



Cylinder Head Reuse And Replacement Guidelines - Inspection And Information - US04 And Newer Emissions, Commonly 2007 And Newer Model Years



> Internal Content

This guide will cover reuse guidelines for several checks that may normally not have a clear appearance of failure. It is not meant to replace or eliminate any of the normal checks performed when a head or head component failure is suspected. The head should be thoroughly inspected and this guide used if there is any question of the reusability of any of the components described below:

A. General Inspections

1. The following items will require replacement of the Cylinder Head:

- Any cracks in the head
- Damaged or excessively worn valve seats
- Damage caused by rotated valve springs
- Fretting or wear under the head bolt flange contact area. **Witness marks are acceptable.**
- Fretting of the camshaft bearing housings
- An example of a fretted surface can be found below:



NOTE: Welding or metal stitching of any part of the cylinder head is not an approved repair.




B. Injector Bore Seats

1. Inspect the Injector Bore Seats. Refer to the tables below for guidelines:

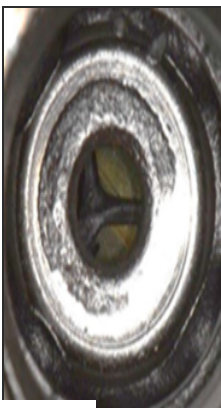
Acceptable For Reuse:



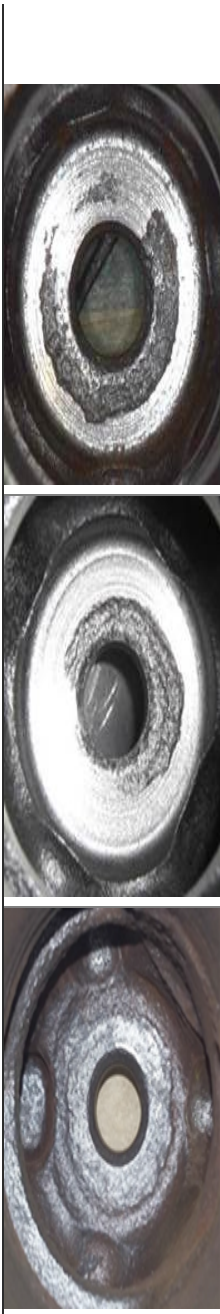
- Small blemishes toward center of seat area
- Seat surface is still even (level) from center hole to outer

	<p>circumference</p> <ul style="list-style-type: none"> • Center hole is still circular • Edge around chamfered surface on center hole is intact
	<ul style="list-style-type: none"> • Wear present toward center of bore surface • Seat surface is still even (level) from center hole to outer circumference • Center hole is still circular (This picture was taken at an angle to better show surface features. The center hole is still round) • Edge around chamfered surface on center hole is intact
	<ul style="list-style-type: none"> • Blemish on bore surface not distorting the edge around the chamfered surface of the center hole • Normal wear present toward center of bore surface (narrow band of minor corrosion/pitting is acceptable) • Center hole is still circular • Edge around chamfered surface on center hole is intact

Replacement Required:

	<ul style="list-style-type: none"> • Heavy corrosion/pitting into a significant portion the seat surface, rough and recessed below machined surface • Center hole out of round • Edge of chamfered surface of center hole compromised
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Live UI



- Heavy wear causing unevenness of the bore seat (Outer surface is higher than that around the center hole)
- The ring visible toward the center of the seat surface marks seat erosion from the ring to the center hole.
- Presence of combustion bypass

