually fit each piston to a cylinder; then mark or stamp the piston to show the cylinder number for which it was fitted. Piston skirt clearance should be 0.007", measured even with the pin boss and perpendicular to the pin itself. Fit the piston pins to the connecting rods with a clearance of 0.0007" to 0.0009". Use stock Ford piston pin retainers.

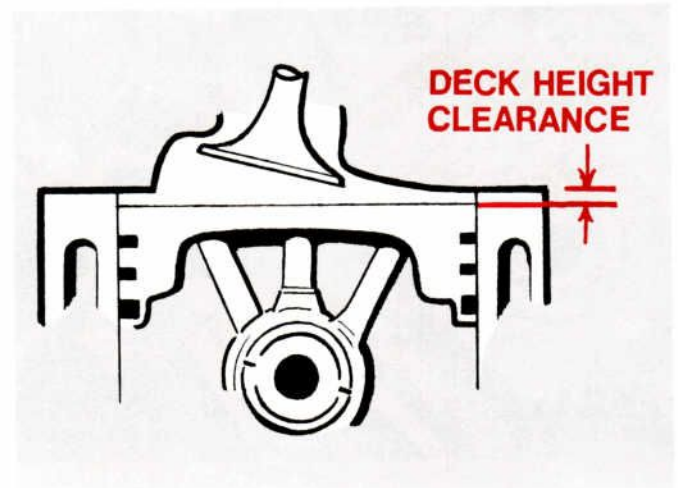


Figure 4 – Measuring Deck Height Clearance

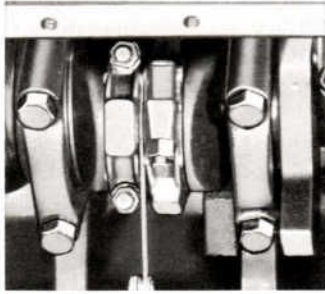


Figure 5 – Checking Connecting Rod Side-clearance

4 Install a stock forged steel crankshaft (Ford Part No. C5AZ-6303-C). It should be Magnafluxed, balanced and checked for straightness. Assemble the crank to the block on stock Ford main bearings (Ford Part No. C5AZ-6333-AA, lower, and C5AZ-6333-AB, upper). Main bearings and rod bearing clearance should be 0.0025" to 0.003" for street use.

For the strip, clearance should be 0.003". Connect pistons to the crankshaft with stock Ford connecting rods (Ford Part No. C5AZ-6200-D). Polish the rods the full length of the shank and remove all sharp edges or small pits that might cause a fracture under extreme loads. Remember, the engine may be wound up as tight as 7500 rpm when it comes off the line. That's no time for a failure, so polish the rods – first with a wheel, then with paper.

Assemble the rods to the crank and check rod side-clearance (Fig. 5). A stock 427 will be about 0.019". This should be increased to a minimum of 0.025" by machining the inner facing surfaces of the connecting rods. Then have the complete rod assembly balanced before fitting it to a balanced crankshaft. A balanced, stock flywheel (Ford Part No. C5AZ-6375-P), weighing 30 pounds, should be bolted to the crank. These balancing operations are all most critical. They're *not* an option; they're a *must*.

CAMSHAFT SPECIFICATIONS	STREET/STRIP PERFORMANCE		STRIP ONLY PERFORMANCE	
Camshaft Part Number	C4AE-6250-B		C8AX-6250-D	
Lifter Type	Mechanical		Mechanical	
Rocker Arm Ratio	1.76:1 Adjustable		1.76:1 Adjustable	
TIMING	Intake	Exhaust	Intake	Exhaust
Checking Clearance	0" @ 0.100" lift	0" @ 0.100" lift	0" @ 0.100" lift	0" @ 0.100" lift
Opens (BTC) (BBC)	56° (BTC) 0° (BTC)	88° (BBC) 31° (BBC)	60° (BTC) 13° (BTC)	94° (BBC) 47° (BBC)
Closes (ABC) (ATC)	88° (ABC) 28° (ABC)	56° (ATC) 3° (ATC)	90° (ABC) 39° (ABC)	56° (ATC) 5° (ATC)
Overlap	112"	112"	116"	116"
Duration	324°	324°	330°	330°
VALVES				
Head Diameter (Max.)	2.195"	1.733"	2.195"	1.733"
Angle of Seat & Face	30°	45°	30°	45°
Lift (Max.)	0.500"	0.500"	0.600"	0.600"
SPRINGS			Special valve springs, lifters, and retainers are required.	
Outer Valve Closed (Max.)	90 lbs. @ 1.82"	90 lbs. @ 1.82"	Spring pressure and installed spring height specifications included with kit	
Outer Valve Open (Max.)	305 lbs. @ 1.32"	305 lbs. @ 1.32"		
NOTE: Timing and lift specifications must be those found at the Cam when checking clearances are set as specified above.				

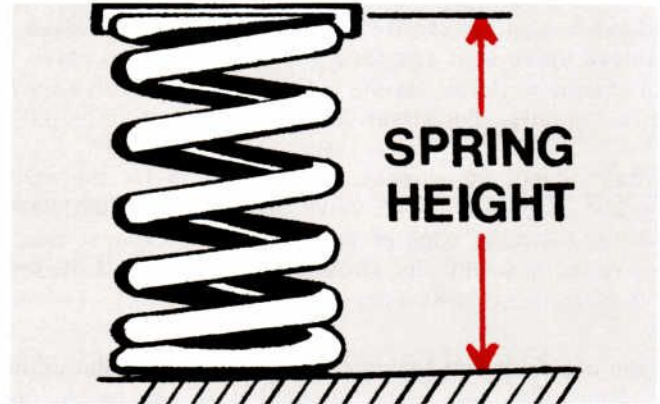


Figure 6 – Checking Spring Pressure Height

Install stock Ford rod insert bearings (Ford Part No. C5AZ-6211-G). Torque the rod bearings to 58 foot-pounds and the main bearings 105 foot-pounds. Refer to Figure 2 for the correct tightening sequence. Tighten main bearing cross bolts to 42 foot-pounds. And here is a reminder about torque wrenches. Tighten bolts in increments of 10 foot-pounds. This is no place to see how fast you can get the job done, so easy does it. If you apply pressure and the bolt doesn't feel right, *STOP*, and find out why. Check for nicks or burrs that can cause binding. If a bolt suddenly seems to tighten too easily, there's a good chance it's beginning to fatigue. That can mean trouble ahead, so take a little extra care when assembling the engine.

5 Install solid lifter cam (Ford Part No. C4AE-6250-B). It has a lift of 0.500" and a duration of 324° (theoretical). This makes it a hotter grind than the production cam (0.500" lift and 306° duration). Complete specifications are shown in the Camshaft Chart on page 19. Usually with a new cam it's advisable to install new valve springs, surge dampers, retainers, lifters, and seats. Either new or used parts, however, may be used as long as the spring pressure specifications shown in the Camshaft Chart are met.

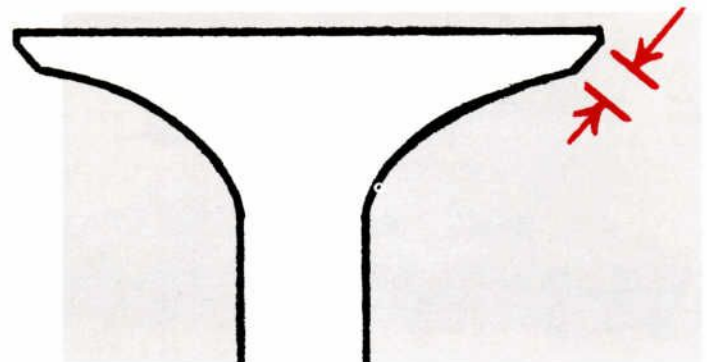


Figure 7 – Valve Seat Measurements

MODIFYING THE 427 FOR STREET/STRIP

6 Assemble cylinder head (Ford Part No. C5AZ-6049-C) with hollow intake valves (Ford Part No. C5AZ-6507-N) and sodium-filled exhaust valves (Ford Part No. C5AZ-6505-N). Make sure the intake valve seat and face angle is 30°. The valve seat width should be 0.035" at the outer edge of the valve for drag strip racing only. For street use, the width should be 0.070".

For drag racing, valve seat and face angle for the exhaust valve should be 45°. The valve seat width should measure 0.050" at the outer edge of the valve. The exhaust seat can be increased to 0.080" for street only use. Figure 7 illustrates how to make these measurements.

With the camshaft and timing chain in place, and the pistons, rods, crankshaft and heads assembled to the block, check the piston-to-valve clearance. Again, this is a *MUST* operation!

The absolute minimum piston-to-valve clearance is 0.120". Since the clearance is 0.120" and the valve lash is 0.025", a feeler gauge of 0.145" inserted between the valve stem and rocker arm can be used to check the clearance. Manually, turn engine over twice. If the piston does not hit the valve, you have the proper minimum clearance. Check all eight cylinders. Pistons may have to be flycut around the eyebrows, in some cases, to provide adequate clearance.

7 Install an 8V (2 4-bbl.) aluminum, single plane intake manifold (Ford Part No. C8AX-9424-A) and a pair of 652 cfm Holley 4-bbl. carburetors (Ford Part No. C8OF-9510-AC and C8OF-9510-AD) as shown in Figure 8.

This "single plane" type induction system will substantially increase the breathing capacity of the engine. Appropriate changes to the accelerator linkage are also necessary to complete installation of this system.

