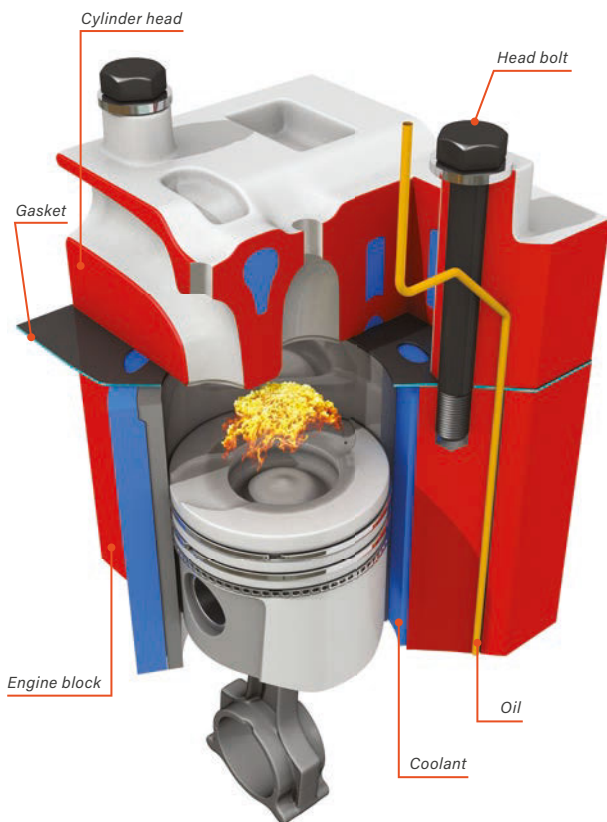


Understanding cylinder head bolts

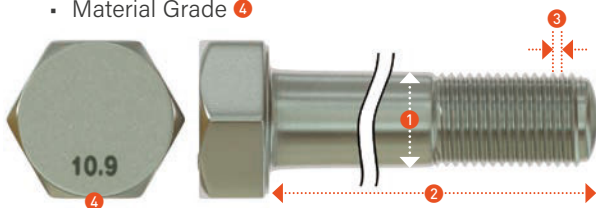
CYLINDER HEAD BOLT FUNCTION

The purpose of the cylinder head bolts is to generate sufficient clamp load for the head gasket to seal gas and fluids.



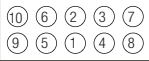
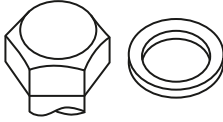
IMPORTANT BOLT DIMENSIONS:

- Major diameter ①
- Length ②
- Thread pitch ③
- Material Grade ④



FITTING PROCEDURE

The effective generation of bolt load is critical to the sealing of the cylinder head gasket. Approximately 80% of the effort put into turning a head bolt is just to overcome friction. The remaining 20% generates the clamp load.

Space 2.0 J5R 88 x 4 x 1995	HBS116 1 = 50 Nm 2 = 80 Nm 3 = 90° 4 = 93 Nm	
Traffic 2.0 J5R 88 x 4 x 1995	M12 x 1.50 x 243 (10)	
Master 2.0 J5R 716/722/726/720 88 x 4 x 1995		

M12 X 1.50 X 243 (10)

If the bolt is not turned enough an inadequate load level will be generated. However if the bolt is turned too far into yield the bolt is likely to fail.

BOLT TIGHTENING METHODS

Traditionally, cylinder head bolts were tightened using a measured amount of torque in several steps. It is now more common for a combination of torque and angle tightening to be used. This generates a more consistent amount of bolt load since it is independent of the friction conditions.



DON'T REUSE HEAD BOLTS!

This could lead to inadequate load generation due to:

Rusty bolts



Damaged bolt threads



Corrosion



Stress corrosion cracking



Previous overtightening

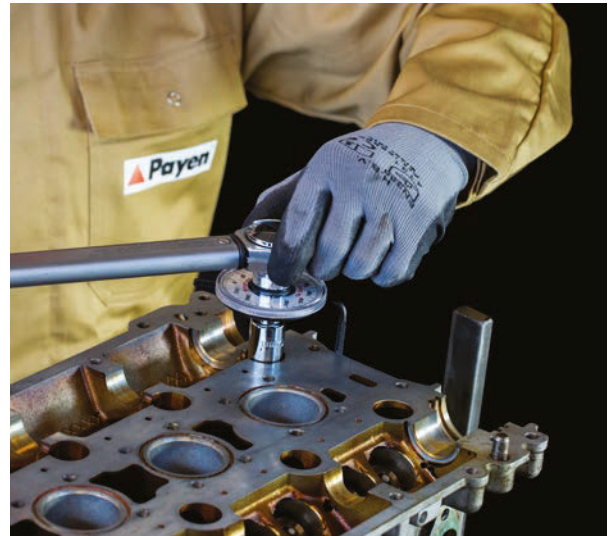


Previously yielded giving permanent extension and plastic deformation



PAYEN TIPS & TRICKS

- Inspect bolts for damage.
- Clean and lubricate or seal threads as recommended.
- Inspect bolt hole threads and depth.
- Blind bolt holes should be dry at the bottom.
- Ensure that the joint surfaces are clean and free of oil.
- Torque the bolts using the recommended sequence.
- Stop pulling the torque wrench when it clicks.
- Use a degree wheel when required.
- Verify the accuracy of the torque wrench regularly - certainly after it has been dropped!



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