

## Manifold Cleaning Caution On 1985-'96 Ford 1.9L VIN J Engines

Repeat piston failures have been reported after installing remanufactured 1985-'96 Ford 1.9L VIN J engines, according to the AERA Technical Committee. Foreign objects left inside the intake or exhaust manifold have caused damage in these situations when the engine is restarted. The debris has been attributed to improper intake manifold cleaning.

The intake manifold on this engine is a tuned port runner design, which has the plenum located below the runners. If these engines suffer piston failure and a piston separates into pieces, it's possible for some of these broken pieces to end up in the intake plenum or exhaust manifold. If any portion of those pieces remains following cleaning operations, they can be ingested into the engine any time after the engine is restarted. It may require wide-open throttle (WOT) to generate sufficient turbulence in the plenum to ingest the foreign objects.

AERA would like to caution all shop personnel on the importance of eliminating this possibility of contamination, which can cause a catastrophic engine failure.

Unlike other intake manifolds that can be blown out with an air hose to remove foreign objects, this intake manifold requires removal from the engine compartment. A thorough cleaning involves a liquid cleaner and repeatedly rotating the manifold end for end and upside down. The manifold should then be rotated and blown dry until no debris is present. This will dislodge any foreign objects in the

plenum and port areas. The same procedure should be followed for the exhaust manifold.

## Piston Oil Jet Removal & Installation Information For 1993-2002 Ford/Mazda 2.0L VIN A Engines

The 1993-2002 Ford 2.0L VIN A engine, built by Mazda, utilizes a cooling oil jet nozzle for each piston. The following information regarding piston oil jet removal and installation should be considered any time the crankshaft has been removed for service work.

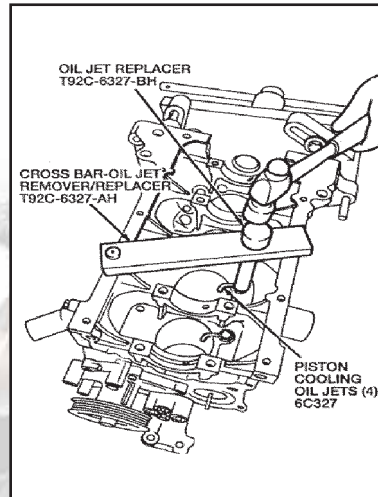
To facilitate easy removal and installation, special tools (p/n T92C-6327-AH and T92C-6327-BH) should be used (see **Figure 1**, right). It is also recommended that four new piston oil cooling jets (p/n 6C327) be installed as they're often damaged during removal. Some shops drill a small hole into the oil jet and then tap a screw into the hole, to which they attach a slide hammer for pulling the jet out.

During proper installation, each oil jet will align with each piston's taper cut-out. The jets are press-fit into the block with a minimum pressure of 726 lbs. (3.2 kN or 330 kgf). They also must be re-installed to a depth of .413"-.433" (10.50-11.00 mm) above the block mounting pad.

Caution: installation depth over specification can damage the oil jet nozzle. Pressure below specification indicates loose fit; replace the cylinder block and oil jet if that occurs.

## Valve Stem Seal Testing On 1995-2002 Ford 2.0L VIN 3 Engines

The AERA Technical Committee



**Figure 1** For easy oil jet removal/installation use these tools on Ford 2.0L engines

offers the following information on valve stem seal testing using a cylinder leakdown detector on 1995-2002 2.0L VIN 3 engines found in the Ford Contour. This valve stem seal leakage test is performed when tracing an oil consumption complaint.

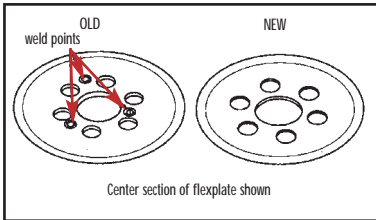
1) Plug all crankcase openings except the one used for connecting a cylinder leakdown detector.