Some experimentation with the jets is necessary to obtain the optimum air/fuel ratio. When running without an air clean-

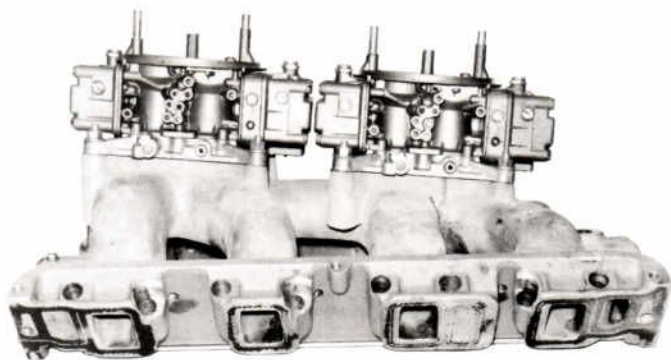


Figure 8 — Dual 4-bbl. Holley Carburetors on "Medium Riser" Manifold

er, it usually takes an increase of three to four sizes over standard to get a good mixture. However, the exact mixture is a function of temperature, altitude, humidity, etc. As a starter, it's recommended that jetting begin with Holley number 77's in the main metering (primary) jets, and with 71's in the secondary jets.

8 Install a set of smooth, lightweight, tube-type headers to help exhaust the increased volume of air/fuel charge and exhaust gases being handled by the engine through the previous modifications. This step alone usually adds from 10 to 15 horsepower over the standard exhaust system.

9 Install Autolite BF-12, BF-22, or BF-32 spark plugs. BF-22 is the most popular plug of this group.

10 Set the timing to match the distributor curve shown on page 21.

11 Use the highest octane fuel available.

ALL-OUT COMPETITION (STRIP ONLY)

Except for a few different parts and some specification variations, the information for "street and strip performance" also applies for all-out competition cars. The only essential difference is that engines set up for maximum performance the drag strip usually run so rough at street rpm's that they must be trailered to the track.

Here is what changes a "street and strip" engine to a "strip only" performer.

1 Install special pistons (Ford Part No. C8AX-6110-A) which use upper Dyke piston rings. Piston-to-deck height should be 0.012", with a cylinder head volume of 80 cc. to obtain a compression ratio of 14.0:1. Steel shim head gaskets are recommended.

2 Install a solid lifter camshaft (Ford Part No. C8AX-6250-D). This all-out competition cam has a lift of 0.600" and a duration of 330°. Special valve springs, retainers and lifters are recommended with this cam. Your local speed shop, Ford or Lincoln-Mercury dealer can help you obtain these parts.

If special valve spring retainer assemblies are not used, 0.100" must be milled off the top of the cylinder head valve guides. This is to prevent an interference condition caused by the cam's high lift (0.600") characteristics.

3 The stock 427 oil pump is adequate for just about all conditions. However, a special oil pickup (Ford Part No. C5AE-6622-B) and a deep-sump oil pan (Ford Part No. C8AX-6675-A) are recommended. This added capacity keeps away from the crankshaft throws. With the deep-sump pan, you can run 9 quarts of oil with filter. A low-restriction filter is also recommended.

Anyone interested in the ultimate performance of his Ford 390, 406, 427 or 428 cubic inch engine must consider cylinder heads. Stock heads for these engines are engineered to produce good, reliable, economical street performance, and this they do. But, for the enthusiast who desires added power for street, drag strip or track use, four *Hi-Per* cylinder heads are available. They offer sizeable horsepower gains due to their larger valve and port areas and free-breathing design. As outlined below, the heads can be simply "bolted-on" in most cases. Please note, however, that certain engine-head combinations will require minor modifications.

THE NEW TUNNEL PORT

Here is Ford's all-new, all-out competition head. It derives its name from the fact that it uses extremely large, round ports which come straight out from the intake valve. To accomplish this, the ports do not bend to clear the push rod holes as in conventional wedge head engines. Instead, the intake charge passes directly around the push rod which is now encased in a sleeve that passes through the intake manifold port.

With this large, nearly circular port area measuring 2.17 in. by 2.34 in., a much greater volume of fuel-air mixture can be moved into the cylinder with significantly increased breathing at high rpm.

Head chambers are fully machined and have a minimum chamber volume of 88 c.c.. Intake valves are a large 2.25 in. O.D. and exhaust valves are 1.73 in. O.D.

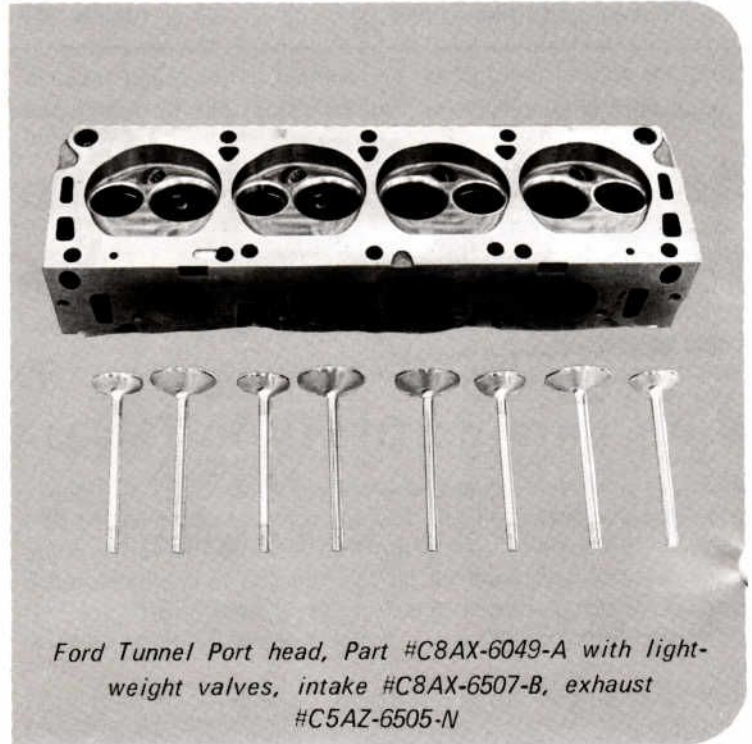
Tunnel port heads will bolt-on to all 427 Ford blocks with no block modification. Tunnel ports can also be used with 406 and 428 cubic inch blocks if the block is chamfered for proper valve clearance. A tunnel port intake manifold is mandatory with these heads and special lightweight valves are required.

THE HIGH RISER

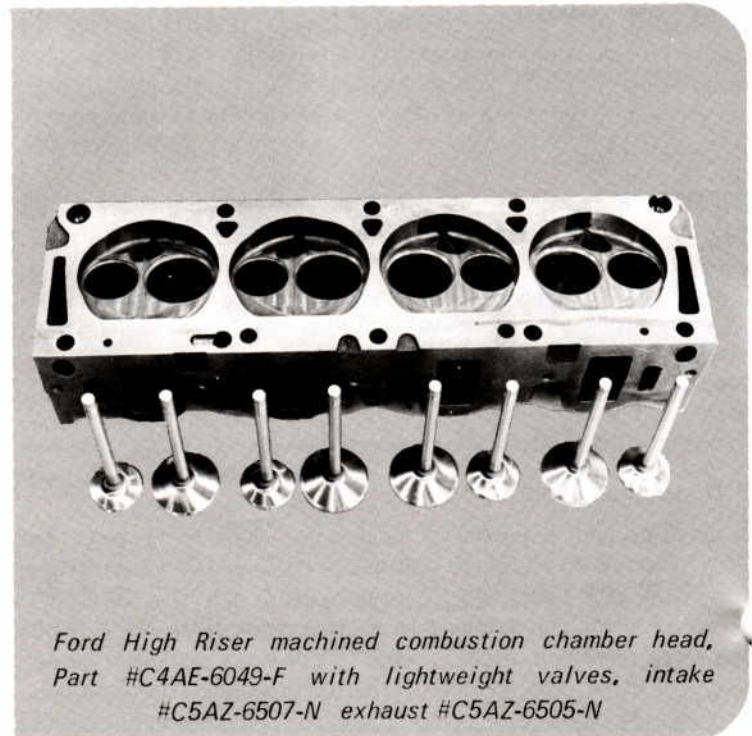
This head was king of the track before introduction of the tunnel port head and comes very close to matching the flow rates of the tunnel port. With performance capability of this magnitude, it is recommended for strip and track use primarily.

The head features extremely large rectangular intake ports measuring 1.34 in. by 2.72 in.. Combustion chambers are fully machined and have a minimum volume of 86 c.c.'s. Valve diameters are a big 2.19 in. O.D. intake, 1.73 in. O.D. exhaust for very low restriction.

High Riser heads will fit all 427 cubic inch blocks without modification. The 406 and 428 blocks require bore chamfering to provide sufficient valve clearance. Matching 4V or 8V High Riser intake manifolds and lightweight valves are required.

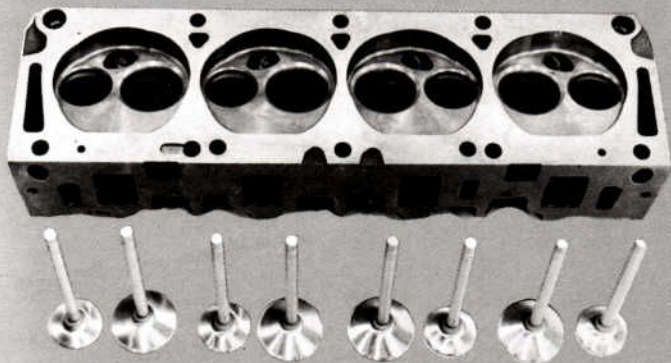


Ford Tunnel Port head, Part #C8AX-6049-A with lightweight valves, intake #C8AX-6507-B, exhaust #C5AZ-6505-N

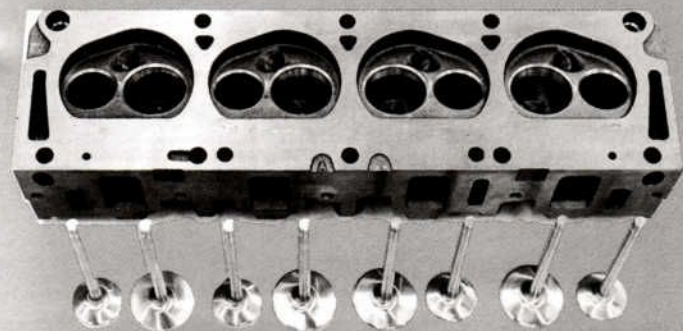


Ford High Riser machined combustion chamber head, Part #C4AE-6049-F with lightweight valves, intake #C5AZ-6507-N exhaust #C5AZ-6505-N

.. YOU WIN!