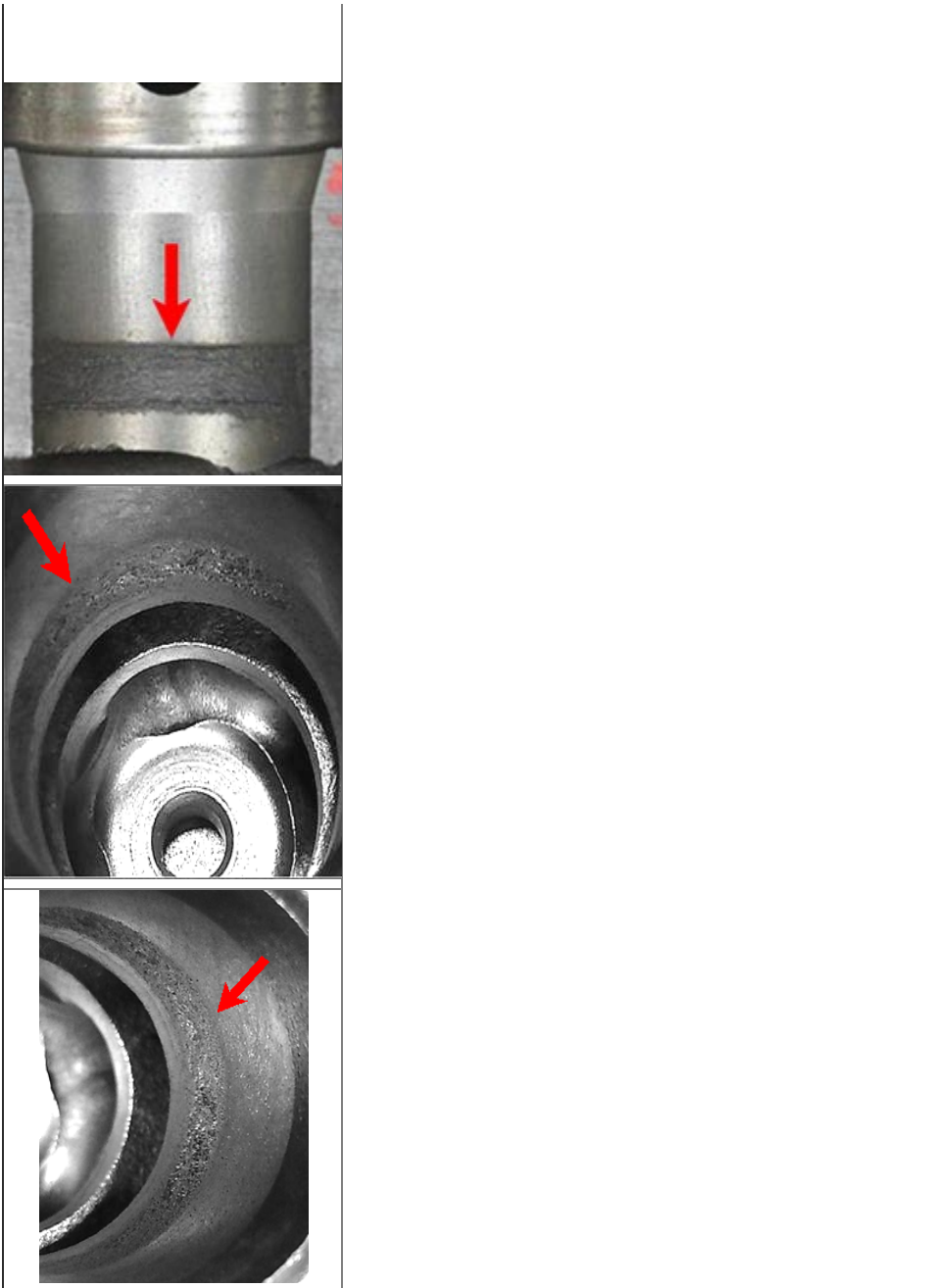
C. Injector Bore Walls And Injector Sleeve O-Ring Sealing Surface

Corrosion or pitting of the Injector Sleeve O-Ring sealing surface may allow mixing or passage of fuel and coolant.

1. If the sealing surface for the Injector Sleeve O-Ring appears to be pitted or corroded, refer to the chart below for examples that require replacement:

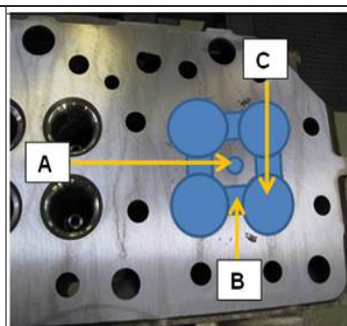
	<ul style="list-style-type: none"> • Excessive corrosion/ pitting present at o-ring sealing surface
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Live UI

