Volume 6

SHOP TIPS

FROM Autolite Ford

September 1967 to August 1

All 12 Issues

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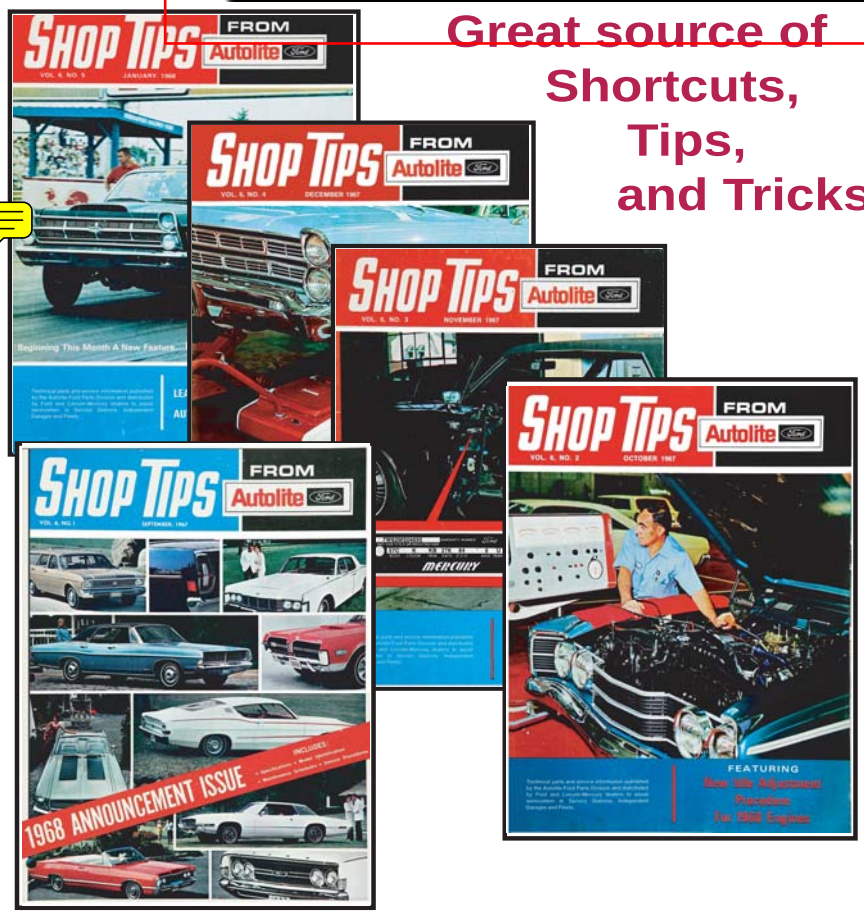

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ROTUNDA

Ford Shop Tips – Volume 6

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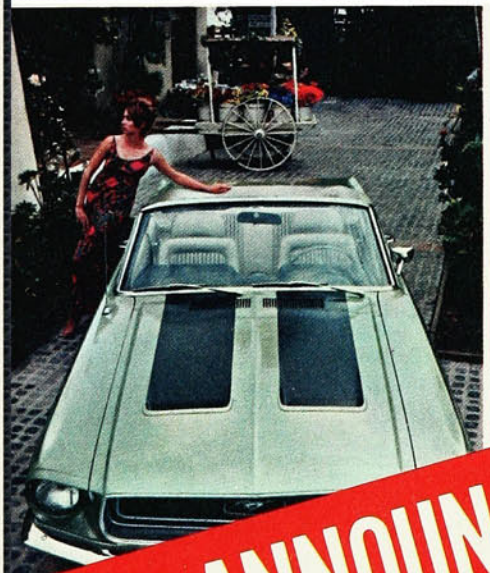
SHOP TIPS

FROM Autolite Ford

VOL. 6, NO.1 SEPTEMBER, 1967



1968 ANNOUNCEMENT ISSUE

INCLUDES:

- Specifications
- Model Identification
- Maintenance Schedules
- Service Procedures

1968 AIR POLLUTION CONTROLS..

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Autolite Ford

VOL. 68 FPM 1 LITHO IN U.S.A.

Motor oil . . . high quality motor oil . . . has always been essential to protect and maintain the performance designed into Ford-built engines. It's even more essential in 1968 engines. In fact, high quality motor oil is so important to 1968 engines that Ford has developed a new engineering specification (M2C101-B) to describe the type of motor oil used as service fill. Motor oil that meets specification 101-B must be used throughout the life of the 5-year, 50,000-mile warranty for 1968 vehicles.