Ford Medium Riser machined combustion chamber head, Part #C5AZ-6049-C, with lightweight valves, intake #C5AZ-6507-N, exhaust #C5AZ-6505-N



Cobra Jet head #C80Z-6049-F with solid valves, Intake #C3AZ-6507-AJ, Exhaust #C3AZ-6505-E. Lightweight valves also available, intake #C8AX-6507-A, exhaust #C8AX-6505-A.

THE MEDIUM RISER

Here is an improved-performance head which, though not as potent as the high riser, offers dramatic improvement in engine output. This is an excellent head for street, strip or road course. Large rectangular intake passages measure 1.34 in. by 2.06 in. for an extremely good cross section area. Valves are big, with the intake at 2.19 in. O.D. and exhaust at 1.73 in. O.D..

The combustion chamber is fully machined and has a minimum volume of 86 c.c.'s. A variety of intake manifolds are available to combine with this head.

The medium Riser head will bolt-on to all 427 cubic inch Ford blocks with no modification and will accept the stock 427 intake manifold as well. For use on 406 and 428 cubic inch engines, blocks must be chamfered.

THE COBRA JET

Here's instant bolt-on horsepower for all Ford big-block engines... the new Cobra Jet head. This is the same head used on production 428 Cobra Jet engines, which are making a name for themselves in stock and super stock drag strip classes.

The Cobra Jet head will bolt-on to all 390, 406, 427 and 428 blocks with no modification of any kind. Intake ports boast 1.34 in. by 2.34 in. dimensions to give an unusually large cross section. Intake valves are 2.09 in. O.D., and exhaust valves are 1.66 in. O.D. for excellent breathing and long life. Combustion chambers are cast and have a 68 c.c. minimum volume.

This head is highly recommended for all uses short of all-out competition on strip or race course. A wide variety of 4V and 8V manifolds is available and stock production manifolds also fit without alteration. Both solid and lightweight valves are available.

HI-PER CYLINDER HEADS

TYPE	PART NO.	390	406	427	428	INTAKE PORT	VALVES		REMARKS
						DIMENSIONS	INTAKE	EXHAUST	
Tunnel Port	C8AX-6049-A C70E-6090-K (casting)	No	Yes**	Yes+	Yes**	2.17 x 2.34	2.25	1.73	Requires Tunnel Port intake manifold. #C70E-9424-A or #C70E-9424-B. See head description for valve information.
High Riser	C4AE-6049-F C4AE-6090-F (casting)	No	Yes*	Yes	Yes*	1.34 x 2.72	2.19	1.73	Requires High Riser intake manifold #C4AE-9425-E or #C4AE-9425-F. See head description for valve information.
Medium Riser	C5AZ-6049-C C5AE-6090-F (casting)	No	Yes*	Yes	Yes*	1.34 x 2.06	2.19	1.73	Use Medium or Low Riser intake manifold. #C6AZ-9424-H, C6AZ-9424-M, C5AZ-9424-G or C8AX-9424-A. Stock manifold fits. See head description for valve information.
Cobra Jet	C80Z-6049-F C80E-6090-H (casting)	Yes*	Yes*	Yes	Yes	1.34 x 2.34	2.09	1.66	Use Medium or Low Riser intake manifold. #C6AZ-9424-H, C6AZ-9424-M, C5AZ-9424-G or C8AX-9424-A. Stock manifold fits. See head description for valve information.

* Blocks must be chamfered to assure proper intake valve clearance.

+ Forged steel 427 crankshaft recommended for all high output tunnel port applications. See crankshaft section for additional information.

● 68 c.c. minimum volume required for best compression gains.

CAMS..... MILD,

There's a Ford *Hi-Per* cam for every degree of performance improvement desired . . . street, strip or track. A cam change can significantly boost engine horsepower by allowing a greater fuel-air charge to enter the cylinders . . . and by allowing the engine to turn at higher rpm's for greater output. Changing cams alone, can produce horsepower gains, but greatest improvement will always be achieved when a balanced combination of cam, heads, intake manifold, carburetor and exhaust system is selected.

STREET'N STRIP, HYDRAULIC

Here is a relatively mild grind that makes an excellent street-strip cam. It is a good performer up to approximately 6000 rpm, and will retain high torque at low rpm with very acceptable idling characteristics.

This is the production cam recommended for "stock" class strip use in 428 Cobra Jets.

The cam carries part number C8AX-6250-C. Lift at the valve is .515 inches. Overlap is 58° and duration is 282° intake, 296° exhaust. Either the 1.73 ratio non-adjustable rocker arm or the 1.76 ratio adjustable may be used. All 390, 406, 427, and 428 engines will accept the cam without modification.

STREET'N STRIP, MECHANICAL

Here's a somewhat hotter grind that uses mechanical lifters. It, too, will run at approximately 6000 rpm, producing good low-end torque. Idling is acceptable and operation is quiet throughout its range. Maximum torque occurs at approximately 3600 rpm. The cam requires mechanical lifters and adjustable rocker arms.

As can be seen from the chart, it produces cam timing with a total of 306° duration, 78° overlap . . . and a net valve lift of .500 in.

This is the same cam that was used in production 427 engines and therefore is recommended for use in modifying 390, 406 and 428 cubic inch engines only.



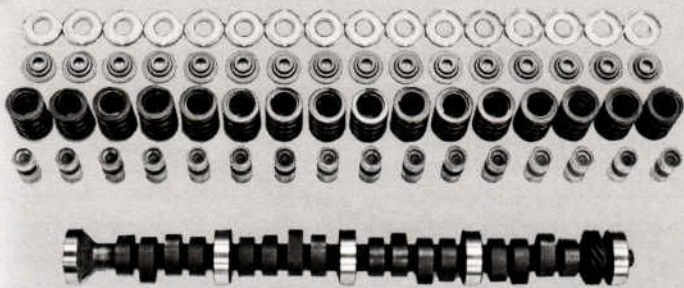
Ford C8AX-6250-C cam for street and strip use. Available are lifters #C8AZ-6500-A, Springs #C3AZ-6513-A, seats #C3AZ-6A536-A and retainers #C3AZ-6514-A



Ford C3AZ-6250-AA cam for street use. Available are lifters #C4AZ-6500-B, springs #C3AZ-6513-A, Seats #C3AZ-6A536-A and retainers #C3AZ-6514-A

TYPE	PART NUMBER	LIFTER & LASH (hot)	OPEN VALVE/CAM	INTAKE CLOSE VALVE/CAM
Street & Strip	C8AX-6250-C	Hydr.	24° BTC/ 22° ATC	78° ABC/ 30° ABC
Street & Strip	C3AZ-6250-AA	Mech. .025"	40° BTC/ 16° ATC	86° ABC/ 30° ABC
Street & Strip	C4AE-6250-B	Mech. .025"	56° BTC/ 0° BTC	88° ABC/ 28° ABC
Strip & Track	C8AX-6250-D	Mech. .025"	60° BTC/ 13° BTC	90° AB 39° ABC

WILD AND WOOLY



Ford C4AE-6250-B cam for street and strip use. Available are lifters #C4AZ-6500-B, springs #C3AZ-6513-A, seats #C3AZ-6A536-A and retainers #C3AZ-6514-A



Ford C8AX-6250-D cam for strip or track use only. Special valve springs, seats and retainers are required.

MORE STRIP THAN STREET

This cam is another step up from the mechanical cam, Page 24. Street performance is likely to be a bit rough, but it is definitely streetable. This cam has a 6000 to 7000 rpm range. Valve overlap is 112° with 324° duration. Net valve lift is .500 inches.

This is the cam especially recommended for 427 street-strip modification . . . and will operate equally well in 390's 406's and 428's when these engines are properly set up for high rpm applications. Order Ford part number C4AE-6250-B. This cam requires 1.76 adjustable rocker arms.

THE STRIP TRIPPER

Here's the hot one. It is a full race-type cam for strip or track use only. Net valve lift is a high .600 inch, while overlap hits 116° with 330° duration. This is the cam that will allow engines to turn in 7000 rpm plus.

Special valve springs, seats and retainers are required with this cam. In addition, piston-to-valve clearance must be checked for .120 in. minimum.

Order Ford part #C8AX-6250-D. This cam will fit all 390, 406, 427 and 428 blocks. It is recommended for use only in those engines properly set up to handle extremely high rpm's.

HI-PER CAMSHAFTS

INTAKE DURATION	OPEN VALVE/CAM	EXHAUST CLOSE VALVE/CAM	EXHAUST DURATION	MAX. VALVE LIFT	VALVE OVERLAP	REMARKS
282°	82° BBC/ 34° BBC	34° ATC/ 18° BTC	296°	.515" Non Adj. .524" Adj.	58°	Uses either 1.76 adjustable or 1.73 non-adjustable rocker arm. Fits 390*, 406*, 427 and 428 blocks. See Photo Caption for matching valve train components.
306°	88° BBC/ 33° BBC	38° ATC/ 19° BTC	306°	.500"	78°	Uses 1.76 ratio adjustable rocker arm. Recommended for 390*, 406*, and 428. See Photo Caption for matching valve train components.
324°	88° BBC/ 31° BBC	56° ATC/ 3° ATC	324°	.500"	112°	Uses 1.76 ratio adjustable rocker arm. Fits 390*, 406*, 427 and 428 blocks. See Photo Caption for matching valve train components.
330°	94° BBC/ 47° BBC	56° ATC/ 5° ATC	330°	.600"	116°	Uses 1.76 ratio adjustable rocker arm. Recommended for engines set up for high rpm use. Fits 390*, 406*, 427 and 428 blocks. See Photo Caption for required special valve train components.