2) Connect the cylinder leakdown detector to a crankcase opening (oil level indicator tube) and adjust the air pressure to 5 psi (34 kPa).

3) Remove the spark plugs and rotate the crankshaft slowly with a wrench. Check for large amounts of air escaping into the cylinders as each intake and exhaust valve opens.

4) To check for oil leaks, use a solution of liquid soap and water, brush the solution along the gasket sealing surfaces and bearing seals. Look for bubbles or foam.

Do not exceed 5 psi (34 kPa) or damage to the seals and gaskets will occur. The spark plugs



**Figure 2** Redesigned flexplate for 4.0L Ford engine.

on the leaking cylinders will probably show deposits of burning oil.

### Revised Front Cover Bolt Torque Specifications For 1996-'98 Ford 3.8L & 4.2L VIN 4 & 2 Engines

The AERA Technical Committee offers the following information concerning a revised bolt torque value for the front cover on 1996-'98 Ford 3.8L and 4.2L VIN 4 and 2 engines. Engine builders have reported engine coolant leakage at the front timing cover area. Most often a contaminated engine oil supply results as undesirable coolant mixes with the engine oil.

This leakage at the front timing cover gaskets seemed to be a problem on these engines after many engine temperature cycles. This condition showed up in the field after a few years of vehicle service and has resulted in this revised bolt torque to help cure the problem.

When replacing this gasket, do not tighten the front cover bolts to the torque value listed in existing manuals unless they say 20 ft.lbs. (28 Nm) for the stud/bolts and nuts. The socket head cap screws are the only fastener that has a different torque value, which is 16 ft.lbs. (22 Nm). Tightening these bolts to a higher torque value could crack the water pump housing.

As always, extreme care must

be exercised scraping the old gasket off, especially when replacing this gasket in the vehicle. Make absolutely sure none of the old gasket pieces or airborne dust enters the engine. Do not use any type of rotating air tool, cordless drill or similar tool with a scrubby pad or disc attached. Careful hand scraping is required when in this application or when the engine you are working on is an assembled unit.

### Cracked or Broken Flexplates On 1990-1996 Ford 4.0L VIN X Engines

Some 1990-'96 Ford vehicles equipped with 4.0L VIN X engines and automatic transmissions may exhibit an unusual noise or vibration during cranking. This condition may be caused by a cracked or broken flexplate.

To help reduce the possibility of this type of failure again, Ford has redesigned the flexplate and offers it as p/n F1TZ-6375-BA. The revised flywheel has increased strength in the area where cracking is most common as shown in **Figure 2**, top.

### 1997-2002 Ford 4.0L VIN E & K Valve Spring Revisions

The AERA Technical Committee offers the following information on a revised valve spring for 1997-2002 Ford 4.0L VIN E and K engines. Some vehicles equipped with this engine may exhibit a check engine light "ON" with diagnostic trouble codes (DTC) P0300 (Random Misfire) or P0301.

The DTC will set when the engine is operated at high rpms (4,800 rpm and higher). The misfire code results from higher than expected transient exhaust

system backpressure (under heavy acceleration) coupled with valve spring resonance points experienced at these engine speeds. This system interaction may cause the exhaust valve to hang open at engine speeds of 4,800 rpm and higher.

To help reduce this possibility, Ford has developed a revised valve spring for all intake and exhaust valves. After removing the valve covers, carefully replace the 12 existing intake and exhaust valve springs (p/n F77Z-6513-M) and replace with new service intake and exhaust valve springs (p/n 2L2Z-6513-AA).

All 12 valve springs (6 intake and 6 exhaust) must be replaced in order to maintain/ensure proper valve train dynamics.

Many machine shops report replacing the valve springs with the revised spring will help overcome any possible DTC's in the future after a valve job.