Use of motor oil that does not meet Ford Specification M2C101-B, when oil is added or at each oil and filter change interval, may void the warranty.

Many of the high quality motor oils of the leading oil companies meet Ford Specification M2C101-B. Ford Motor Company understands that oil companies are informing service stations, etc., of the specific motor oils that meet Ford's new 101-B specification. If this information is not available, or there is doubt about which motor oil to use, contact your oil supplier and obtain written concurrence that he is supplying you an M2C101-B motor oil.

CLEARLY write the full brand name and grade of oil used on all customer receipts. Owners must show evidence of the use of a 101-B oil to their Ford or Lincoln-Mercury Dealer to obtain the annual certification of warranty.

WHY SPECIFICATION 101-B?

Ford's 1968 engines continue the proven features (with refinements) that provide thousands of miles of service. They are carefully designed, quality built and backed by a 5-year, 50,000-mile warranty. The only major change is the addition of a "closed" crankcase emission control system to *all* engines.

Federal law requires that all 1968 U.S. vehicles be equipped with air pollution control systems. The crankcase emission system must be the "closed" type. Ford initially used crankcase emission control devices on some 1961 California registered vehicles. Continuous testing programs by Ford Lubrication Engineers since these first emission control devices were installed have revealed conclusive evidence that:

> While "closed" crankcase ventilation systems significantly reduce hydrocarbon emissions by recirculating blow-by combustion gases and crankcase fumes through the fuel induction system, they also increase the load on the motor oil, and complicate the lubrication system because of the constant recycling of highly acidic blow-by gases. If these acids from fuel combustion remain in the engine in the presence of an unbalanced or low quality motor oil, they are not neutralized; and usually cause high rates of corrosive wear, varnish and sludge deposits.
>
> High quality motor oil, heavily fortified with a properly balanced formula of over-based metallic detergents and polymeric dispersants, however, do not cause these engine problems.

Graphic evidence of what happens to engines that use low quality motor oil is shown on page 3 . . . alongside of the same components from engines using high quality motor oils that meet Ford Specification M2C101-B.

CHANGE MOTOR OIL WARRANTY REQUIREMENTS

OFFICIAL FORD ENGINEERING PHOTOS ILLUSTRATING THE EFFECTS OF LOW QUALITY VS. HIGH QUALITY (FORD SPEC. M2C101-B) MOTOR OIL

OIL PLUGGED (NON-OPERATING)

OIL FREE (OPERATING)

Figure 1—Closed Crankcase Emission Valves

PCV valve on left was used with low quality oil. Sludge from acids result in one of the major causes for engine damage and poor performance. PCV valve on right was used with high quality motor oil.

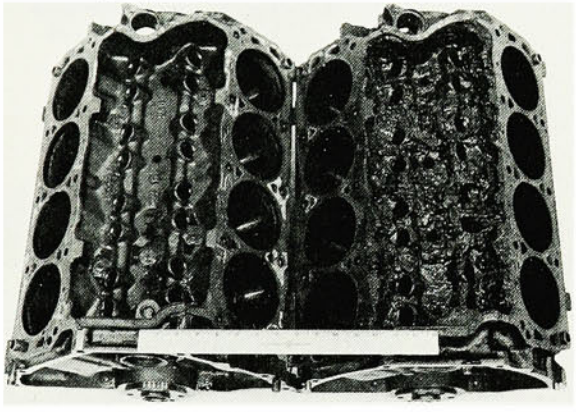


Figure 2—V-8 Engine Blocks

Engine block on left shows practically no evidence of sludge when used with high quality motor oil. Engine block on right used low quality motor oil and "valley" is full of sludge.

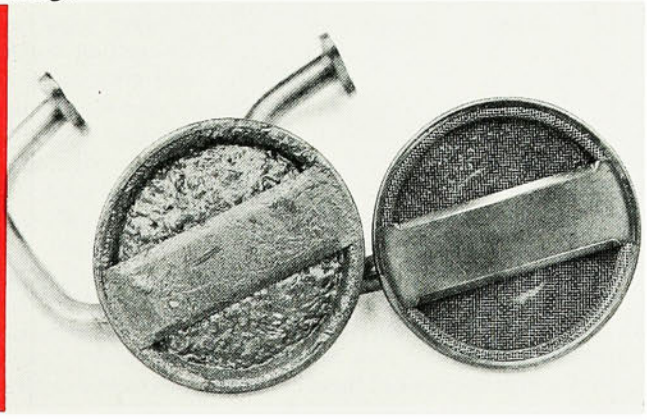


Figure 3—Crankcase Oil Pump Screens

Oil screen on left used low quality motor oil and is plugged with sludge. Oil screen on right is from engine that used high quality motor oil.