* Some 390 and all 406 blocks will require addition of camshaft thrust plate.

With any head or cam change, it is always desirable to take advantage of the engine's increased breathing capacity, by installing a high-output intake manifold. Nine Ford *Hi-Per* manifolds are available, allowing you to select the type best suited to your engine modification program. Choose from medium and high rise types . . . 4V's . . . 8V's . . . and tunnel-port styles. There's a Ford *Hi-Per* manifold that will put you in the winner's circle.

FOUR-HOLER, MEDIUM RISERS

Here are the perfect manifolds for all mild street uses. They are simple bolt-on items that will significantly increase horsepower output, especially if cam and head changes are made. Manifolds are aluminum, medium riser-type, with dual plane runners for good low-end torque. Port sizes are 1.24" x 1.94".

Manifolds are available in two styles – straight line and equal runners. Straight line manifold has the carburetor centered for ease of installation. Equal runner manifold has an offset carburetor location to provide equal length tuned induction. This model requires minor linkage modifications. Manifolds fit all 390, 406, 427 and 428 heads except low rise, high rise and tunnel port. Order Straight Line #C6AZ-9424-H (Casting No. C7AE-9425-F) or Equal Runner #C6AZ-9424-M (Casting No. C7AE-9425-C).

FOUR-HOLER, HIGH RISER

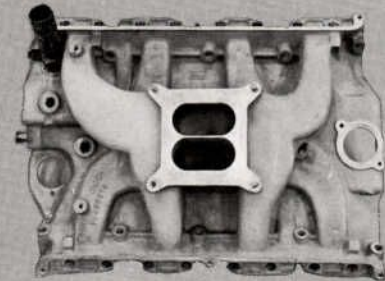
With its big 1.24" x 2.60" ports, this manifold provides the highest flow capacity of any 4V-type manifold, except tunnel port, when matched with high riser heads. It makes an excellent strip-track performer with its dual-plane design providing good low-end torque.

Manifold is cast aluminum and fits all 406, 427 and 428 CID engines equipped with mandatory high rise heads (#C4AE-6049-F). Order No. C4AE-9425-G (Casting No. C4AE-9425-E).

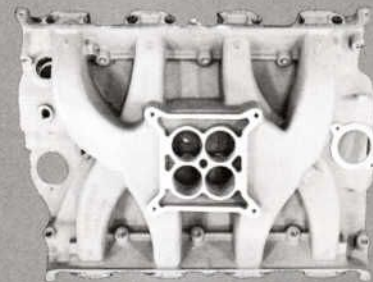
EIGHT-HOLER, MEDIUM RISER

Next move up is to the dual-quad, medium riser. This manifold makes an excellent street-strip performer. Manifold is aluminum, dual-plane type with large rectangular runners. Low end torque remains strong while high flow capacity gives good breathing at higher rpm.

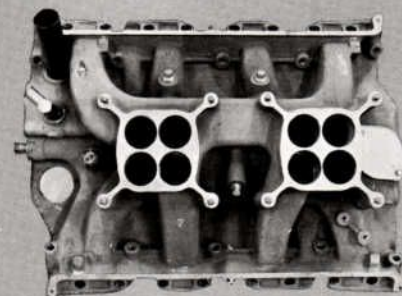
Port sizes are 1.24" x 1.94" and fit all 390, 406, 427 and 428 heads other than low rise, high rise and tunnel port. Order Ford #C5AZ-9424-G (Casting #C7AE-9425-A).



Ford 4V, Medium riser #C6AZ-9424-H



Ford 4V High Riser #C4AE-9425-G

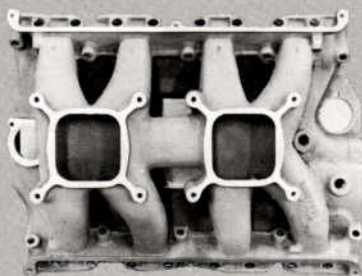


Ford 8V, Medium Riser #C5AZ-9424-G

NOW..... INHALE!



Ford 8V High Riser #C4AE-9425-F



Ford 8V, Tunnel-type #C8AX-9424-A



Ford 8V single plane manifold for Tunnel Port heads.

EIGHT-HOLER, HIGH RISER

Here's a tall and terrible eight barrel that nearly matches the tunnel port in flow capacity. Dual plane design gives good torque at lower rpms, making this manifold an exceptional track-strip performer. Manifold is aluminum with big 1.24 in. by 2.60 in. ports. Hood modifications are required for air cleaner installation. . . or for cool air intake setup. Fits 406, 427 and 428 cubic inch engines equipped with high riser heads (#C4AE-6049-F) Order #C4AE-9425-F (Casting #C4AE-9425F.)

EIGHT-HOLER, TUNNEL-TYPE

Here's an all-out, high-flow medium riser manifold for full race use. It is *not* for use on tunnel-port heads, but applies a similar engineering approach to the standard rectangular port heads. Large round runners allow maximum fuel-air flow. Single plane design provides high output at top rpm's. Manifold is aluminum with 1.24" x 1.94" ports. Fits all 390, 406, 427 and 428 heads except tunnel port, low riser and high riser. Order #C8AX-9424-A (Casting #C8AX-9425-A).

TUNNEL PORT, 4V AND 8V

Here are the ultimate performers . . . the tunnel ports. These manifolds are designed for all-out competition use where highest power at high rpm is desired. They feature large round runners which provide a nearly straight shot at each intake valve. Port sizes are a big 2.05" x 2.20" and tunnel port heads are mandatory.

FORD HI-PER INTAKE MANIFOLDS

TYPE	PART NUMBER	CASTING NUMBER	PORT SIZE (in.)	ENGINE				REMARKS
				390	406	427	428	
4V - Straight Line Dual Plane Street	C6AZ-9424-H	C7AE-9425-F	1.24 x 1.94	X	X	X	X	Fits all heads except low rise, High Rise & Tunnel Port.
4V - Equal Runners Dual Plane, Offset Street Strip	C6AZ-9424-M	C7AE-9425-C	1.24 x 1.94	X	X	X	X	Fits all heads except low rise, High Rise & Tunnel Port.
4V - High Riser Dual Plane Strip - Track	C5AZ-9424-G	C7AE-9425-A	1.24 x 1.94	X	X	X	X	Fits all heads except low rise, High Rise & Tunnel Port.
8V - Medium Riser Dual Plane Street, Strip	C8AX-9424-A	C8AX-9425-A	1.24 x 1.94	X	X	X	X	Fits all heads except low rise, High Rise & Tunnel Port.
8V - High Riser Dual Plane Strip, Track	C4AE-9425-G	C4AE-9425-E	1.24 x 2.60	NA	X	X	X	Uses High Rise heads only. See head section.
8V - Tunnel Type Medium Riser Strip	C4AE-9425-F	C4AE-9425-F	1.24 x 2.60	NA	X	X	X	Uses High Rise heads only. See head section.
4V - Tunnel Port Single Plane Strip	C8AX-9424-B	C8AX-9425-B	2.05 x 2.20	NA	X	X	X	Uses Tunnel Port heads only. See head section.
8V - Tunnel Port Dual Plane Street, Strip	C70E-9424-B	C70E-9425-B	2.05 x 2.20	NA	X	X	X	Uses Tunnel Port heads only. See head section.
8V - Tunnel Port Single Plane Strip, Track	C70E-9424-A	C70E-9425-A	2.05 x 2.20	NA	X	X	X	Uses Tunnel Port heads only. See head section.

ON THE COUNT OF 8..... EXHALE!

Our free-breathing exercise, thus far, has concentrated on the intake side of the engine. To assure full power output, exhaust back-pressure must be reduced to the maximum extent possible. Stock exhaust manifolds are designed to operate efficiently and quietly at the rpm ranges most frequently encountered in normal driving. But when improved performance is desired . . . and modifications are made to improve the fuel-air intake . . . exhaust restriction must be kept to a minimum.

Two cast iron exhaust manifolds are recommended and described below. Cast iron manifolds are suitable for street use. They are as durable and quiet as production manifolds, but do not offer the performance improvement available from custom-fabricated steel tube headers. Therefore, to get the ultimate horsepower gain for competition use, steel tube-type tuned headers are highly recommended. Your Ford or Lincoln-Mercury dealer can assist you in locating headers for any Ford big-block engine.

POLICE INTERCEPTOR



This manifold was used on earlier high performance Ford engines and makes a good, low-cost street setup. It offers a sizeable reduction in exhaust back pressure and is especially good for engines producing less than 400 hp. Exhaust flange is 2.50" in diameter. Fits all 390*, 406, 427 and 428 heads and installs in most full-size Ford Motor Company cars without modification. Order #C3AZ-9430-E (R), #C3AZ-9431-E (L).

COBRA JET



These manifolds are specifically designed for use with the Cobra Jet head only. They are identical to production Cobra Jet manifolds and provide good scavenging with low exhaust back-pressure, making them ideal for street use. When installed with the mandatory Cobra Jet heads, they will fit all Ford Motor Company cars using big-block engines, including Mustang and Cougar. Exhaust flange diameter is 2.42 inches. Order #C8OZ-9430-A (R) and #C8OZ-9431-A (L).

*Fits all 390 heads utilizing a vertical bolt pattern. Will not fit 390's with horizontal bolt pattern.



