

# FORD

## Special Tools Needed to Install Ford 2.0/2.3L Duratec Crankshaft Pulley

Some 2001–2007 vehicles equipped with a Ford 2.0L or 2.3L Duratec engine may exhibit no start, loss of engine timing or a scraping noise in the crankshaft pulley at the front of engine. These engines, excluding 2.0L SPi and Zetec engines, may be damaged if the crankshaft pulley bolt is loosened incorrectly during service.

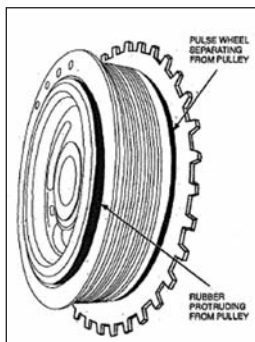
The crankshaft pulley bolt also retains the crankshaft cam drive sprocket which is NOT keyed to the crankshaft, so valve timing may shift if the crankshaft pulley bolt is loosened. If this occurs, the pistons may contact and damage the valves.

Before ANY repairs are made that require loosening or removal of the crankshaft pulley bolt, the engine's valve timing MUST be locked by using the special service tools detailed here. Do not attempt to start the engine without verifying engine cam timing.

### SERVICE TOOLS REQUIRED:

- 1) Crankshaft Timing Peg (ESST Number 303-507) is 2-1/8" (54 mm).
- 2) Camshaft Alignment Plate (ESST Number 303-465).
- 3) Holding Fixture (ESST Number 205-126).
- 4) Adaptor (ESST 205-072-02).

Inspect the crankshaft pulley for rubber protruding from the pulley (see **Figure 1**), loose pulse wheel, or bent tabs on pulse wheel touching the engine front cover. Replace dam-



**Figure 1** Inspect the crank 2.0/2.3L shaft pulley for rubber protruding from pulley, loose pulse wheel or bent tabs on pulse wheel touching the front cover.

aged crankshaft pulley with appropriate service kit for respective vehicle line.

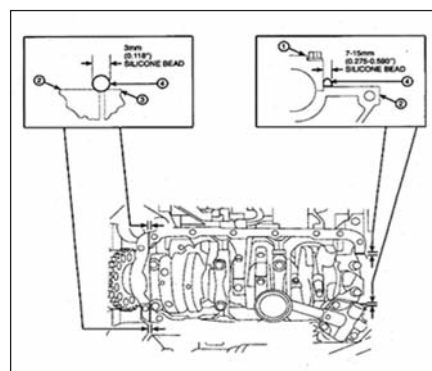
## Revised Ford 3.0L Oil Pan Gasket Identification and Replacement

A service oil pan gasket and a new service oil pan gasket kit (p/n 2U7Z-6710-AA) has been released for all Ford 3.0L-2V "Vulcan" engines built from 1986–2001. The revised gasket eliminates the need to attach the gasket to the block using contact adhesive, eliminating gasket creep during installation. Slightly longer fasteners have also been released and packaged in the kit. The old bolts must be replaced with the new ones.

The new gasket is installed by simply placing it on the oil pan (not gluing it to the block). The bolts still must be torqued twice during installation and once after the engine has reached operating temperature. The torque value for the bolts has not changed and is the same as listed in service manuals.

With the revised Oil Pan Gasket Kit follow this installation procedure.

1. Remove the oil pan and discard the old gasket and fasteners.
2. Clean and inspect both the oil pan and the engine block mounting surface. Carefully and thoroughly remove all traces of the old RTV sealant from the oil pan and engine block. Refer to the Workshop Manual for the correct metal surface cleaner.
3. Apply beads of Silicone Gasket and Sealant (p/n F7AZ-19554-EA or equiva-



**Figure 2** Apply beads of silicone gasket and sealant to the front cover and rear bearing cap-to-block parting lines of the revised oil pan gasket for Ford 3.0L engines.

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lent meeting Ford specification WSE-M4G323-A4) to the front cover and rear bearing cap-to-block parting lines (see **Figure 2**).

