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Engine Failure and Close-Coupled Cat Converter Information For 2004-2007 GM Vehicles

While GM vehicles using close-coupled catalytic converters may provide improved vehicle emissions at cold ambient temperatures, they present a possible concern if engine failure occurs.

Certain 2004-2007 General Motors products may be equipped with a new style of catalytic converter, technically known as the close-coupled catalytic converter (**Figure 1**, below), providing quick catalyst warm-up resulting in lower tail pipe emissions earlier in the vehicle operating cycle.

If an engine breakdown or non-function were to occur (such as broken intake/exhaust valve or piston), debris may be deposited in the converter through the engine exhaust ports. If the engine is non-functioning due to severe overheating, damage to the ceramic "brick" internal to the catalytic converter may occur. This may result in ceramic debris being drawn into the engine through the cylinder head exhaust ports.

If a replacement engine is installed in either of these instances, the replacement engine may fail due to the debris being introduced into the combustion chambers when started.

Therefore, when replacing an engine, an inspection of the catalytic converters and ALL transferred components (such as exhaust/intake manifolds) should be performed. Any debris found should be removed. In cases of engine failure due to severe overheating, installers should also inspect each catalytic converter for signs of melting or cracking of the ceramic "brick." If damage is found, the converter should be replaced.

Engine Misfire on 2004-2007 GM 1.6L Engines

Some customers may comment on an intermittent engine misfire on GM vehicles using the Eco-Tec II 1.6L four cylinder engine (VIN 6 - RPO L91) found in 2004-2007 Chevrolet Aveo and 2005-2007 Pontiac Wave (Canada Only). Typically, misfires related to this valve sealing concern will be very intermittent and may or may not be felt by the driver. They will normally occur during engine warm up, deceleration, highway driving, wide open throttle acceleration, and/or uphill driving

The engine misfire may be experienced due to a valve sealing condition. If this concern has been noticed and it has been ongoing, a previous GM repair involving replacement of only intake valves and seals may have been performed.

The current recommended repair is to replace all valves and seals with the part numbers shown in the table below if they have not been replaced previously by GM.

Part Number	Description
96440081	Intake Valve
96830500	Exhaust Valve
968401022	Valve Stem Oil Seal

Oil Leak at Front of Engine on 2004-2007 GM 1.6L VIN 6 Engines

An oil leak at the front of the engine on 2004-2007 GM 1.6L VIN 6 engines may be troubling to customers, especially if the oil is leaking out of the oil pump area.

The oil pump-to-engine block gasket may leak near the top of the oil pump assembly, resulting in a leak that spreads oil on the front of the engine and oil pump. Technicians may misdiagnose the source of the leak and unnecessarily replace the oil pump along with the gasket if they are unable to determine the exact location of the oil leak.

The oil pump gasket may develop a crack that cannot withstand high oil pressure under operating conditions. GM has developed a new metal-reinforced oil pump gasket (p/n 90573301) that should be used anytime the oil pump is removed (**Figure 2**, page 8). RTV sealant should not be used when installing a new gasket.

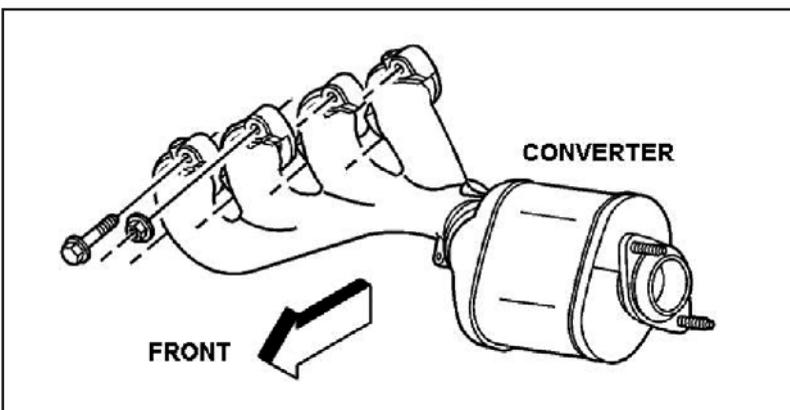


Figure 1 Close-coupled catalytic converters on GM vehicles may become damaged after certain engine failures.