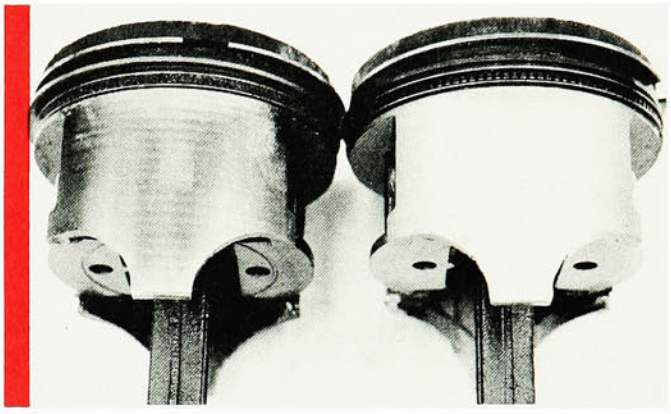


Figure 4—Piston and Piston Rings

Piston on left is from engine that used low quality motor oil. Note plugged oil control ring. Piston on right is from engine using high quality motor oil.

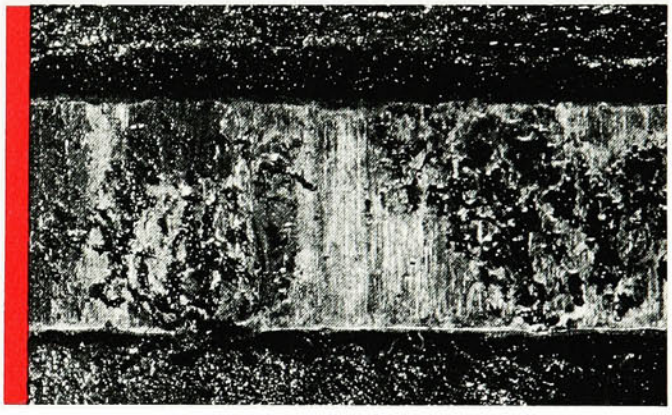


Figure 5—Corroded Piston Ring

View of top piston ring from engine using low quality motor oil showing corrosion. Piston ring is magnified 50 times.

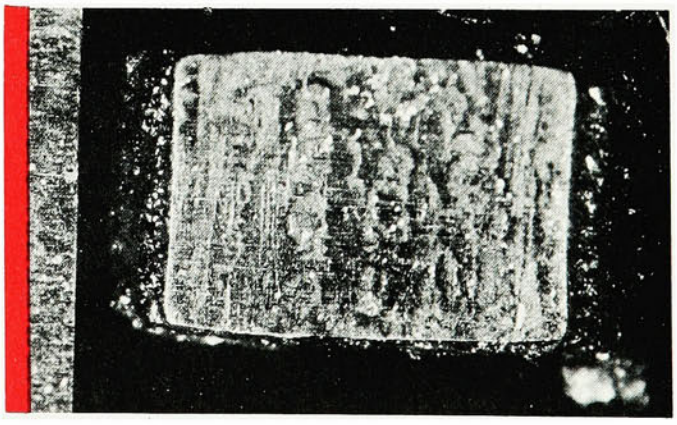


Figure 6—Corroded Oil Ring

View of oil control ring from engine using low quality motor oil showing corrosion. Ring magnified 50 times.

CRANKCASE AND EXHAUST

All 1968 Car engines use two systems to keep emission levels to standards set by the Federal Government—a crankcase emission control system, and an exhaust emission control system. All 1968 Truck (gas) engines also come equipped with crankcase emission control devices. All 1968 Light Truck engines have exhaust emission control devices, as do Heavy Duty Trucks with 240-6, 300LD-6 and 300HD-6 engines.

THE CRANKCASE EMISSION CONTROL SYSTEM

Emission controls were initiated on Ford engines in 1961 for California registered cars, and nationwide on 1963 models. These first controls were known as positive crankcase ventilation (PCV) systems. Refinements to this system were made to meet California requirements in January, 1964. This system and variations of it have been used on all Ford engines since. Figure 1 diagrammatically illustrates the technical advancements and modifications made to meet new emission control requirements. The latest requirement is that all 1968 engines use the "closed" crankcase ventilation system.