4. Install the gasket on the oil pan, being careful not to damage the plastic tabs.

5. Install the oil pan to the engine block with the new bolts packaged in the service kit. Hand tighten the fasteners. Note: The two corner bolts near the front of the engine are a different length.

6. Tighten the 4 corner bolts first to 106 in.lbs. (12 Nm)

7. Tighten the remaining 14 bolts from back to front (alternating from side to side) to 106 in.lbs. (12 Nm).

8. Check all the bolts by retightening to the same torque specs in the appropriate model year Service Work Shop Manual and discard the old gasket and fasteners.

9. Finish installing the oil pan with appropriate fasteners.

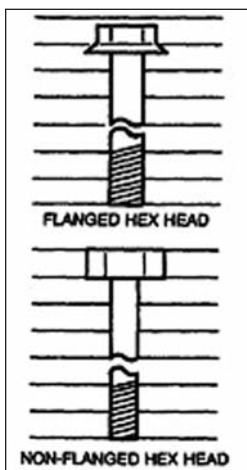
10. Refill engine with oil, start engine and allow it to reach operating temperature. The cooling fan should cycle at least one time. Stop the engine and retighten

(torque) all the oil pan bolts to 106 in.lbs. (12 Nm).

11. Inspect for oil leaks.

### Revised TTY Head Bolt Kit and Torque Procedures for 88-95 5.0L Engines

In 1992, the cylinder head bolts used on the 5.0L engines were changed to Torque-

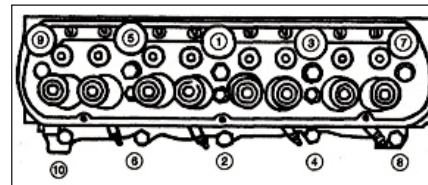


**Figure 3** Two types of head bolts for 5.0L engines.

To - Y i e l d

(TTY) style. Depending on the build date of the engine, the 1992 model year engines came with either TTY bolts or standard torque, not a combination of the two. In 1993, TTY bolts were used on all 5.0L engines.

The two



**Figure 4** Cylinder head torque sequence for flanged and non-flanged TTY head bolts on 1988-1995 Ford 5.0L engines.

types of bolts that are used are physically different as seen in **Figure 3**. The standard torque bolt is a non-flanged hex head bolt. The torque to yield bolt is a flanged head bolt. Both types of bolts may be used on any of the 5.0L engines however they must all be the same style on each cylinder head. Do not mix and match.

The TTY cylinder head bolts are available only in a packaged kit (F3ZZ-6065-E). The kit contains the following:

- (5) 7/16-14x3.94 bolts
- (5) 7/16-14x2.49 bolts
- (1) 3/8-16x7/16-3.93 stud
- (1) Instruction sheet (I.S. #6605)

Some applications use various quantities of studs for fastening items to the cylinder heads.

Torque Specifications:

For the non-flanged standard hex head bolts, tighten in two (2) steps as follows:

- 1) Tighten all bolts in sequence (see **Figure 4**) to 55-65 ft.lbs. (75-88 Nm).
- 2) Tighten all bolts in sequence (see **Figure 4**) to 65-72 ft.lbs. (88-98 Nm).

For all Torque-To-Yield hex head bolts, tighten in three (3) steps as follows:

- 1) Tighten all bolts in sequence (see **Figure 4**) to 25-35 ft.lbs. (34-47 Nm).
- 2) Tighten all bolts in sequence (see **Figure 4**) to 45-55 ft.lbs. (61-75 Nm).
- 3) Tighten all bolts in sequence (see **Figure 4**) an additional 1/4 turn (85-95 degrees).

Note: When the cylinder head bolts have been tightened following these procedures, it is not necessary to retighten the bolts after extended operation. However, used TTY bolts must be replaced with new bolts. Do not reuse TTY bolts.