Cylinder Head Replacement For 1996-2005 GM 3.4L VIN E Engines

Any time you are replacing a cylinder head on 1996-2005 GM 3.4L VIN E engines the following information should be reviewed.

To date, there have been two different rocker mounting bolts used to secure the non adjustable rockers to the cylinder head. While the cylinder heads are otherwise interchangeable, the rocker arms and bolts may not be.

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Figure 2 GM has developed a new metal reinforced oil pump gasket for 2004-2006 1.6L engines.

There is at least one cylinder head casting number that has been manu-

Head Casting Number	Bolt Design	Rocker Arm Part Number
24507487, 12568234, 12580234	8mm	12576628
24507487, 10218170	10mm	24504436

factured with both 8mm and 10mm rocker bolt holes.

Above is a list of casting numbers with bolt design used and appropriate rocker arm part numbers to assist in identifying which head is required.

Oil Leak at Rear of Crankshaft on 2005-2007 GM 4.2L VIN S Engines

This leak from the rear of crankshaft is due to porosity problems in the crankshaft. GM offers the following solution to the problem.

Verify the leak by looking at the end of the crankshaft. If oil is present

in the bore (where the torque converter nose engages the crankshaft), a special service procedure should be performed. If the bore is dry, or oil appears to be from the seal area, perform normal oil leak analysis. A service cup plug has been developed to stop leakage that may occur in this area and can be ordered under p/n WPC-340 only through the Warranty Parts Center.

Clean the crankshaft flange bore area with brake clean or equivalent. Thoroughly dry the area and examine the bore surface for irregularities. If the bore surface needs additional cleaning,

use sand paper or equivalent and clean as necessary. Once the crankshaft bore is clean and smooth, apply a thin bead of Loctite 620 (TM) completely around the inside of the crankshaft flange bore.

General Motors offers a tool to aid the installation. If the tool is not available through local dealership, an aftermarket equivalent is acceptable.

Position the crankshaft service cup plug into the crankshaft flange bore with the service cup plug, dish side outward (**Figure 3**, page 9). Note: Do not use an impact socket with hammer to drive the service cup plug into place. Damage to the crankshaft thrust bearing may result.

Assemble arbor, forcing screw, attaching bolts and socket. Install the tool press assembly to the end of the crankshaft flange and position the socket and service cup plug into the bore of the crankshaft flange. Be sure you have the proper tool set up

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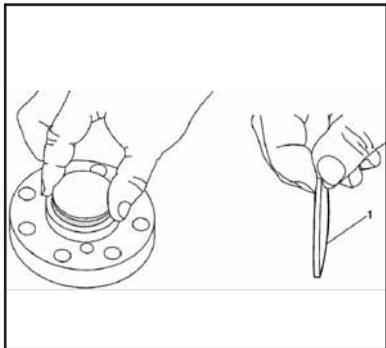


Figure 3 Install service cup plug dish side out on GM 4.2L crankshafts. Do not drive plug in place with impact socket and hammer as damage may result.

before pressing the cup plug into the end of the crankshaft.

The forcing screw will fit inside an 18 mm or 19 mm end of the impact style socket with the 1/2" drive side of the socket facing the service cup plug. The forcing screw should bottom on the 15 mm step inside the socket.

Hand tighten forcing screw into the socket, making sure that it is centered on the service cup plug. Mark forcing screw and arbor for reference, then tighten forcing screw two complete turns and an additional 90 degrees or 1/4 turn more.

When completed, remove installation tool assembly and confirm the installation depth of the service cup plug. Place a straight edge across the center of the crankshaft flange as the measurement point. Measure from the straight edge to the center of the installed cup plug. The depth of the installed cup plug should be 16-17 mm (.630"-.670").

Coolant in the Engine Oil on 2002-2006 GM 4.8 and 5.3L Engines

Some 2002-2006 GM 4.8 and 5.3L VIN V, T, B and M engines may experience a coolant leak into the engine oil. Two different locations may be responsible and should be investigated when coolant loss is noted and cylinder head service is appropriate.