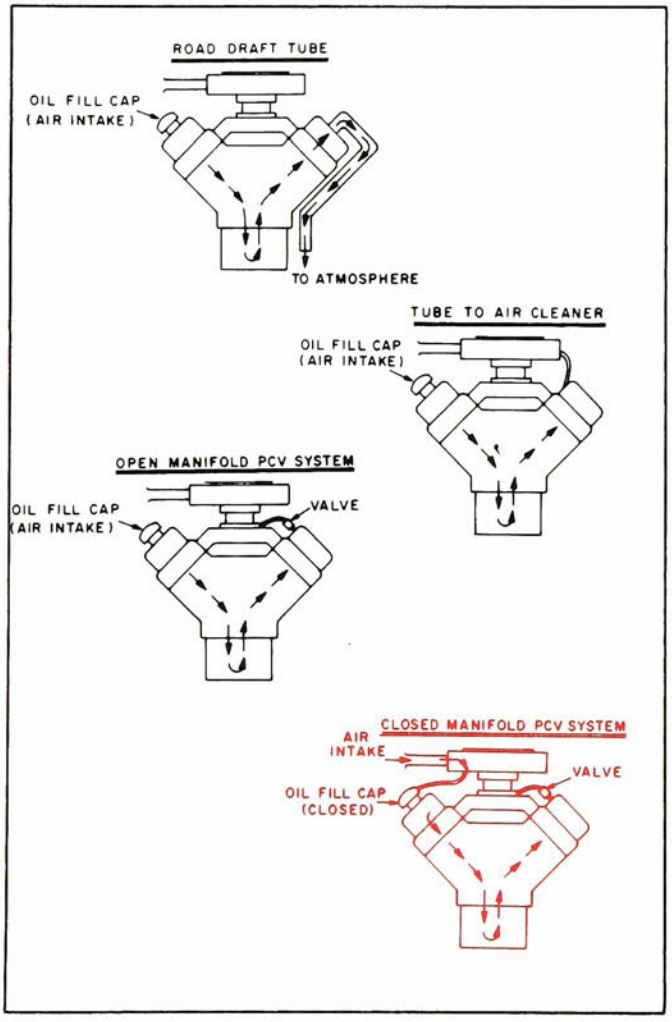


Figure 1—Crankcase Ventilation Systems

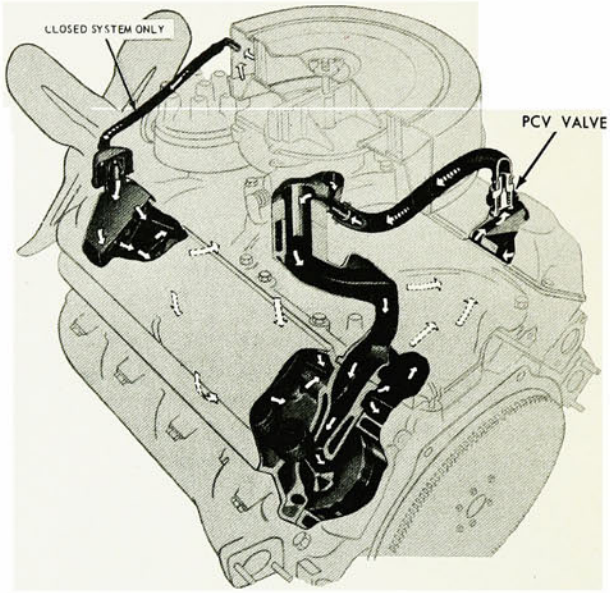


Figure 2—Closed Crankcase Ventilation System

CLOSED CRANKCASE VENTILATION SYSTEM

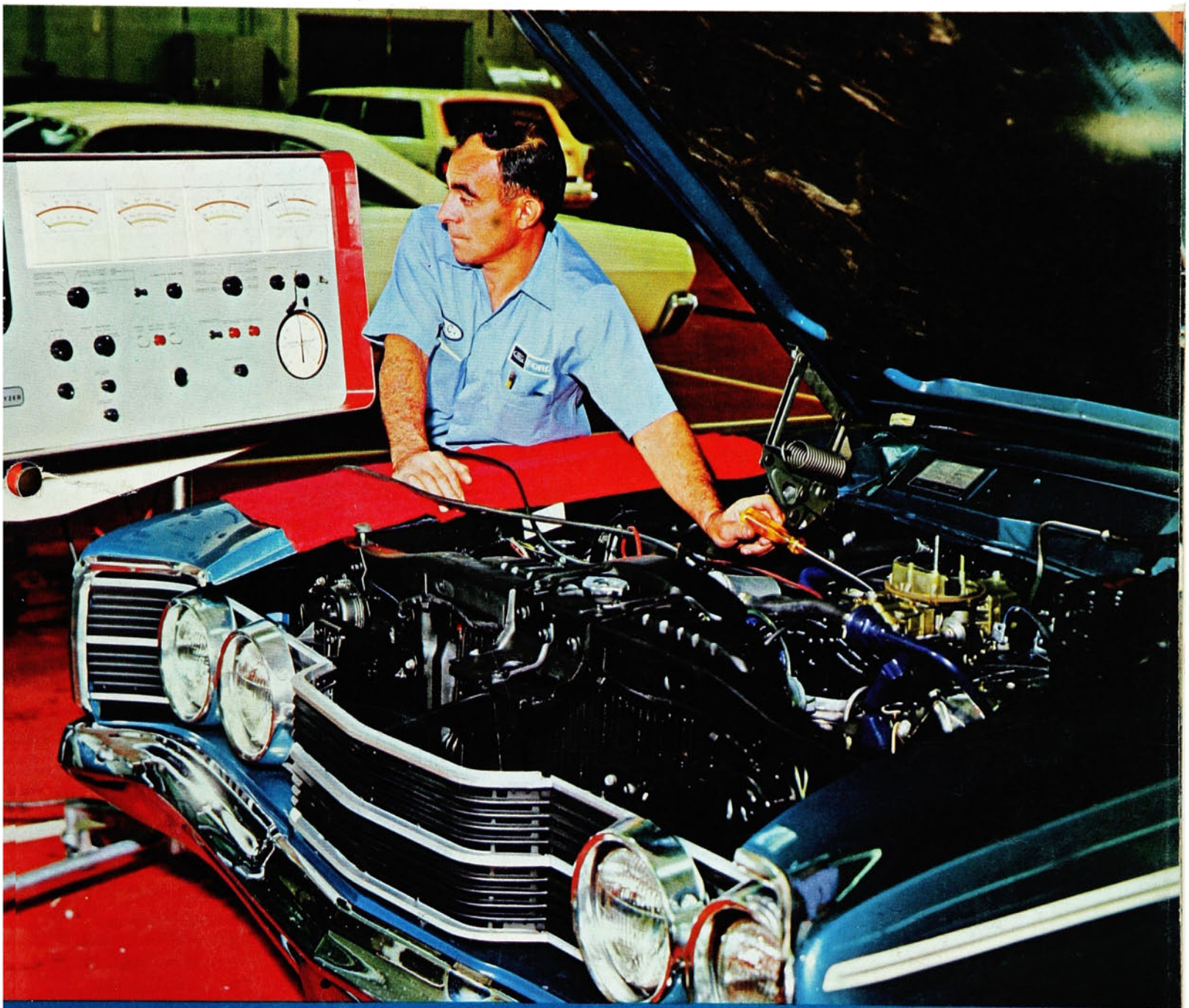
The closed crankcase ventilation system used on all 1968 Ford-built engines is similar to the "open" system used on most previous engines. However, instead of getting fresh air through the oil filler cap (as with the open system), the closed system obtains fresh air through the carburetor air cleaner. A tube routes the air to the oil filler cap (Fig 2) which is sealed from outside air. The fresh air circulates through the crankcase picking up blow-by gases that pass the piston rings, as well as condensation vapors and crankcase fumes. The PCV control valve modulates this mixture of harmful gases into the intake manifold where they combine with the carburetor air-fuel mixture and are burned in the combustion chamber. Smog-producing hydrocarbons emitted to the exhaust system are thus reduced to an acceptable level.

However, because none of these harmful gases can normally escape the crankcase—especially when the engine is inoperative (as through the oil filler cap of the "open" system), the blow-by contaminants are highly acidic. During the time the engine is shut down (such as overnight) the acids rust the metal parts of the engine if not adequately protected. Thus the need for a high quality motor oil as explained on page 2.

SHOP TIPS

FROM Autolite Ford

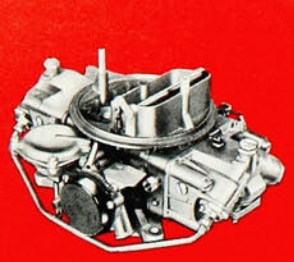
VOL. 6, NO. 2 OCTOBER 1967



Technical parts and service information published by the Autolite-Ford Parts Division and distributed by Ford and Lincoln-Mercury dealers to assist servicemen in Service Stations, Independent Garages and Fleets.

FEATURING

New Idle Adjustment Procedure For 1968 Engines



NEW IDLE ADJUSTMENT

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Autolite Ford

VOL. 68 FPM 21 LITHO IN U.S.A.

