2003 Ford Mustang V8-4.6L SOHC VIN X
Vehicle > Technical Service Bulletins

ENGINE - CYLINDER HEAD STRAIGHTEDGE SURFACE CHECK

Article No.
02-21-13

10/28/02

ENGINE - STRAIGHTEDGE PROCEDURE FOR
CHECKING CYLINDER HEAD AND BLOCK FLATNESS

FORD:
1992-1997 THUNDERBIRD
1992-2003 CROWN VICTORIA, ESCORT, TAURUS
1995-2000 CONTOUR
1996-2003 MUSTANG
2000-2003 FOCUS
2002-2003 THUNDERBIRD
1997-2003 E SERIES, EXPEDITION, EXPLORER, F-150, WINDSTAR
1999-2003 SUPER DUTY F SERIES
2000-2003 EXCURSION
2001-2003 ESCAPE, EXPLORER SPORT TRAC, EXPLORER SPORT, RANGER

LINCOLN:
1992-2003 TOWN CAR
1993-1998 MARK VIII
1995-2002 CONTINENTAL
2000-2003 LS
1998-2003 NAVIGATOR
2002 BLACKWOOD
2003 AVIATOR

MERCURY:
1992-1997 COUGAR
1992-2003 GRAND MARQUIS, SABLE
1995-2000 MYSTIQUE
1997-1999 TRACER
1999-2002 COUGAR
1993-2002 VILLAGER
1997-2003 MOUNTAINEER

Article 02-20-2 is being republished in its entirety to update the measurements in the Service Procedure.

ISSUE

Aluminum cylinder heads and blocks require flatness checks prior to gasket installation to ensure the component

part is not out of factory specification. The surface quality (finish) of the cylinder head gasket surface is machined to close tolerances which enable an effective sealing joint for the MLS (multi-layered steel) gasket.

ACTION

Ensure all head gasket surfaces are clear of any gasket debris, RTV, oil, and coolant using Motorcraft Silicone Gasket Remover (ZC-30) and Motorcraft Metal Surface Prep (ZC-31). Use a lint free rag to mop up the deck surfaces. Shop vacuums are unacceptable for mop up as the cleaner is volatile. The block or head surface must be clean and dry before running a flatness check.

SERVICE INFORMATION

Use a straightedge that is calibrated by the manufacturer to be flat with 0.0002 inches (0.005 mm) per running foot length. For example, the straightedge may be 24 inches (61 cm) long. That means the machined edge must be flat within 0.0004 inches (0.010 mm) from end to end.

Special care is required to ensure the tool is not damaged in handling or storage. Be sure that the machined surface is free of nicks and dents. If these properties are found, the cost of tool re-calibration most likely will exceed the cost of a new straightedge. Machine shops may not be able to hold the specified tolerance within the original cost of the straightedge.

When checking for flatness, avoid running the feeler gauge butt end against the straightedge. This action will curl or warp the feeler gauge leaf and prevent entry under the straightedge. Erroneous readings will result.

Instead, lay the feeler gauge leaf on the suspect area, placing the straightedge on top of the leaf. A very easy pull or looseness of the leaf under the edge will indicate a depression in the surface. Turn the edge 90 degrees to the area just checked. Confirm any suspicion by checking the area more than one time.

Figure 1 demonstrates a 12 point check system using a grid format on a 4 cylinder bank. It is important to note that a localized area of approximately 1.0 to 20 sq.in. will influence the effectiveness of the MLS gasket sealing capability. Depressions or marks measured to be over 0.001 inch deep will not seal properly. The overall flatness check (head end to other end) is not as critical.