A possible coolant leak may exist between the cylinder head valve guide bore and the interior of the cylinder head casting, or a porosity condition may exist on certain Castech castings (as shown in **Figure 4**, right). Under pressure while the cylinder head casting is hot, coolant may collect in the leaking areas of affected heads and if allowed to continue, eventual oil and coolant mix-

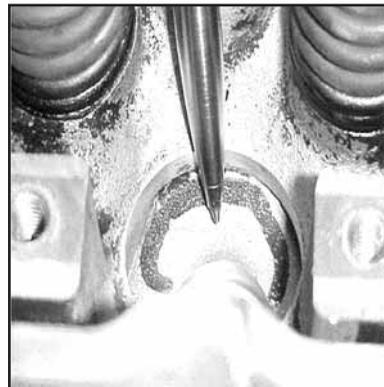


Figure 4 A possible coolant leak may occur between the cylinder head valve guide bore and the interior of the cylinder head casting on GM 4.8 and 5.3L engines.

ing will occur, resulting in engine damage.

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Figure 5 A porosity condition may exist on certain Castech castings. Above arrow shows Castech logo found on some GM 4.8 and 5.3L engines.

manufactured by Castech, inspect the inside corners for a logo such as the one shown in **Figure 5**, left.

DTC P0300 & Engine Misfire On 2000 GM 4.3, 5.0 & 5.7L VIN W, M, R Engines

An engine misfire on 2000 GM 4.3, 5.0 and 5.7L VIN W, M and R engines may be encountered and a P0300 diagnostic trouble code may be set on certain situations when the vehicle is under extreme load, such as cruising uphill, pulling a trailer or on hard acceleration.

If the P0300 diagnostics did not isolate a concern, to resolve the trouble code, the following may help:

Remove the valve cover, valve springs and valve seals on the affected cylinder(s). A small wire tie or rubber bands can be placed in the valve stem keeper groove to prevent the valve from falling into the cylinder. Rotate the valve while moving it up and down in the guide to see if it binds. If a binding valve is found, remove both cylinder heads and increase the valve stem-to-guide clearance.

In these instances, it is recommended to provide a minimum valve stem-to-guide clearance of .0020" (.051 mm) for all guides. Even though the service manual specification for valve stem clearance is listed as .0010-.0030" (.025-.076 mm), the clearance must be increased. In certain driving situations, when combustion temperatures are at their maximum, the minimum listed specification may be insufficient.

One method of increasing the clearance is to hone the guide with a 9 mm hone, until a clearance of .002" is obtained. Doing so will usually only take about 4 strokes of the hone.

Exhaust Manifold Bolt & Torque Update For 1998-2003 GEN III 4.8, 5.3, 5.7, 6.0L Engines

A new exhaust manifold bolt and torque specification was introduced to GEN III Vortec small block V8 engines beginning in the 2004 model year to update the 1998-2003 GEN III 4.8, 5.3, 5.7 and 6.0L engines. When servicing any of the GEN III small block exhaust manifolds, the exhaust manifold bolts should be replaced.

These exhaust manifold

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bolts can be purchased from GM (p/n 11518860). When installing the bolts into the mounting hole, apply a .200" (5 mm) wide bead of high temperature thread locker (GM p/n 12345493 [US] and p/n 10953488 [Canada] or equivalent) to the threads of the exhaust manifold bolts before installation.

Tightening the exhaust manifold bolts should be done in two passes. First, tighten the two center bolts on the exhaust manifold. Then, tighten the rest of the bolts alternating from side-to-side while working toward the outside bolts.

During the first pass of bolt tightening, tighten bolts to 59 in.lbs. Then, on the final bolt torque pass, tighten the bolts to 15 ft.lbs.

