Main Bearing Housing Bore For Caterpillar 10.0 & 12.0L C10 & C12 Diesel Engines

Originally published specifications regarding the main bearing housing bore for Caterpillar 10.0 and 12.0L C10 and C12 diesel engines were apparently inaccurate, so review this information carefully.

Standard Main Housing Bore
4.5844″-4.5856″
(115.925mm-115.975mm)

Oversize Main Housing Bore
4.5640″-4.5659″
(116.445mm-116.471mm)

Although some machine shops have reported a discrepancy while measuring main housing bores for these engines, no apparent bearing damage existed even though the measured sizes were consistently .002″-.003″ smaller than the published specification.

Caterpillar also offers .020″ (.508 mm) oversize OD main bearings for these engines to repair severely damaged bores. Refer to the chart above to determine the proper machining dimensions for the above engines.

At this time, we are unaware of an aftermarket source for main bearings for these engines.

Main Bearing Housing Bore Caution For 1997-2007 Caterpillar C15 Diesel Engines

Oversize main bearing bores have been reported during engine rebuilding operations on 1997-2007 Caterpillar diesel engines.

To allow additional salvage operations and block reclamation the Caterpillar Corporation does offer an oversize .025″ (.635 mm) outside diameter bearing set. Caterpillar also offers main bearing sets for oversize bore bearings in both standard and .025″ (.635 mm) inside diameters (see chart below).

To determine if a block you're checking has the oversize bores, use the following procedures:

1) Install main bearing caps in original positions.

2) Lubricate cap bolt threads and bolt head contact surfaces with a small quantity of thread lubricant 2P2506.

3) Install and tighten main cap bolts on the left side to 180-200 ft.lbs. (246-274 Nm).

4) Install and tighten main cap bolts on the right side to 180-200 ft.lbs. (246-274 Nm).

5) Tighten the main cap bolts on the right side by rotating them an additional 120º.

6) Tighten the main cap bolts on the left side by rotating them an additional 120°.

7) Measure bores with a dial bore gauge which has a dial indicator calibration in .0001″ increments.

8) Record your measurements and compare to the standard main bore diameter specification of 5.1133″-5.1143″ (129.878-129.903 mm).

If the block you are checking is larger than the above standard specification, compare it to the oversize dimension of 5.1383″-5.1393″ (130.513-130.538 mm). If there is a need to resize, it is recommended to go to the oversize, rather than repairing by align boring back to standard dimensions.

Coolant Loss On 1985-2000 Cummins 5.9L Diesel Engines

The following information regarding coolant loss on Cummins 5.9L diesel engines is known to apply to 12 valve engines, but this condition is certainly a possibility for 24 valve engines as well.

Cylinder porosity has been reported in the front cylinder toward the intake manifold side of the engine. This porosity concern was not a result of an unconditioned cooling system. In this instance the condition was not revealed until oversize cylinder boring was performed. The amount of oversize was the first oversize available, .020″ (.5 mm).

One way of determining if this condition is present on an oversize bore engine is to pressure test the cylinder block after all honing operations have been completed.

Revised Cylinder Head Bolt For 1985-1996 Cummins 10.0L, L-10 Diesel Engines

A revised cylinder head bolt has been introduced for for Cummins 10.0L, L10 diesel engines.

This change has been implemented as a product improvement to address cap screw corrosion failures. The cap screw (head bolt) was first used with engine serial number 35124397. The old and new cap screws can be intermixed within the engine.

The new cap screws have a grey coating on them and do not have the <90° marking on the head of the cap screw.

The cap screws should also be checked for stretch using a set of calipers. The maximum allowable free length is measured from the bottom of the flange head to the end of the cap screw.

The new long cylinder hex head flange cap screw (p/n 4923187) that supersedes p/n 3045850.

Part #	Description	Oversize OD	Inside Diameter
4W5700	Main Bearing	.025″ (.635 mm)	Standard inside ID
4W5701	Main Bearing	.025″ (.635 mm)	.63 mm undersize inside ID

Caterpillar main bearing sets.

Cylinder Head Cap Screw Free Length	mm	inch
3045849 Short Intake Port Cap Screws	74.5	2.933″
3045850 Long Hex Head Cap Screws	139.5	5.492″
4923187 Long Hex Head Cap Screws	139.5	5.492″

Cummins 10.0L cylinder head cap screw chart.

Valve & Valve Guide Caution For Cummins 11.0L ISM, M11 & QSM Diesel Engines

Engine builders are cautioned that 11.0L M11, IAM and QSM Cummins diesel engines have valves and valve guides that may be incompatible. As a condition of a product improvement, Cummins implemented chrome intake valve stems and a reverse scroll valve guide for all locations beginning with engine serial number (ESN) 35135680 built in July 2005.

These reverse scroll guides were implemented to prevent excess exhaust valve guide wear in the lower portion of the valve guide inside diameter. The reverse scroll guide has 50 percent more surface area in the lower portion of the valve guide inside diameter.

New P/N	Description	Old P/N
4926069, 4955239	Intake Valve	3417778
4923471	Standard Valve Guide	3328786
	Valve Kit	3800636
4923473	Oversize Valve Guide	3417559

The valve guides are the same for the intake and exhaust valves. Engines prior to ESN 35135680 were built with chrome plated exhaust valve stems and non-reversed scroll valve guides. To accommodate the change in the valve guides, it was required that the intake valve stems also be chrome plated to prevent excess wear on the intake valve stem. The chrome plated intake valve stems were released a month before the release of the reverse scroll valve guides in order to prevent usage of non-chrome plated valve stems with the reverse scroll guides. Do not use intake valves from prior serial number engines in cylinder heads with reverse scroll vale guides.