### Stripped Spark Plug Threads On 1991-2003 Ford 4.6L and 5.4L Engines

The AERA Technical Committee reports that spark plug threads on 1991-2003 Ford 4.6L and 5.4L engines have become damaged at a rate significantly higher than on other aluminum cylinder heads. It appears the number of threads used to retain the plug (as few as four) may be insufficient for continued long term use.

Since this design may limit the possibilities of different repairs, a solid insert offers the best opportunity of continued retention in the cylinder head casting. AERA says a hard-anodized aluminum insert currently being reviewed by the

Ford Motor Company for an authorized repair has been available for more than a year and has proven to be very durable.

These repairs are best made with the cylinder heads removed from the engine, and some AERA members report the engine may be removed and repaired in a timelier manner than trying to make the repairs with the engine installed. but reports of in-chassis repairs have been made.

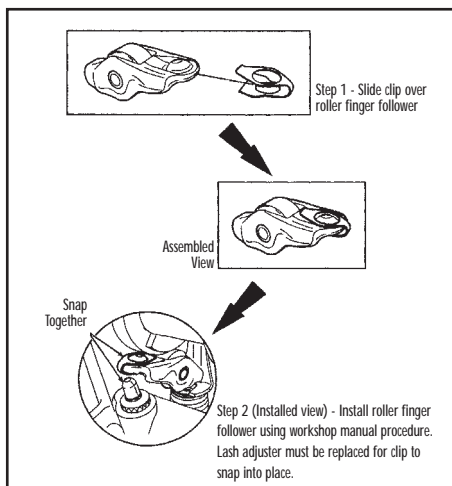
Most often, spark plugs remain installed in the engine for years at a time. Over time the threads may become almost locked to each other and the damage may occur when the plugs are hastily removed or reinstalled. It is recommended to always remove the spark plugs with the engine at room temperature after first allowing a penetrating fluid to soak the threads.

AERA has received reports of plugs that loosen while in service. In extreme cases, plugs may "blow out," taking the threads with them. This is one critical instance when the exact torque value of 11 ft.lbs. (14 Nm) is extremely important. Inspect all spark plug threads when rebuilding these cylinder heads.

### Startup Engine Miss On 1997-2000 Ford 4.6L 5.4L and 6.8L SOHC Engines

An engine miss or engine noise at start-up on 1997-2000 Ford 4.6L, 5.4L and 6.8L SOHC engines has been reported during cold ambient temperatures less than 10° F (-12°C), according to the AERA Technical Committee.

The cause of this noise may



**Figure 3** Inspect and replace any worn or damaged engine valve components and install new retaining clip and lash adjuster on Ford 4.6L, 5.4L and 6.8L engines.

be a roller finger follower(s) (RFF) being dislodged from the valve, which may cause damage to the camshaft, RFF, valve, retainer or other components.

Apparently, the clearance created in the lifters, at the locations with the valves remaining open when the engine is shut off, is sufficient enough to allow the dislodgement. Thicker oil during cold ambient temperatures may not allow fully pressurized oil to reach all locations during initial engine start-up. However, AERA recommends the following procedure be used to service this condition.

Inspect and replace any worn or damaged engine valve components and install new retaining clip and lash adjuster for service (**Figure 3**, above).

Perform normal engine diagnostic routines before opening valve covers. If the valve train is suspect, remove the valve covers and look for RFFs that may have become dislodged.

Inspect the following parts

that may have been damaged by any dislodged RFFs:

Cam lobes (chipped or grooved); valve stem tips (mushroomed, metal displaced, or bent); RFFs (chipped or grooved).

Inspect valve guide only if its corresponding RFF or valve stem tip is damaged. If follower(s) are damaged, replace as necessary, otherwise re-use followers in same location as removed from head.

Remove all intake and exhaust lash adjusters from the engine and replace with service-only lash adjusters (p/n YL3Z-6500-AA). Refer to **Figure 3**, left, for installation

of the new retaining clips (p/n YL3Z-6A539-AA), to the RFF.