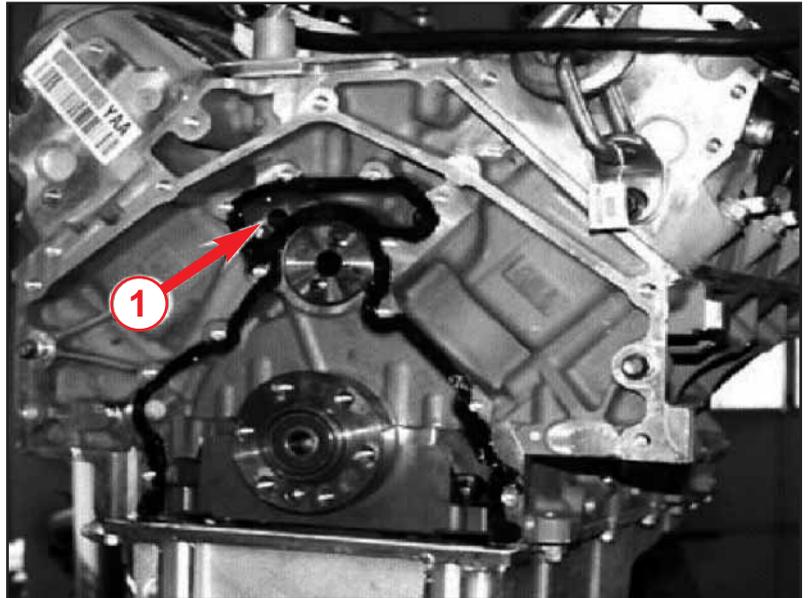


Figure 6 An oil leak on 2003-'06 GM 4.8, 5.3, 5.7, 6.0 and 7.0L engines may suggest that the leak seems to be coming from the rear cover gasket area.

Revised Connecting Rod Bolt Torque For 1997-2007 GM 4.8, 5.3, 5.7 and 6.0L Engines

This information regarding revised connecting rod bolt torque for 1997-2007 GM 4.8, 5.3, 5.7 and 6.0L engines applies to all current GEN III and IV design small block engine variations. This information should be considered any time the bolts are being installed.

Additional final torque may be applied to the connecting rod bolts in the above mentioned engines. Although the bolt tightening method uses the now familiar torque-turn, the bolts do not require replacement unless damaged.

The bolts should be tightened in a two step process, with the second step including an additional 10° turn from the original specification.

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Application

GEN II & GEN IV

1st Step

15 ft.lbs. (20 Nm)

2nd Step

Rotate Each Bolt an additional 85° using a Torque Angle Meter (J45059)

Rear Engine Oil Leak on 2003-'06 GM 4.8, 5.3, 5.7, 6.0 and 7.0L Engines

While an initial investigation of a rear engine oil leak on 2003-'06 GM 4.8, 5.3, 5.7, 6.0 and 7.0L may suggest that the leak seems to be coming from the rear cover gasket area, this condition may actually be caused by engine block porosity on the engine block sealing surface.

If the leak is found to be coming from the rear cover gasket area (see **Figure 6**, page 11), remove the cover

and inspect the cylinder block for any indications of porosity in the sealing areas. If porosity is found anywhere on the sealing surface, use RTV p/n 8-12778-521-0 to fill in any porosity locations.

Wipe a small amount of the RTV sealant onto the surface using a plastic scraper to fill in the porosity holes on the mating surface of the cylinder block. Remove any excessive RTV that may have been applied, especially from the high-pressure oil passage as shown with arrow in picture below.

Allow the RTV to cure 10 minutes before installing the rear cover. When installing the rear cover, tighten the engine rear cover bolts to 18 ft.lbs.

Recommended Spark Plug For 2003 GM 5.3 & 6.0L VIN T & U Engines

The following information regarding the correct spark plug for 2003 GM 5.3 and 6.0L VIN T and U engines is being provided in conjunction with a voluntary recall from General Motors.

Certain 2003 Chevrolet Silverado and Express trucks as well as GMC Sierra and Savanna model vehicles equipped with a 5.3L (RPO LM7 - VIN T) or 6.0L (RPO LQ4 - VIN T) engines may have been built with wrong spark plugs.

The incorrect spark plugs could lead to idle degradation or engine piston damage under high load and/or high temperature operation, such as trailer towing.

Vehicles involved are shown in **Chart 1**, page 13, and they should have their spark plugs replaced with p/n 12563707, if they have not already been replaced. If a GM dealer has already made this repair there should be a label attached to the radiator core support.