Several controls and devices are used on 1968 Ford Motor Company vehicles to keep exhaust emission within government regulations—crankcase emission control (previously called PCV), two types of exhaust emission control: Thermactor and IMCO (Improved Combustion), dual diaphragm distributor with retarded spark advance and carburetors with idle adjustment limiters. Idle adjustment limiters restrict the maximum idle richness of the air/fuel mixture and prevent individuals from making overly rich adjustments.

There are two types of idle limiters: internal and external. The internal needle limiter is located in the idle channel (Fig. 1) and is not externally visible. This limiter is set and sealed at the factory. Under no circumstances, during normal service or during overhaul, should the seal be removed and adjustments made to this needle. This type of limiter is used on the Holley 4-V and Carter 1-V carburetors.

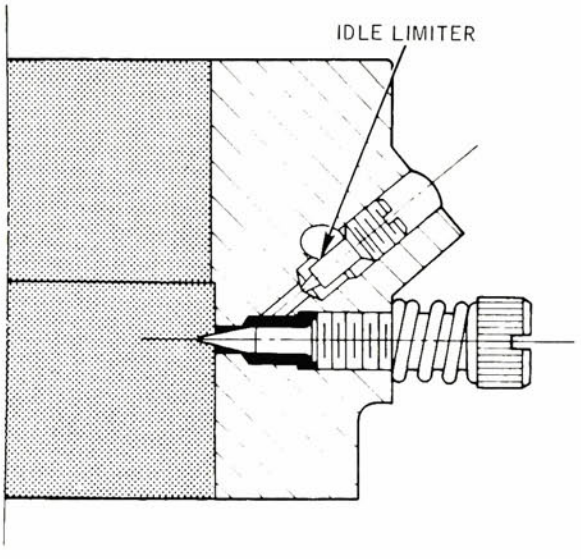

Fig. 1—Internal Idle Limiter

The other type of Idle Limiter is an external plastic idle limiter cap installed on the knurled head of the idle fuel mixture adjusting screw (Fig. 2). This type limiter is used on Carter 4V and all Autolite carburetors. Any adjustment to the idle fuel mixture on carburetors having this type of limiter must be made within the range of the plastic limiter cap.

Under no circumstances may the limiter cap, the stop boss, or the power valve cover, which the limiter caps stop against *be mutilated or deformed in any way to render the limiter inoperative.* A satisfactory idle is obtainable within the range of the limiter cap.

PROCEDURE FOR '68 ENGINES

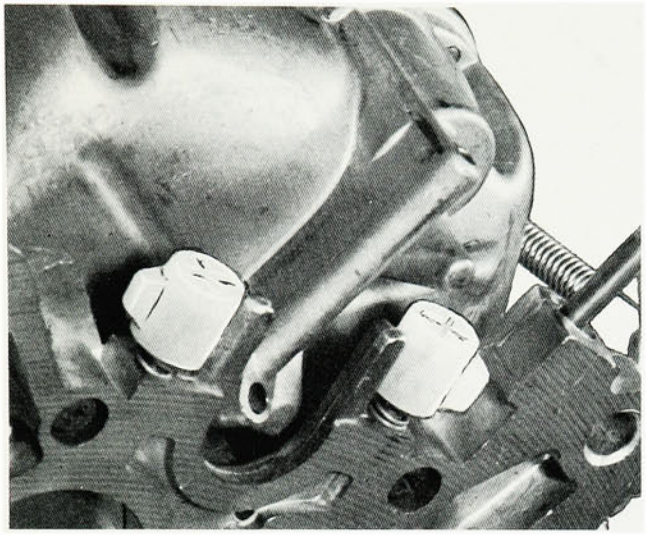

Fig. 2—External Idle Limiter

The addition of idle limiters doesn't relieve the service technician from the responsibility of adjusting engine idle speed and mixture. All the limiters do is prevent overly rich mixtures, which increase the amount of hydrocarbons emitted to the atmosphere. The service technician still must adjust engine idle. If performed in accordance with the procedures that follow, it should be no problem to keep customer's cars operating at peak performance . . . and within Federally-established limits for hydrocarbon exhaust-emissions.

IDLE FUEL MIXTURE ADJUSTMENT —ENGINE OFF

1. Preliminary Adjustment

External Limiters On all Autolite carburetors and Carter 4V carburetors, set the idle fuel mixture screw(s) and limiter cap(s) to the full counterclockwise position of the limiter cap(s).

Internal Limiters On Carter 1-V and Holley 4-V carburetors, establish an initial idle mixture screw setting by turning the screw inward until it's lightly seated. Then, screw it outward 1 to 1½ turns.