### Identifying Differences Between Ford 351 Windsor and Cleveland Engines

One problem you may encounter when building Ford Windsor/Cleveland 351 (5.8L) cubic inch engines is interchanging or installing parts for the wrong engine. This is often caused by the lack of informa-

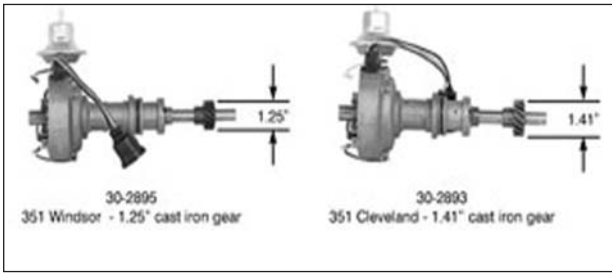
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**Figure 5** Ford 351 distributor differences: 351W has a smaller 1.245" diameter distributor gear, and the 351C has a larger 1.418" diameter distributor gear.

tion on Ford 351 engine differences. The most obvious external difference is the engine valve covers.

**Windsor 351 V8 Engine:**

1. Valve cover is held in place by 6 bolts.
2. Radiator hose connects to water neck on the front of the intake manifold.

The 351 Cleveland's radiator hose attaches to the radiator and connects directly into the front of the engine block. It makes a 90° bend from the radiator to the engine block.

**Cleveland 351 V8 Engine:**

1. Valve cover is held in place by 8 bolts.
2. Radiator hose is a 90° hose that connects directly to the top front of the engine block.

The distributors are also different as well. The 351W has a smaller 1.245" diameter distributor gear, and the 351C has a larger 1.418" diameter distributor gear (see **Figure 5**). Each engine has a 5/16" oil drive at the bottom of the shaft and a 1.557" diameter housing, measuring directly above or below the O-ring area.

*Tech Tip courtesy of CARDONE.*

**6.0L Diesel Cylinder Head Variations May Affect Interchangeability**

Ford has released information on a cylinder head gasket caution for 2003-'07 Ford 6.0L VIN P diesel engines.

According to Ford's TSB 06-24-4, some 2003-'07 vehicles equipped with a 6.0L engine may require the cylinder head to be replaced, while design changes can affect interchangeability between model years and service of 2003-'07 6.0L engines.

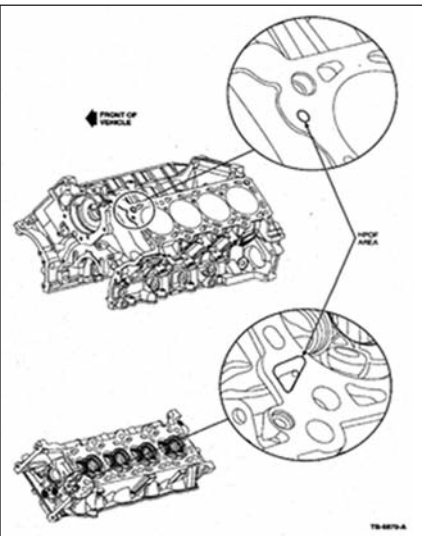
According to the bulletin, the manufacturer for this engine used two separate facilities. And, while both locations built engines with the same design data, three cylinder head variations have been used.

There are serial number dates to help determine which cylinder heads were used.

The cylinder head gasket and locating dowels also changed in the 2006 model year to accommodate the increase in the dowel size from 18 mm to 20 mm. Using the wrong head gasket for the

application will lead to engine damage.

The revised dowel hole was made to accommodate the larger head bolts to be used in the new 6.4L diesel engine and



**Figure 6** If there is a difference in dowel hole size between the 6.0L head and block, a special "stepped dowel" is available for proper assembly.

was commonized for manufacturing purposes. The injector clamp design and associated cylinder head casting support area also were modified on the changeover date in early 2006.

The cylinder head and block dowel hole sizes must be measured to determine the correct cylinder head gasket kit to be used. If there is a difference in dowel hole size between the head and block, a special "stepped dowel" (p/n 6C3Z-6B041-B) is available to accommodate proper assembly (See **Figure 6**).

Ford notes that the cylinder head gasket and injector clamp versions are not interchangeable; they must be used with the corresponding cylinder head versions. Refer to Ford's charts to determine the correct application. **TSG**



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