The clip cannot be removed from the adjuster once it has been snapped into place. If the engine needs to be serviced at a later date, remove the RFF by bending up the clip. Leave lash adjuster in the engine with the clip while removing the follower. Then remove the lash adjuster from the head and snip/cut the clip from the lash adjuster. Replace with a new clip on the follower during re-installation.

### Mysterious Engine Overheating On 1999- 2003 Ford 5.4L Engines

The AERA Technical Committee offers the following information on engine overheating on 1999-2003 Ford 5.4L engines. Mysterious coolant loss and engine overheating on these engines has been reported numerous times. Cylinder head replacement has generally repaired this condition even though the location of coolant loss was never determined.





**Figure 4** Hole exposed after removing valve seat on 1999-2003 Ford 5.4L engines.

Coolant loss and eventual engine overheating may have been caused by a pinhole located underneath an exhaust valve seat insert. At the time of publication this condition has been traced to a cylinder head with the casting number F75E6090C20A.

The pinhole has been found most often in the number 6 combustion chamber. However, don't limit your inspection to only that cylinder as others may also be affected. Many AERA shops have repaired this pinhole condition by removing the exhaust valve seat and welding the pinhole area. The repair is completed by re-machining for a new seat insert and returning the cylinder head to service after the valve job is completed.

Careful examination is neces-

sary: no cracks are usually shown and pinholes are generally invisible to the naked eye. But in severe situations, as shown in **Figure 4**, left, they can be easily seen if you know where to look for them. When checking these heads for coolant leaks, pressure testing is mandatory.

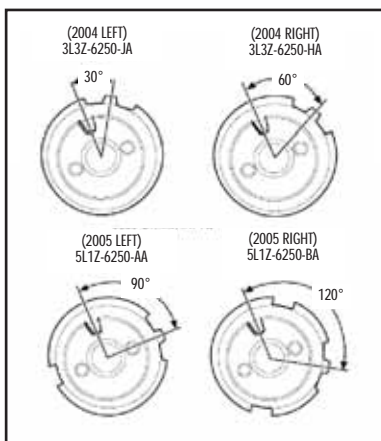
### Camshaft And Lash Adjuster Design Change On 2004-'05 Ford 5.4L, 3 Valve VIN 5 Engines

Because a camshaft and lash adjuster design change was made between the 2004 and 2005 Ford 5.4L 3-valve VIN 5 engines, using 2005 model year parts when servicing a 2004 model year or 2004 model year parts for a 2005 model year, the engine may exhibit noise on affected cylinders and engine damage may result.

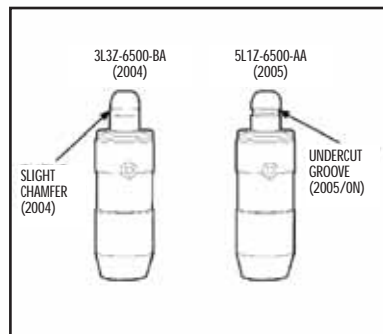
Camshaft differences between the 2004 and 2005 model years can be identified by the location of the variable cam timing phaser (VCT) pin notch in relation to the machining lug as seen on the end of the camshaft shown in **Figure 5**, left.

2004 and 2005 model year lash adjusters can be identified by the presence or lack of an identification groove cut into the lash adjuster boss shown in **Figure 6**, left. The 2005 model year parts will have this identification groove cut into the boss, while the 2004 model year parts will not.

You should always confirm the engine model year by checking the engine tag located on the valve cover. A 2004 model year engine will carry code 4G-992-AA and a 2005 model year will be identified as 5G-692-AA. **EB**



**Figure 5** Camshaft identification on 2004-'05 Ford 5.4L engines is made by location of the VCT pin. (Top) 2004 camshafts are shown; (Bottom) 2005 camshafts are identified.



**Figure 6** A groove in the lash adjuster on 2004-'05 Ford 5.4L engines will identify 2004 or 2005 components.