Ford Police Interceptor exhaust manifolds for street use, #'s C3AZ-9430-E (R), C3AZ-9431-E (L).



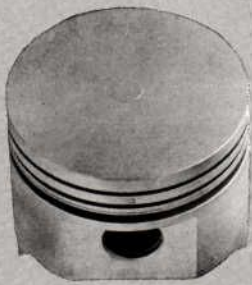
Ford Cobra Jet exhaust manifolds #'s C8OZ-9430-A (R), C8OZ-9431-A (L).

MORE PINCH..... MORE PUNCH

For those desiring the utmost performance from their 406, 427 or 428 engine, Ford offers a selection of high compression pistons. Compression ratios can be jumped one to two points, depending upon the engine model. High compression pistons are recommended for use in competition vehicles, although they are streetable with top octane gasolines.



Pop-up style high compression piston for 427 and 428 blocks.



Flat top high compression piston for use in 406 blocks.

POP-UP

The 427 and 428 blocks utilize a pop-up type, extruded aluminum high compression piston. Valve reliefs are forged in the piston top to provide valve clearance. Clearance must be checked carefully when high lift cams are used, and a .120 in. minimum must be maintained. Compression ratios, with standard head volume will approximate 12.5 to 1.

In addition to the regular high compression pop-up, a similar piston with a Dyke top ring is available for the 427 only.

FLAT TOP

The 406 cubic inch blocks gain added compression with the use of a flat top extruded aluminum piston. Piston produces a compression ratio of approximately 11.5 to 1 when a standard volume head is used. When used with some cams, valve relief pockets may have to be cut in the piston top to assure clearance at high rpm. Requires .120 in. minimum clearance, valve to piston.

FORD HI-PER PISTONS

TYPE	PART NUMBER	ENGINE MODEL				COMP. RATIO*	REMARKS
		390	406	427	428		
Pop-Up	C8AZ-6110-A (R) C8AZ-6110-B (L)				X	12.5-1	Order right and left hand pistons. Check for .120 in. minimum piston to valve clearance.
Pop-Up	C8AX-6110-A			X		12.5-1	Has Dyke-type top ring #C8AX-6150-A. Check for .120 in. minimum piston to valve clearance.
Flat Top	C2AZ-6108-B		X			11.5-1	With some cams, piston top may require valve reliefs. Check for .120 in. minimum piston-to-valve clearance.

* Compression ratio based on standard volume head.

TURNING 6 GRAND?

When the enthusiast has modified the top end of his Ford big-block engine for high performance, stress levels on rods, crankshaft and bearings can become extremely high, especially at high rpm. Ford offers race-proven *Hi-Per* rods, cranks and bearings designed to handle these stresses. As with all parts that rotate at high speeds, balance is super-critical. With any change of rods, pistons or crankshaft, rebalancing will be required.

HI-PER RODS

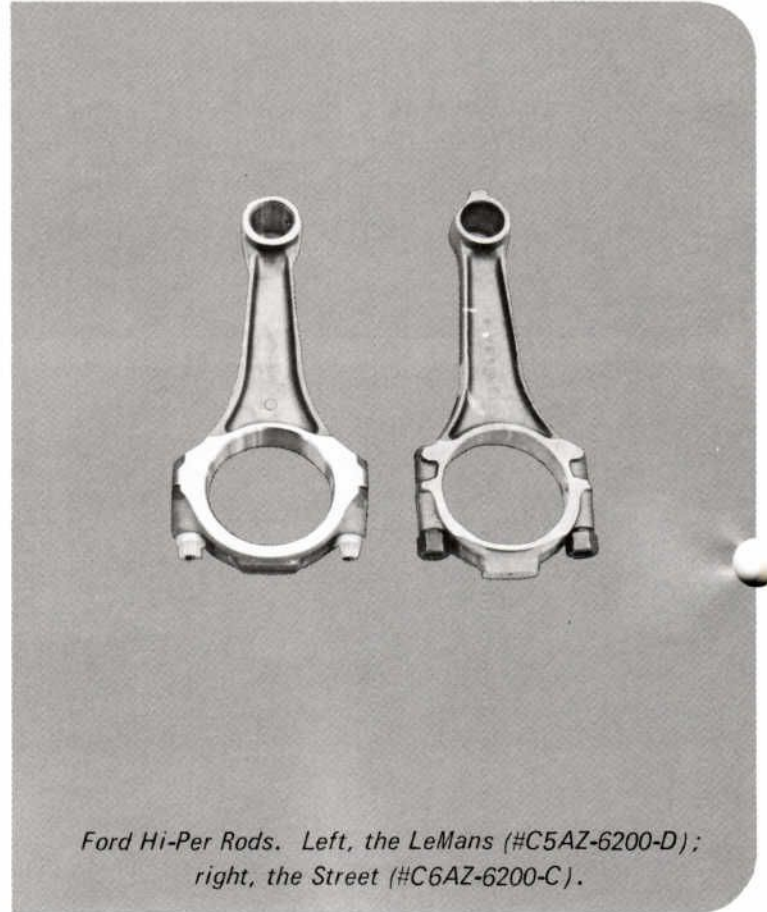
Ford *Hi-Per* rods are available in two types, providing two basic levels of rod strength. The LeMans rod is the toughest. It is designed to withstand high piston pressures and rpm's in the 7000 range, giving good low-end strength for all but the most demanding high output applications.

The LeMans rod is constructed of SAE 1041-H forged steel and has a 7/16 in. reduced-body, tri-lobe cap screw with a twelve point head. The cap screw is made of SAE 8640 steel. Rod weight for the LeMans rod is 833 to 845 grams.

The Street rod is designed for operation at somewhat lower rpm ranges. It makes an excellent rod for the modified big-block engine which runs primarily street duty but, on weekends, may get a shot at the strip.

The Street rod is forged of SAE 1041-H steel and uses a 13/32 inch bolt and nut. (Most standard big-block Ford engines have a 3/8 inch rod bolt.)

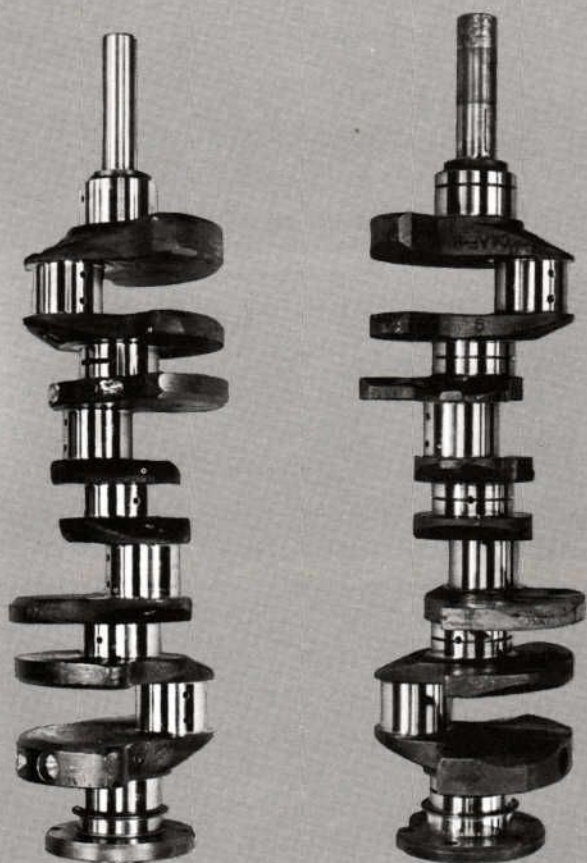
Street rod bolt material is SAE 8740 steel and the rod weight is 761 to 775 grams.



Ford Hi-Per Rods. Left, the LeMans (#C5AZ-6200-D); right, the Street (#C6AZ-6200-C).

FORD HI-PER RODS

TYPE	PART NUMBER	ENGINE				WEIGHT (GRAMS)	REMARKS
		390	406	427	428		
LeMans	C5AZ-6200-D	X	X	X	X	833 to 845	Recommended for track, strip or street use. Crank rebalancing required.
Street	C6AZ-6200-C	X	X	X	X	761 to 775	Recommended for street use. Crank rebalancing required.



Ford Hi-Per crankshafts. Left, #C5AZ-6303-C, forged steel. . . Right #C8AZ-6303-B, high nodular cast iron.

HI-PER CRANKSHAFTS

Two basic types of *Hi-Per* crankshafts are available to add low-end strength and durability.

For the serious racer, Ford offers a competition crankshaft made of forged steel. This crank is induction hardened and stress relieved to produce a super-strong, high-rpm unit. All main journals are cross drilled for maximum oil flow, insuring adequate lubrication under the most extreme conditions. Crank fits 390, 406 and 427 blocks without modification . . . and will fit 428 when special pistons are used. Order crankshaft #C5AZ-6303-C.

For those desiring added beef for drag, track or street use, Ford also offers an improved cast iron crankshaft. This unit is cast of high nodular iron to achieve significantly greater low-end strength. Order crankshaft #C8AZ-6303-B for 390, 406 and 427 engines. Crankshaft #C6AZ-6303-B, with .200" more stroke, fits the 428 but can also be used in other engines if special pistons are utilized.



Ford Hi-Per connecting rod bearings.

HI-PER ROD BEARINGS

High performance connecting rod bearings, made of copper-lead alloy with SAE 1010 steel backs offer maximum durability for both street and strip. Order bearing #C5AZ-6211-G for all big-block engines.

JOIN THE JET SET

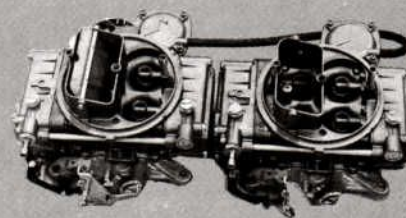
There is a matched Ford carburetion setup available for all head and intake manifold configurations. Each combination has been engineered to provide optimum performance.