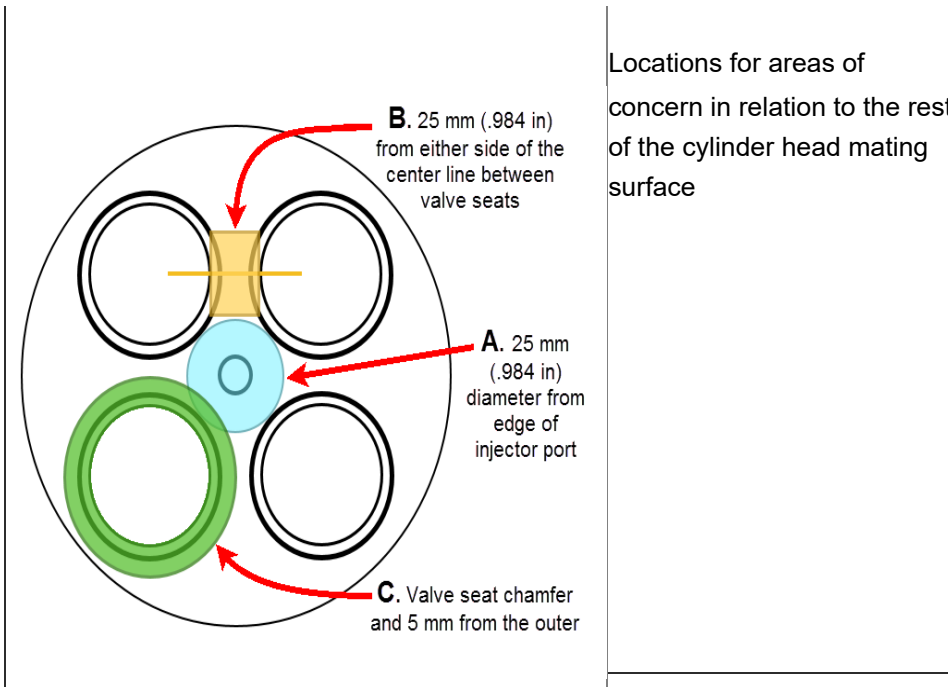


D. Cylinder Head Mating Surface, Cylinder Combustion Face

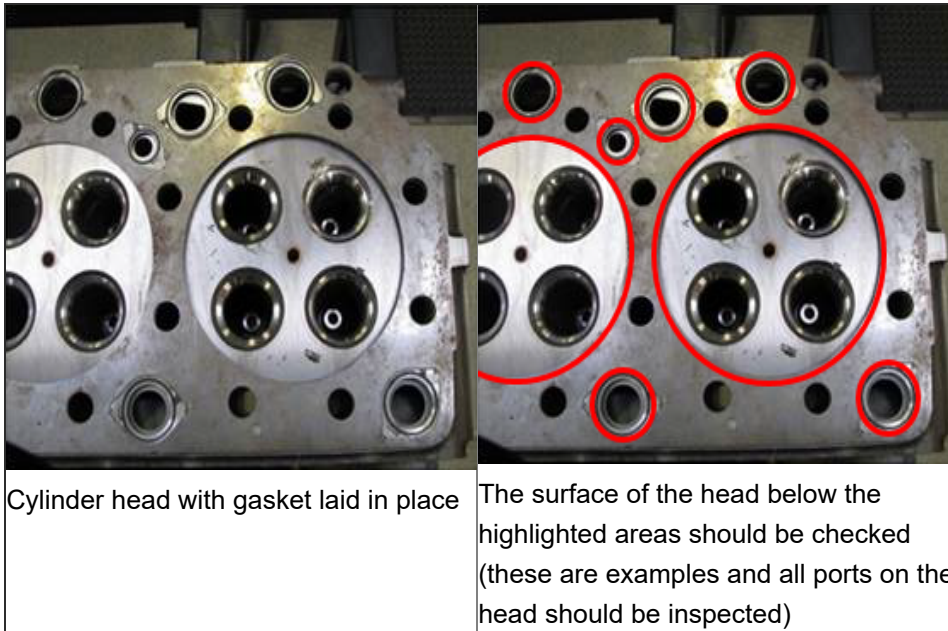
1. The valve seats and injector ports should be inspected. There should be **no marks** in the areas indicated below:



Live UI



2. Lay a Cylinder Head Gasket on the cylinder head surface. The edge of each opening around any ports or passages (area underneath each red circle in the picture below) is considered a sealing surface. **There cannot be any damage or corrosion present in any of these areas.**



Cylinder head with gasket laid in place

The surface of the head below the highlighted areas should be checked (these are examples and all ports on the head should be inspected)

3. Marks up to a depth of 1 mm (.040 in) are acceptable on any area of the head surface **asid**

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