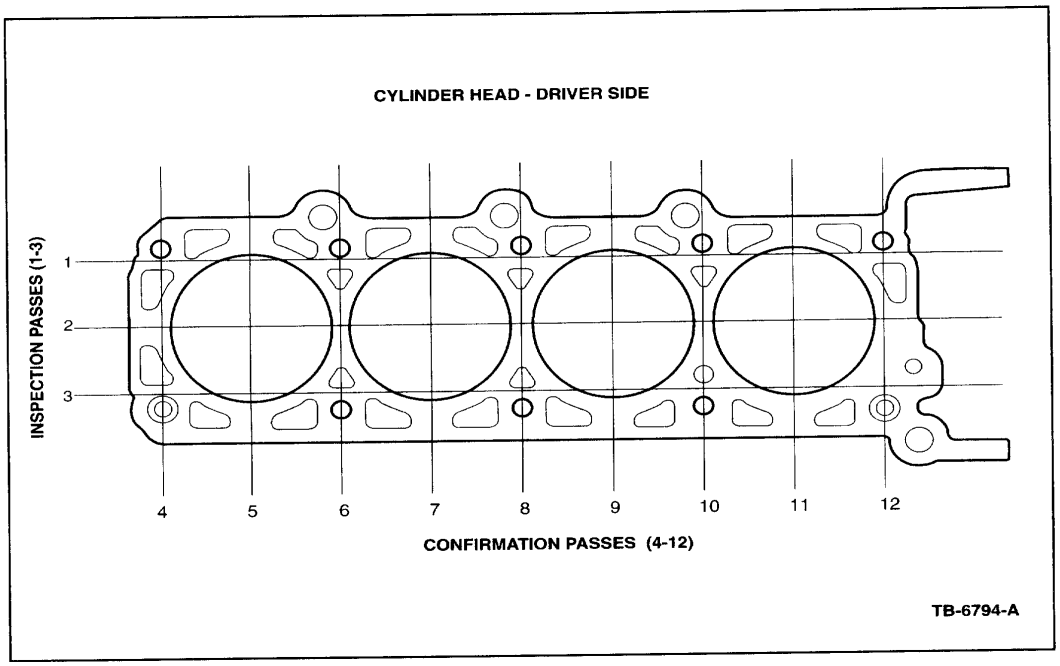

Figure 1

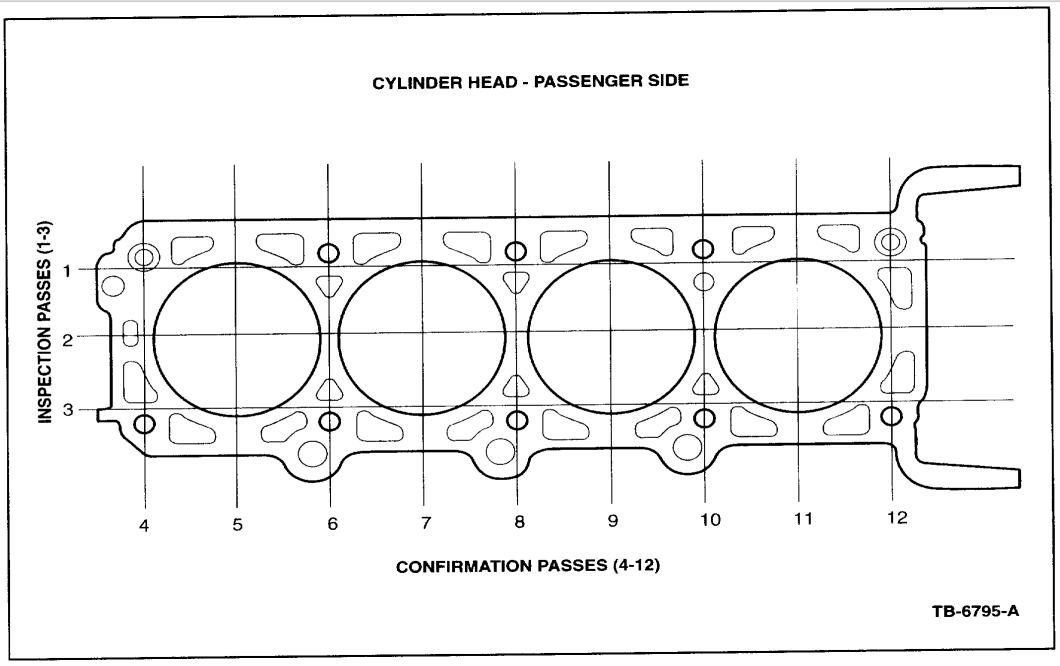

Figure 2

As shown with Inspection Planes 1 through 3 (Figure 1), check these areas locally with the gauge looking for suspect depression areas of 0.001 inch or more. Then, check these same areas again, perpendicular, using Confirmation Planes 4-12. The second pass will confirm a suspect area because you are using a shorter span of the straightedge. The first pass (Planes 1-3) is necessary because the overall end to end flatness must be accounted for before doing the secondary passes, Planes 4-12. The second pass will confirm a suspect area because you are using a shorter span of the straightedge. The first pass (Planes 1-3) is necessary because the overall end to end flatness must be accounted for before doing the secondary passes, Planes 4-12.

Ford Motor Company approved straightedges are commercially available through the Rotunda Tool Catalog at

special pricing, or can be purchased from the local tool distributor or truck at regular pricing. This edge meets or exceeds the requirements of testing Ford engine components.

OTHER APPLICABLE ARTICLES: 02-2-3, 02-1-4, 01-21-10
SUPERSEDES: 02-20-2
WARRANTY STATUS: INFORMATION ONLY
OASIS CODES: 401000, 402000, 403000, 499000

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