Ford *Hi-Per* carburetors offer the latest advances in carburetion technology, including balanced fuel inlet with nitrophyl solid floats. . . mechanical accelerating pump systems. . . and secondary venturis controlled by air flow through the primaries. Models used on 4V manifolds feature center-pivot float bowls and central fuel inlets to prevent fuel starvation in hard cornering. Models used on 8V manifolds utilize a short bowl with an improved float and fuel inlet system for better cornering performance.

A variety of jet sizes is available for each model, allowing the enthusiast to fine tune for specific altitudes, temperatures, and strip or track requirements.

FORD HI-PER FUEL PUMP

With the addition of Ford *Hi-Per* carburetors, especially the dual-quad setups, a high-capacity fuel pump is recommended to prevent carburetor starvation at high rpm. The Ford *Hi-Per* fuel pump is of conventional design but has larger pumping capacity. A 3/8" diameter fuel line is required from pump to carburetor. Pump fits 390, 406, 427 and 428 blocks. Order #C7AZ-9350-B



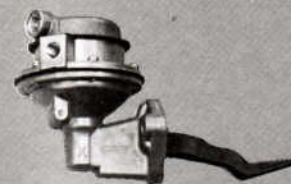
Ford Short Bowl-type carburetors for use on 8V manifolds.



Ford Center Pivot-type carburetor for use on 4V manifolds.



Ford Center-Pivot-type carburetor with adjustable inlet seat bowl, for use on 4V manifolds.



Ford Hi-Per Fuel Pump #C7AZ-9350-B.

FORD HI-PER CARBURETORS

HEAD	INTAKE MANIFOLD	CARBURETOR	C.F.M.	TYPE	RECOMMENDED USAGE
Tunnel Port (#C8AX-6049-A)	8V-Single Plane (#C70E-9424-A)	C5AF-9510-BU (Front)	780	Short Bowl	Full-race track or strip. Not recommended for street.
		C5AF-9510-BT (Rear)	780		
	8V-Dual Plane (C70E-9424-B)	C80F-9510-AC (Front)	652	Short Bowl	Strip or track. Not recommended for street.
		C80F-9510-AD (Rear)	652		
High Riser (#C4AE-6049-F)	8V-Dual Plane (#C4AE-9425-F)	C6AZ-9510-AH (Interchangeable front and rear.)	710	Short Bowl	Track, Strip or Street.
	4V-Dual Plane (C4AE-9425-G)	C5AF-9510-BU (Front)	780	Short Bowl	Strip or track. Marginal street use.
		C5AF-9510-BT (Rear)	780		
Medium Riser (#C5AZ-6049-C)	8V-Tunnel-type (#C8AX-9424-A) or 8V-Dual Plane (#C5AZ-9424-G)	C5AF-9510-BU	780	Center Pivot	Strip, track or street.
	4V-Medium Riser (#C6AZ-9424-H) or 4V-Equal Runner (#C6AZ-9424-M)	C80F-9510-AC (Front)	652	Short Bowl	Strip or track, tunnel-type. Strip, track or street, dual plane.
		C80F-9510-AD (Rear)	652		
Cobra Jet (#C80Z-6049-F)	8V-Tunnel-type (#C8AX-9424-A) or 8V-Dual Plane (#C5AZ-9424-G)	C80Z-9510-AA - (Standard Trans.)	735	Center Pivot Adj. Seat Bowl	Strip, track or street
	4V-Medium Riser (#C6AZ-9424-H) or 4V-Equal Runner (#C6AZ-9424-M)	C80Z-9510-AB - (Automatic Trans.)			

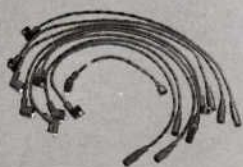
* See Kit Section for added information.

FIRE IN THE HOLE!

It takes a hot spark with plenty of punch behind it to operate at high rpm . . . and under high compression conditions. If the enthusiast is to realize the full horsepower potential from his modified engine, he should follow the recommendations of Ford performance engineers and install these *Hi-Per* electrical components. They are all race-bred and competition-proved.



Hi-Per Dual Point distributor for all 390, 406, 427 and 428 engines, #C0AZ-12127-L.



Autolite Hi-Per solid-core spark plug wire kit #C7AZ-12259-D.



Autolite Hi-Per plugs. Left to right, Standard Gap. . . Power Tip. . . and Racing Gap.

AUTOLITE HI-PER SPARK PLUGS

TYPE	AUTOLITE NUMBER	GAP SETTING	HEAT RANGE	RECOMMENDED USAGE
STANDARD GAP	BTF6	—	Hot	Street
	BTF3 & BTF31	—	▲	Street & Mild Drag
	BTF1	.023/.027	▼	Drag & Short Track
	BF601	.023/.027	Cold	Drag & Long Track
POWER TIP	BF82	—	Hot	Street
	BF42 & BTF42	—	▲	Street
	BF32	—	▼	Street & Mild Drag
	BF22	.028/.032	▼	Drag & Short Track
	BF12	.028/.032	Cold	Drag & Short Track
RACING GAP	BF703	—	Hot	Strip or Track
	BF603	—	▲	Strip or Track
	BF403	—	▼	Fuel Blown Drag
	BF203	—	▼	Fuel Dragster-Blown
			Cold	

DUAL POINT DISTRIBUTOR

Here's the dual-point setup that will deliver right up to 7000 + rpm. Two sets of points increase the effective cam dwell from approximately 27° to 34°, giving high efficiency at high rpm. Points have high-pressure springs to prevent bounce. Point life is significantly higher than single point distributors. Fits all 390, 406, 427 and 428 blocks.

AUTOLITE HI-PER WIRING KITS

Most production Ford engines utilize "resistance-type" spark plug wire to reduce radio interference. For high performance use, solid-core wire is highly recommended.

Autolite *Hi-Per* solid-core wiring kits are the "universal-type" that can be adapted to all Ford Motor Company vehicles from 1949 on. When using solid-core wire, a radio suppression kit is also recommended. Use Wire Kit #C7AZ-12259-D for all eight-cylinder models.

AUTOLITE HI-PER PLUGS

There is a wide selection of Autolite performance-type plugs available for street, strip or track use. Plugs have special high-temperature alloys in side and center electrodes for long life. Plugs are offered in three types: standard gap, power tip, and racing gap. Power-tip design allows faster heat-up at low rpm to burn away deposits, assuring foul-free high-rpm operation. Racing gap plugs are extremely cold plugs with fixed gap. All plugs listed in the chart are 18mm and fit most Ford Motor Company heads.

THREE 2V INDUCTION KIT

Here is a complete package designed to give increased power and performance for your 1965-67 Ford 352, 390 or 428 CID engine. These kits feature three 2-venturi carburetors on a precision cast aluminum intake manifold . . . plus a special air cleaner. Kit includes all linkage and fuel log. Mechanical linkage lets you run on center carburetor only for good economy in normal driving . . . cuts in the other two carburetors when you want to go.

Order kit #C5AZ-6B068-B for 1965-67 Fords with standard transmission, or kit #C5AZ-6B068-C for 1965-67 Fords with automatic transmission.

DUAL 4V INDUCTION KIT

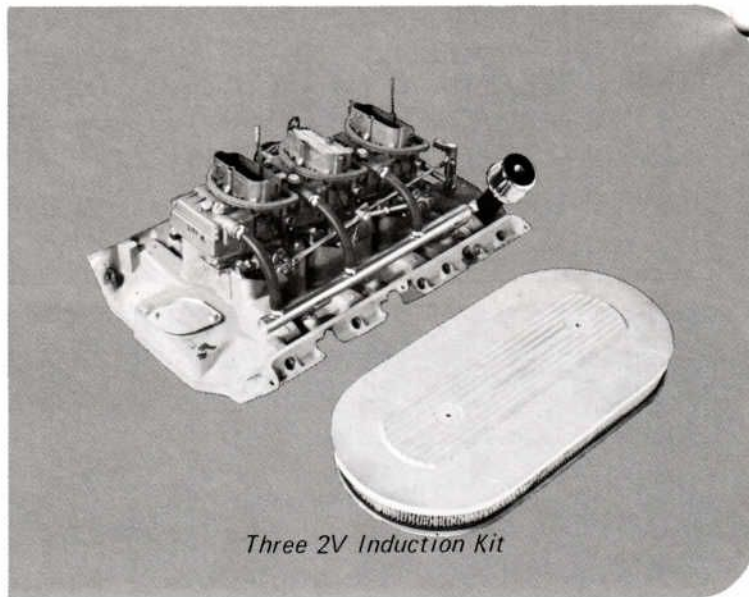
Bolt it on and go . . . that's all that's required with this complete dual 4V manifold kit. Manifold is a medium rise-type and will fit 1966-67 Ford Motor Company 390 and 428 CID engines. Kit comes with all attaching parts including two 4V Holley 510 cfm carburetors.

Order kit #C7AZ-6B068-A.