CAUTION: Never tighten an idle mixture adjusting screw against its seat. If the tapered tip of the screw is damaged, it must be replaced before a satisfactory mixture adjustment can be made.

2. Back off the idle speed adjustment screw until the throttle plate(s) seat in the throttle bore(s). Be sure the dashpot (if so equipped) is not interfering with the throttle lever. If the dashpot interferes, loosen the dashpot adjusting screw to allow the throttle plate to seat in the throttle bore. Also check to see that the hot idle compensator is seated on Carter 4-V, Autolite 4-V and on the crankcase ventilation valve tube on some 2-V carburetors.

3. Turn the idle speed adjusting screw (except Thunderbird and Lincoln) inward until it just makes contact with the screw stop on the throttle shaft and lever assembly. Then, turn the idle speed adjusting screw inward 1 to 1½ turns to establish a preliminary idle speed adjustment.

4. Turn the idle speed adjusting screw (Thunderbird and Lincoln only) *inward* until it lightly seats. Then, turn the screw *outward* 3½ turns.

5. Set the parking brake while making idle mixture and idle speed adjustments. On vehicles with a vacuum release parking brake, remove the vacuum line from the power unit of the vacuum release parking brake assembly. Plug the vacuum line, then set the parking brake. The vacuum power unit must be deactivated to keep the parking brake engaged while the engine is running with the transmission in "Drive".

IDLE ADJUSTMENT—ENGINE RUNNING

1. Attach an accurate tachometer to the engine.

2. Engine and underhood temperatures must be stabilized before idle adjustments are made. Run the engine at least 20 minutes at 1500 rpm. Position the fast idle screw on the intermediate step of the cam to hold this engine speed.

1968 CURB IDLE RPM

ENGINE	IMCO	THERMACTOR	
	Auto. Trans.	Auto. Trans.	Std. Trans.
CAR			
170 Six (1-V)	550		700
200 Six (1-V)	550		700
240 Six (1-V)	500		600
289 V-8 (2-V)	550		625
289 V-8 (4-V) H.P.		650	750
302 V-8 (2-V)	550		625
302 V-8 (4-V)	550		625
390 V-8 (2-V)	550		625
390 V-8 (2-V) Prem. Fuel	550		
390 V-8 (4-V)	550		625
390 V-8 (4-V) GT		550	700
427 V-8 (4-V)		600	
428 V-8 (4-V)	550		625
429 V-8 (4-V)	550		
462 V-8 (4-V)	550		
BRONCO, ECONOLINE AND F-100 - F-350 TRUCK			
170 Six (1-V)			700
240 Six (1-V)	500		600
289 V-8 (2-V)			625
300 Six (1-V)	500		600
360 V-8 (2-V)	550		625
390 V-8 (2-V)	550		625
MEDIUM AND HEAVY DUTY TRUCKS			
All Automatic Transmission			500 rpm
All Standard Transmission			525 rpm

Chart—Curb Idle Speeds—1968 Engines

NEW IDLE ADJUSTMENT

3. At the end of the engine warm-up period, connect a timing light and check initial ignition timing. Engine speed must be below 600 rpm to avoid erroneous readings due to partial advance of the distributor. Also disconnect and plug the distributor to the carburetor vacuum hose. (If the engine is equipped with a dual diaphragm distributor, disconnect both hoses (Fig. 3) and plug them). Also check the centrifugal advance mechanism.

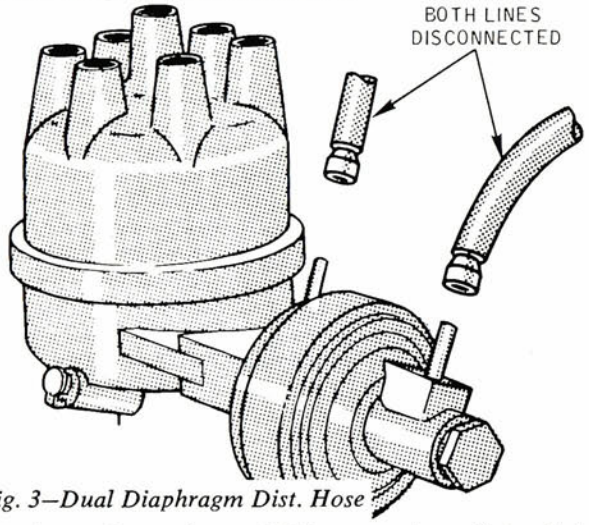

Fig. 3—Dual Diaphragm Dist. Hose

Accelerate the engine to 2000 rpm and see if the timing advances. If the timing advances, the centrifugal advance is functioning. Check vacuum advance by dropping engine speed to 1500 rpm and noting the degree of spark advance. Install the carburetor vacuum line (Fig. 4) and recheck the timing marks. With the hose connected, there should be *increased* vacuum advance.