It remains unclear if all aftermarket parts catalogs reflect the correct spark plug part number for the GM (p/n 12563707 or AC Delco 41-974).

Head Bolt Replacement For 1999-2001 GM 7.4L VIN B, D, J & S Engines

GM and AERA now recommend replacing the head bolts after one usage on 1999-2001 GM 7.4L VIN B, D, J & S engines. Doing so provides a

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better likelihood the following installation process will provide a longer lasting gasket seal.

Make sure the threaded holes in the engine block are clean and not damaged. Do not use sealer on any engines that use a composition type gasket. Align the cylinder head gasket locating mark to face up.

1) Place the cylinder head gasket in position over the cylinder head locating pins and guide the cylinder head carefully into place over the locating pins and the cylinder head gasket.

2) Always use NEW cylinder head bolts when servicing the cylinder head.

Do not reuse the cylinder head bolts, because the bolts may stretch or break causing engine damage. If not pre-applied to the new cylinder head bolts, apply sealer GM P/N 12346004 or equivalent to the cylinder head bolts. Refer to Use of RTV and Anaerobic Sealer. The sealer must be applied to a minimum of eight threads starting at the point of the cylinder head bolt. Install all 16 bolts finger tight.

3) Tighten all of the cylinder head bolts in the sequence shown in **Figure 7**, above, to 37 ft. lbs (50 Nm).

4) Rotate bolts numbered 1, 2, 3, 6, 7, 8, 9, 12, 14 and 15 in sequence an additional 150°

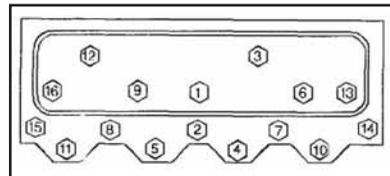


Figure 7 Cylinder head bolt torque sequence for GM 7.4L engines.

16 in sequence an additional 150° turn.

6) Rotate bolts numbered 4, 5, 10 and 11 in sequence an additional 150° turn.

After the cylinder head is secured to the cylinder block, install and:

- Tighten the spark plugs in a new cylinder head to 22 ft.lbs. (30 Nm).

- Tighten the spark plugs in serviced cylinder heads to 15 ft.lbs. (20 Nm). **TSG**

Dealer	VIN
10060	1GCHK23U03F122625
11367	1GCFG15T431106982
11377	1GBFG15T731121142
11377	1GBFG15T931119263
14420	1GCHK29U83E141596
14505	1GCHK29U03E133282
15133	1GCHK24U93E134180
15410	1GCHK23U53F121602
15423	1GCHK29U53E134735
16780	1GCFG25T531118273
17380	1GCEK19T33Z141308
19142	1GCFG29T531120924
19395	1GCHK24U43Z147718
20127	1GCGK13U43F122519
20214	1GCGK13U33F120549
20455	1GCGC13U23F120748
28209	1GCGC13U63F122633
28276	1GCGK13U23F122616
30148	1GCGC13U33F121133
30152	1GCGC13U33F126672
30360	1GCGC13U13F120627
32544	1GCGK13U13F120534
36475	1GCHC24U33E134723
44528	1GCGK13U63F122635
47280	1GCHK29U73E132534
47473	1GCGK13U33F122558
03293	1GBJK34U63E132530
04075	1GCGK13U83F120756
04606	1GCGK13U13F126527
05764	1GCGK13U73F121624
06912	1GCHK24U83Z150296
07120	1GCHK29U43Z147713
07127	1GCGK13U33F126686
07403	1GBHC24UX3E133296
07608	1GCGC24U83Z142515
08504	1GCHC29UX3E133304
09230	1GBFG15T231118200
17083	1GTHK29U33Z142521
21047	1GDFG15T331107309
40365	1GTHK29U63Z142500
42009	1GTHC29U33E137064
44403	1GTHK23U93F120663
47318	1GDFG15T231120908
08074	1GTFG25T931132550
08211	1GTFG15T031117946
32325	1GCHK23U63F120703

Chart 1 These vehicles have the incorrect spark plugs and should be replaced.

5) Rotate bolts numbered 13 and

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