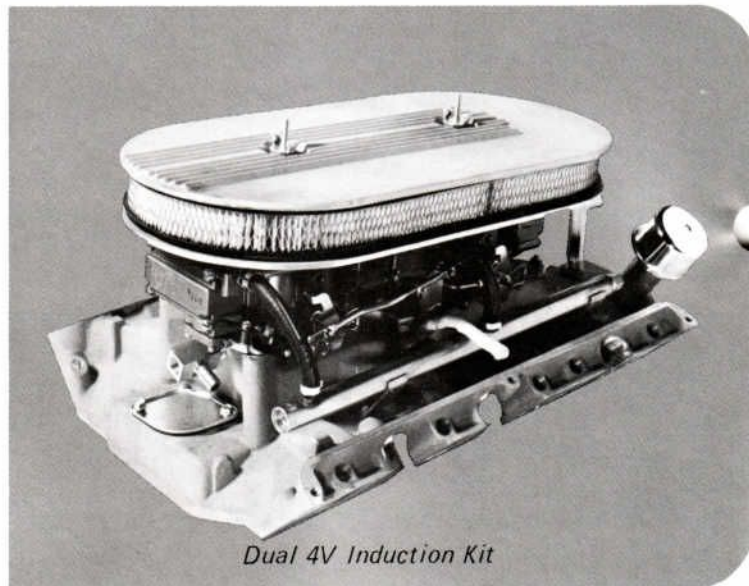
THROTTLE LINKAGE KIT

A universal throttle linkage kit is available for all *Hi-Per* dual quad carburetion setups. Kit includes bellcrank assembly, carburetor throttle rods, and all other necessary attaching parts to connect standard throttle linkage to dual carburetors.

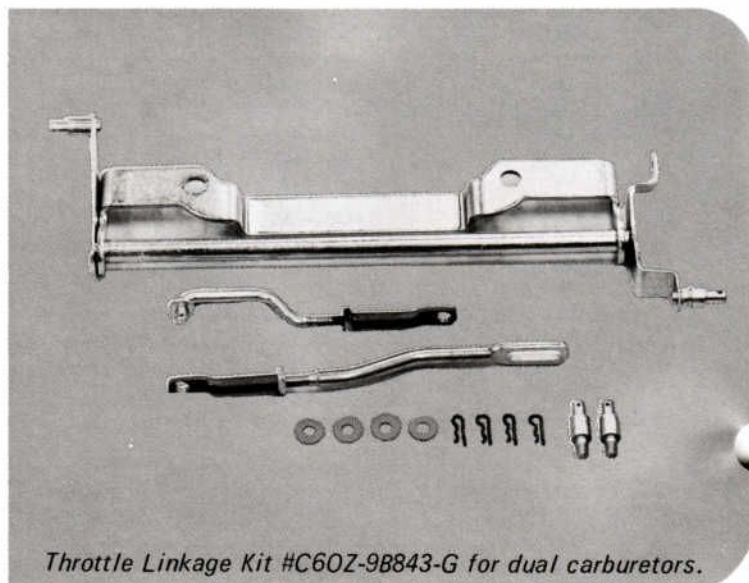
Fits all *Hi-Per* 8V manifolds. Order #C6OZ-9B843-G.



Three 2V Induction Kit

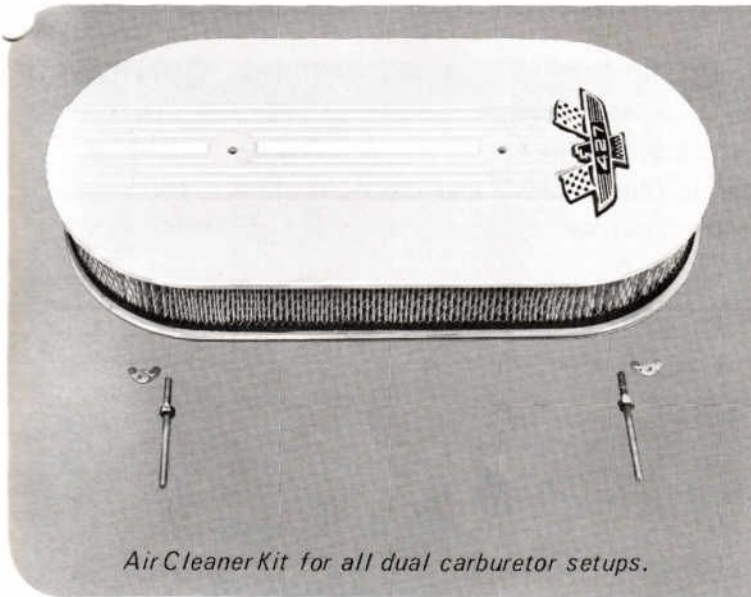


Dual 4V Induction Kit

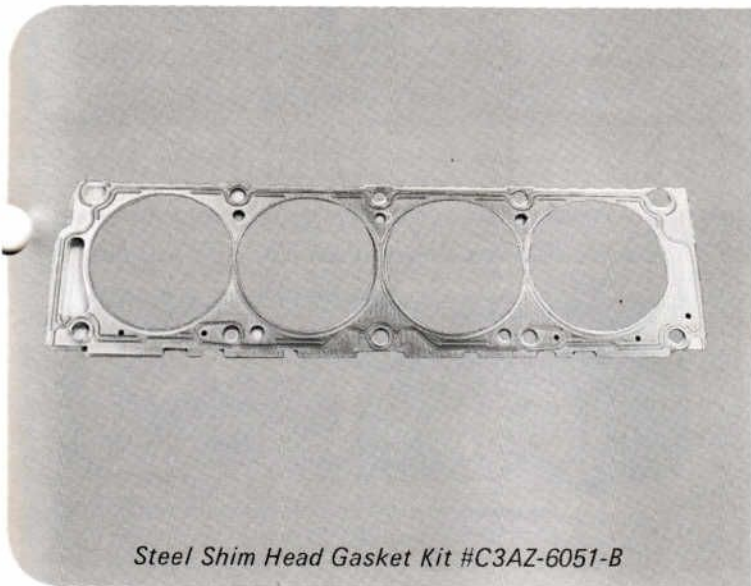


Throttle Linkage Kit #C6OZ-9B843-G for dual carburetors.

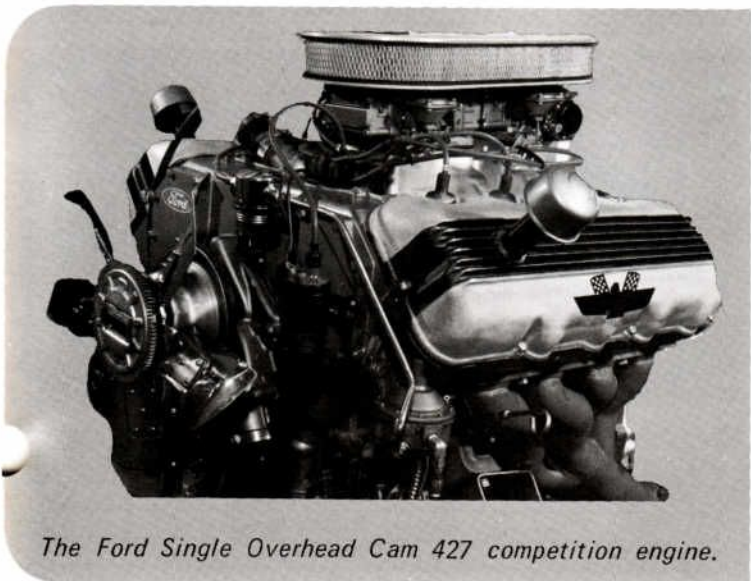
AND GO!



Air Cleaner Kit for all dual carburetor setups.



Steel Shim Head Gasket Kit #C3AZ-6051-B



The Ford Single Overhead Cam 427 competition engine.

AIR CLEANER KIT

To top off your dual carburetor installation, here's an air cleaner kit which will fit all *Hi-Per* 8V setups. Air cleaner has cast aluminum base and utilizes paper type filter element. When installed on high rise 8V manifold, hood may require modification for clearance. Order #C5MY-9600-B.

STEEL SHIM HEAD GASKETS

Boost compression by half a point or more with the installation of steel shim head gaskets. Gaskets are .030" thick, installed, compared to stock gasket at .050". Recommended for street use with standard heads and for competition use with *Hi-Per* heads. Fits all 390, 406, 427 and 428 blocks. Order #C3AZ-6051-B.

THE ULTIMATE IN KITS ... SOHC 427

Here's the biggest kit of them all... the 427 single overhead cam Ford engine. This is an all-out racing machine built specifically for serious competition. Engine is completely "blueprinted" and ready to race out of the crate. Engine is shipped complete except headers, starter, fan blade, alternator, clutch and fuel pump.

Available in 4V and 8V models. Order #C6AE-6007-363S for 4V... #C6AE-6007-359J for 8V.

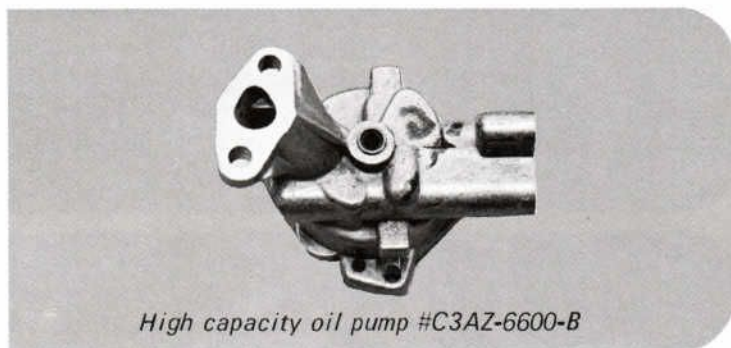
PUMPS AND SUMPS

When all the hardware has been assembled for a modified engine, there is one final consideration . . . lubrication. In constant high rpm operation, the standard production oil pump may be hard-put to maintain sufficient pressure and flow for safe lubrication. Stock oil pans, which are more than adequate for normal driving needs, may have insufficient capacity to maintain oil temperatures below 275°, and to keep oil away from crankshaft throws. For these reasons, Ford offers a selection of *Hi-Per* parts which will insure good lubrication under the most severe conditions.

HEAVY DUTY OIL PUMP



This high-output oil pump is the standard production pump found on all 427 cubic inch high performance engines. It has sufficient capacity to pump 22 gpm with 70–80 psi at 4000 rpm. Pump will also fit all 390, 406 and 428 blocks and will provide improved pumping capacity for these engines. Order #C3AZ-6600-B.

