



IPD Technical Bulletin: **Introduction: Caterpillar® C7 Engines**

This popular engine was released in 2003, and now has a total production of over 300,000 units. With a range from 190hp to 360hp, this mid-range six cylinder engine is very versatile. This popular engine can often be found in on-highway trucks, and also in off-highway applications such as loaders, skidders, excavators, motor graders, and industrial and marine units. It is actually a 7.2 liter (439 cu. in.) engine with a 4.33" bore (110mm) and 5.0" stroke (127mm).

Cylinder Head

The single cylinder head is similar to the late 3126B heads, with 3 valves per cylinder (1 exhaust valve & 2 intake valves). The electronically-actuated injectors are located between the three valves. A common push rod and rocker arm design operates the valves, driven from a camshaft located in the cylinder block. The head is a cross flow design, with the intake ports located on the left side, and the exhaust ports on the right.

Cylinder Block

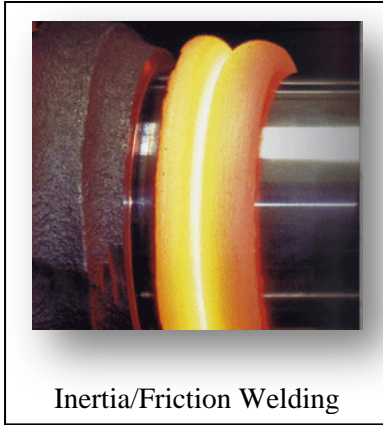
The cylinder block has "parent" bore cylinders, meaning it does not have replaceable liners, but the cylinders can be sleeved if necessary. Before boring the cylinder block to accept repair sleeves, follow the OE guidelines to ensure that the block is salvageable. One guideline in particular explains that the cylinder block should be measured with a digital disc brake caliper to determine if the cylinder wall thickness is thick enough to accept a cylinder repair sleeve.

Insert the thinner leg of the caliper approximately 1.25" into the water passage at the front between of each cylinder. The block must be a minimum of 0.170" (4.3mm) for the block to be salvageable. The use of a stress plate is also recommended for measuring & honing the cylinder diameters.



Pistons

Although several different piston part numbers are used in these engines, two distinct design differences are important to note. Depending on the application, the engine may have aluminum or steel (one-piece) pistons. The one-piece steel piston design is produced by inertia/friction welding a steel crown to a steel piston skirt. This design creates a piston with an internal oil cooling gallery in the crown, and increased structural strength and resistance to fatigue.



Inertia/Friction Welding



Internal Oil Cooling Gallery



One Piece Piston

Gear Train

The front gear train drives the camshaft, oil pump, accessory drives, and the high pressure fuel pump for the common rail fuel system.

Fuel System

The common rail fuel system operates under extreme pressure. The transfer pump that draws fuel from the fuel tank and supplies the fuel pump, produces 280 psi (+/- 15psi). The high pressure fuel pump delivers fuel to the fuel rail at approximately 27,500 psi, and supplies the hydraulic electronic injectors.

In summary, this technical bulletin provides overview information on C7 engines, including general information on selected engine component groups that may be involved in service repair and maintenance processes. Overall, C7 engines are growing in popularity within the rebuilding or repair markets.

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