Intake valves with chrome plated valve stems, p/n 4926069 or 4955239, must be used on cylinder heads which have the reverse scrolled valve guides, p/n 4923471, or reverse scrolled oversized valve guides, p/n 4923473.

Either chrome plated intake valve, p/n 4926069, or non-chrome plated intake valve, p/n 3417778, can be used on cylinder heads which have the non-reverse scrolled valve guides, p/n 3328786.

Reverse scroll valve guides can be identified by the inner threading (spiral) of the guide at the top end, as opposed to no threads (spiral) on the non-reverse scroll guides.

Cylinder Head Installs For 1986-2004 Cummins 14.0L N, NT & N14 Diesel Engines

Because different cylinder head bolts have been used in Cummins, 14.0L N, NT and N14 diesel engines, the installation procedures may be different depending on the age of the head.

This service parts topic provides the correct procedure to tighten the cylinder head gasket cap screws (**Figure 1**, page 31). Information about the different cylinder head bolts have been used as described previously in AERA Technical Bulletin TB

683. There is a difference between procedures of cylinder heads manufactured before and after January 1991.

Pre-1991 Cylinder Heads

When tightening the head bolts on N Series engines built before January 1991 and using head bolt, p/n 209700 or 3013623, the following procedure should be used.

Torque Value (Step):
1) 50 ft.lbs. [68 Nm]
2) 175 ft.lbs. [237 Nm]
3) 184 ft.lbs. [251 Nm]
4) Rotate all headbolts in sequence 90 degrees clockwise, at least one flat, but not more than two flats.

Head bolts part numbers 209700 and 3013623 can be identified by an "NT" or "NTC" stamped on the head of the bolt.

1991 and Later Cylinder Heads

When tightening the head bolts on N Series engines built in January 1991 and later, and using head bolt, Part No. 3071161, 3068897, or 3068898, the following procedure should be used.

Torque Value (Step):
1) 100 ft.lbs. [136 Nm]
2) 220 ft.lbs. [298 Nm]
3) Rotate all headbolts in sequence 90 degrees clockwise, at least one flat, but not more than two flats.

Head bolt part numpers 3071161, 3068897 and 3068898, can be identified by a "<90" stamped on the bolt.

Head Gasket Change On Cummins ISX Signature 600 Series Engines

A revised cylinder head gasket for the Cummins ISX Signature 600 Series engines. has been introduced and engine builders should be aware of the differences.

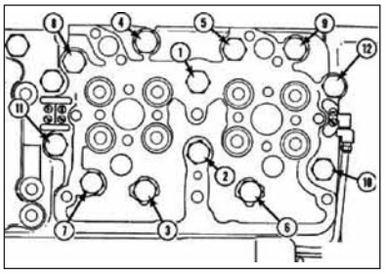

Figure 1 Cylinder head torque sequence for Cummins, 14.0L diesel engines.

The cylinder head gasket (p/n 4926316) contains two individual pieces, one for the high pressure oil supply and one for the low pressure oil return.

The old cylinder head gasket (p/n 4059350) included a one-piece steel carrier for the high pressure supply and low pressure oil return (**Figure 2**, page 32). The old gasket has been made obsolete and superseded by the new one (**Figure 3**, page 32).

The first engine serial number (ESN) for the new cylinder head gasket is 79156618, built on January 20, 2006.

Connecting Rod Caution For 1998-2002 Detroit Diesel 40 Series 7.6L Diesel Engines

The connecting rods for 1998-2002 Detroit Diesel 40 Series 7.6L diesel engines may have pin bushings machined offset, so engine builders

Figure 2 Cummins ISX 600 Series - Old head gasket.

Figure 3 Cummins ISX 600 Series - New head gasket.

are cautioned to check rod lengths carefully.

It is believed this occurred to re-establish the intended center-to-center length (8.638″-8.642″ (219.405-219.507 mm) of the connecting rod. The reported offset has been to the rod big end, thus shortening the rod as measured without the bushing installed.

While it is common practice for some machine shops to hone fit connecting rod bushings after installation. That process does not allow for adjustment of the center-to-center length of a connecting rod. If this method of piston pin fit is used, excessive piston protrusion may result, allowing piston to cylinder head contact if the engine is started.

Rocker Shaft Disassembly Caution For 2000-2007 Mack 11.0L MP7 & MP8 Diesel Engines

When disassembling the rocker shaft for 2000-2007 Mack 11.0L MP7 and MP8 engines you must pay attention to engines equipped with the PowerLeash™ engine brake. In this system the exhaust rocker arm incorporates an integral engine brake valve and piston.

When removal of the rocker shaft is necessary, the pistons must be retained to keep them fully retracted in the bores. Suitable tie wraps or mechanic's wire can be used to secure the pistons in place.

Failure to secure the engine brake piston before removing the rocker shaft assembly will allow the piston to drop from the bore as the shaft is removed. Should this occur, it may not be noticed, or it may be difficult to push the piston fully back into the bore.

Additionally, plungers are a match-fit to the rocker arm, and inadvertent mix-up of components must be avoided. Assembling the rocker shaft to the engine or operating an engine with the engine brake pistons not fully retracted will result in breakage of valve train components and significant engine damage.

Note: The tie wraps or mechanic's wire must be removed only after the rocker shaft has been reinstalled on the engine. **TSG**