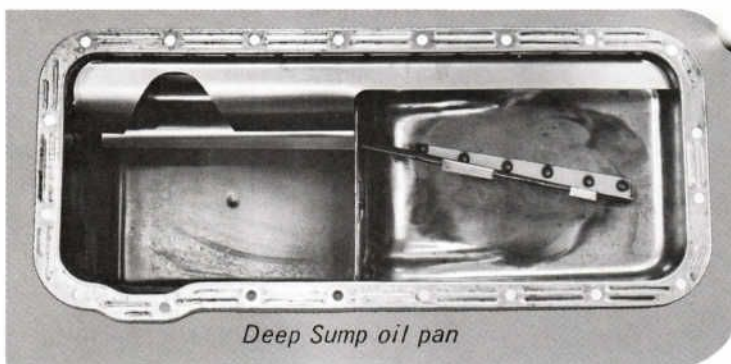


High capacity oil pump #C3AZ-6600-B

DEEP SUMP PAN



For any strip or track competition, the deep sump oil pan is highly recommended. Pan provides oil capacity of 7 qts. (with filter) and keeps oil surface well away from rotating parts. Extra capacity helps maintain cooler oil temperatures for improved viscosity. Fits all 390, 406, 427 and 428 blocks.



Deep Sump oil pan

Order #C8AX-6675-A. (Special oil pick-up required.)

DEEP SUMP PICKUP



The Deep Sump pan above requires the use of this special oil pickup. Pickup has a 3/4" outside diameter for unobstructed flow at high rpm. Fits all big-block oil pumps. Order #C5AE-6622-B.



Special oil pickup, #C5AE-6622-B, for use with Deep Sump pan.

HI-PER PARTS PRICES

CLASS	SERVICE PART NUMBER	MFRS. SUGG. LIST PRICE
C	C3AZ-4880-A	\$ 184.85
Z	C6AE-6007-359-J	2350.00
Z	C6AE-6007-363-S	2350.00
C	C8AZ-6010-B	245.05
C	C4AE-6049-F	161.00
C	C5AZ-6049-C	55.55
C	C8AX-6049-A	181.00
C	C8OZ-6049-F	54.00
A	C3AZ-6051-B	2.55
A	C6AZ-6051-A	1.80 ea.
CA	C5AZ-6B068-B	264.00
CA	C5AZ-6B068-C	264.00
CA	C7AZ-6B068-A	249.00
B	C2AZ-6108-B	16.15 ea.
B	C8OZ-6108-G	22.20 ea.
C	C8AX-6110-A	18.75 ea.
C	C8AZ-6110-A	18.75 ea.
C	C8AZ-6110-B	18.75 ea.
B	C3AZ-6140-B	.07 ea.
A	C6AZ-6148-A	9.80 per 2-Cyl Set
C	C8AX-6150-A	7.25 per Piston
A	C5AZ-6200-D	10.20 ea.
C	C6AZ-6200-C	10.50 ea.
A	C5AZ-6211-G	2.10
A	C3AZ-6250-AA	47.70
C	C4AE-6250-B	45.00
B	C6OZ-6250-B	29.50
C	C8AX-6250-C	29.50
C	C8AX-6250-D	45.00
CA	C6AZ-6A257-A	50.85
B	C5AZ-6303-C	98.50
B	C6AZ-6303-B	87.35
C	C8AZ-6303-B	98.50
B	C5AZ-6333-AA	2.60 ea.
B	C5AZ-6333-AB	2.60 ea.
B	C5AZ-6337-AA	5.00 ea.
B	C5AZ-6337-AB	5.00 ea.
C	C5AZ-6375-P	35.05
A	C3DZ-6500-B	3.10 ea.
A	C4AZ-6500-B	1.55 ea.
A	C4TZ-6500-A	3.00 ea.
A	C8AZ-6500-A	2.95 ea.
A	C3AZ-6505-E	4.90 ea.
A	C5AZ-6505-N	14.60 ea.
C	C8AX-6505-A	14.60 ea.
A	C3AZ-6507-AJ	2.40 ea.
A	C5AZ-6507-N	4.40 ea.
C	C8AX-6507-A	12.75 ea.
C	C8AX-6507-B	12.75 ea.
A	C3AZ-6513-A	1.65
A	C3AZ-6513-B	1.60 ea.
B	C8AZ-6513-B	1.65 ea.
A	C3AZ-6514-A	.57 ea.
B	C3AZ-6A536-A	.29 ea.
A	B8A-6564-B	1.95 ea.
A	B8AZ-6564-C	1.40 ea.
A	B8AZ-6565-C	1.05 ea.
A	C0AE-6600-C	16.50
A	C3AZ-6600-B	18.95

CLASS	SERVICE PART NUMBER	MFRS. SUGG. LIST PRICE
C	C5AE-6622-B	\$ 5.35
B	C6OZ-6622-A	5.35
A	C6OZ-6675-A	16.20
C	C8AX-6675-A	41.75
A	C1AZ-6731-A	4.10
B	C5AZ-8501-S	24.30
C	C7AZ-9350-B	19.60
C	C5AZ-9424-G	112.00
C	C6AZ-9424-H	92.75
C	C6AZ-9424-M	92.75
C	C7OE-9424-A	164.25
C	C7OE-9424-B	164.25
C	C8AX-9424-A	144.00
C	C8AX-9424-B	99.25
C	C8OZ-9424-A	43.00
C	C4AE-9425-F	126.75
C	C4AE-9425-G	92.75
C	C3AZ-9430-E	35.60
C	C8OZ-9430-A	30.25
C	C3AZ-9431-E	35.60
C	C8OZ-9431-A	30.25
B	C3AZ-9510-G	55.40
C	C5AF-9510-BT	60.00
C	C5AF-9510-BU	60.00
C	C6AZ-9510-AH	59.10
A	C6AZ-9510-AP	59.10
C	C8OF-9510-AC	55.40
C	C8OF-9510-AD	55.40
C	C8OZ-9510-AA	73.30
C	C8OZ-9510-AB	73.30
C	C5MY-9600-B	28.00
CA	C6OZ-9B843-G	8.80
A	C0AZ-12127-L	40.45
C	C8OZ-12127-D	21.45
C	C7AZ-12259-D	30.00
A	C2AZ-19580-D	6.50
A	AG-2	1.15
A	AG-4	1.15
A	AG-22	1.15
A	AG-23	1.57
A	AG-42(000-12405-D)	1.15
A	AG-52(000-12405-L)	1.15
A	AG-203	1.57
A	AG-603	1.57
C	AG-701	1.15
A	BF-12(C3AZ-12405-B)	1.20
A	BF-22(C3AZ-12405-A)	1.20
A	BF-32(C0AZ-12405-A)	1.15
A	BF-42(B8A-12405-A)	1.15
A	BF-82(B7A-12405-B)	1.15
C	BF-203	1.57
C	BF-403	1.57
A	BF-601(C2AZ-12405-A)	1.15
A	BF-603	1.57
A	BF-703	1.57
A	BTF-1(C2AZ-12405-B)	1.15
A	BTF-3(B9T-12405-A)	1.15
A	BTF-6(B7A-12405-A)	1.15
A	BTF-31(C3TZ-12405-A)	1.15
A	BTF-42(C5TZ-12405-A)	1.15

HOW TO ORDER HI-PER PARTS

The High Performance Parts described in this brochure are available for Ford Motor Company 390, 406, 427 and 428 CID engines. The parts are listed by part number and can be purchased from any authorized Ford or Lincoln-Mercury dealership.

NOTE TO DEALERS

All of the part numbers in this brochure have regular depot classifications (A, AA, B, C, CY, V, VY, etc.) and should be ordered in the usual manner for each class of item.

REQUESTS FOR INFORMATION

All requests for special information or assistance regarding *Hi-Per* Parts should be referred to:

Autolite-Ford Parts Division
National Service Department
P. O. Box 3000
Livonia, Michigan 48151

Telephone: (Area 313) 427-3500 Ext. 344

The staff assigned to handle your mail and phone inquiries is organized as a "company-wide clearing house" to give you prompt, accurate and complete answers.

Many of these questions can be answered on the spot. Others, because of their technical involvement, may require a little time and the help of our engineering or marketing specialists. (The National Service Department has direct-line contact with the persons who will be able to answer these more difficult questions.) If your inquiry can't be answered immediately, you can be certain that it will be followed up regularly until the information you need is obtained.

HI-PER PARTS WARRANTY

The special parts or special applications described in this brochure are not available as factory installed equipment but only as service items with which the Purchaser may accomplish individualized dress-up and high-performance modifications of his vehicle. Accordingly, the following warranty, and limitation of vehicle warranty, are applicable:

"The Selling Dealer warrants to the Purchaser that the Selling Dealer, at his place of business and using new Ford parts or Ford Authorized Remanufactured parts, will repair or replace, free of charge including related labor, any part of any Ford special or special application dress-up or high-performance service part or accessory that is found to be defective in factory material or workmanship in normal use and service within a period of 90 days from the date of delivery to the Purchaser or until it has been in service for 4,000 miles, whichever occurs first.

If the Selling Dealer has ceased to do business or the Purchaser is travelling or has moved to a different locality, replacements or repairs may be made by any authorized dealer of Ford.

Unauthorized modifications and alterations or improper repairs made by dealers or other sources are not the responsibility of Ford. If, in the reasonable judgment of Ford, any such modification, alteration or repair adversely affects the vehicle's reliability, stability or over-all performance the vehicle warranty may not apply to parts and components so affected."

The description and specifications contained in this book were in effect at the time the publication was approved for printing. The Ford Motor Company, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change specifications or design without notice and without incurring obligation.

Autolite 

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DEARBORN, MICHIGAN

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