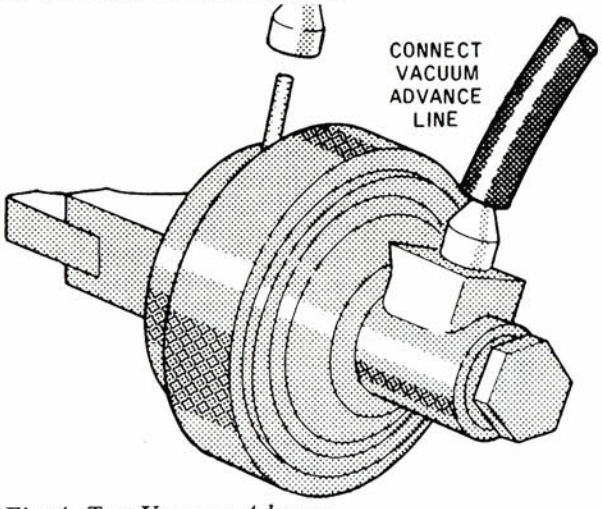

Fig. 4—Test Vacuum Advance

Check the vacuum retard on dual-diaphragm distributors by connecting the intake manifold vacuum line to the inner (retard) diaphragm side of the vacuum advance (Fig. 5). Operate the engine at normal idle speed and check the timing before and after this operation. If the retard diaphragm is functioning properly, the spark timing should retard (less advance) after the vacuum hose is connected.

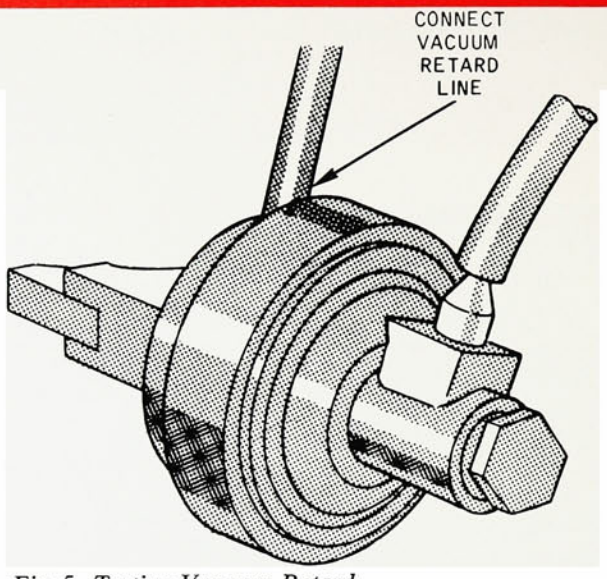

Fig. 5—Testing Vacuum Retard

4. Re-connect the distributor vacuum hose(s).

5. Check to make sure the carburetor choke plate is fully open. On carburetors with a hot idle compensator or where the idle compensator is in the crankcase ventilation hose, be sure the compensator is seated to allow proper idle adjustment.

6. Put a load on the alternator by turning on the headlights. If the car has air conditioning, turn it to maximum cooling (except 200 & 302-2V CID engines with automatic transmission).

Adjust these engines with air conditioner off. On cars with manual-shift transmission, the idle must be adjusted with the transmission in Neutral. On cars with automatic transmission, the shift lever must be in Drive. Set the parking brake while making adjustments. On vehicles with a vacuum release parking brake, remove the vacuum line from the power unit of the vacuum release parking brake assembly. Plug the vacuum line, then set the parking barke. The vacuum power unit must be deactivated to keep the parking brake engaged while the engine is running with the transmission in "Drive."

IDLE SPEED AND MIXTURE ADJUSTMENT

1. Adjust the engine curb idle speed to the specifications shown in the chart on page 3. On Thunderbird and Lincoln, readjust the idle air bypass screw as required to correct the idle speed. The tachometer reading should be taken with the air cleaner installed. If you can not adjust the idle speed with the air cleaner in place, remove it to make adjustments, *but always take the final idle speed tachometer reading with the air cleaner installed.*

2. Turn the idle mixture adjusting screw(s) inward in small increments to obtain the smoothest idle possible within the range of the idle limiter(s). On 2- and 4-barrel carburetors, turn both idle mixture adjusting screws inward by equal amounts to maintain balanced fuel distribution. *Check for smoothness with the air cleaner installed.*