General Motors V8 Engines

6.2 LITER V8 DIESEL

IDENTIFICATION CODING

ENGINE IDENTIFICATION

Engine code letter is suffix of engine Identification Number. Number is on a label on rear of left valve cover.

ENGINE IDENTIFICATION CODES

Application	Code
6.2L (381") Diesel.	TXA,TXB,TXF,TXH,TXM,TXR TXS,TXT,TXU,TXW,TXX,TXY,TXZ

ENGINE REMOVAL

See Engine Removal at end of ENGINE Section.

CYLINDER HEAD & MANIFOLD

INTAKE MANIFOLD

Removal

1) Disconnect battery ground cable. Remove air cleaner. Disconnect PCV hoses and secondary fuel filter lines. Remove secondary fuel filter and adapter.

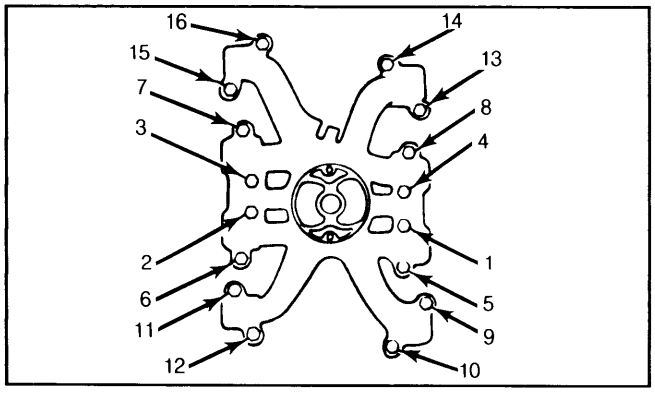
2) Loosen vacuum pump hold down clamp and rotate pump to gain acess to intake manifold bolt. Remove intake manifold bolts and injection pipe clips. Remove intake manifold from engine.

Installation

1) Clean all gasket surfaces. Install new manifold gasket making sure to open EGR passage in gasket if vehicle is equipped with EGR. Install intake manifold and tighten bolts in proper sequence.

2) Fill secondary fuel filter with clean fuel prior to installing filter. Reconnect fuel filter lines. Reverse remainder of removal procedure to complete installation.

Fig. 1: Intake Manifold Tightening Sequence



Tighten bolts gradually to 30 ft. lbs. (41 N.m)

CYLINDER HEAD

Removal

1) Remove intake manifold. Remove injection line clips from brackets. Disconnect injection lines from injector nozzels and cover nozzels. Remove injection lines at pump and mark for reassembly reference.

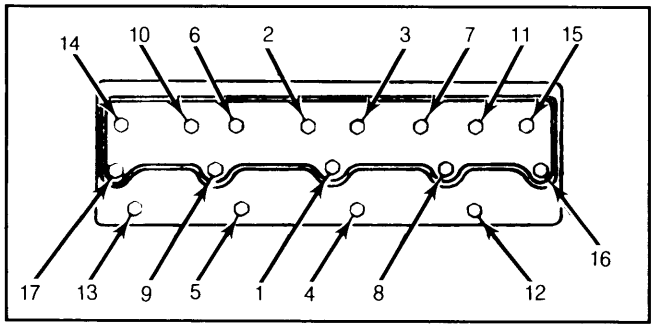
2) Remove fuel supply line from injection pump. Remove wiring harness and bracket from engine. Remove valve cover. Drain coolant. Remove dipstick tube. Disconnect ground wire from cowl at right side of engine.

3) Raise vehicle and disconnect exhaust pipe from manifold. Lower vehicle. If equipped, remove A/C compressor from engine without disconnecting refrigerant lines and lay it on left side of engine compartment.

4) Remove alternator from engine and lay it on right side of engine compartment. Disconnect glow plug wires. Remove rocker arm assemblies and push rods making sure to note their positions to allow installation in the same location.

5) Disconnect radiator, heater and by-pass hoses. Disconnect ground strap. Remove thermostat crossover housing from cylinder. Remove cylinder head bolts and cylinder head.

Fig. 2: Cylinder Head Tightening Sequence



Tighten bolts gradually to 95 ft. lbs. (130 N.m)

Installation

1) Reverse removal procedure to install cylinder heads and note the following: Left rear cylinder head bolt must be installed in cylinder head prior to placing cylinder head on engine.

2) Ensure that gasket surfaces on head and cylinder block are clean and that cylinder head bolt threads and threads in block are clean. Gasket requires no sealer. Coat cylinder head bolt threads with sealer. Tighten cylinder head bolts gradually in sequence. Push rods must be installed with the painted end up.

VALVES

VALVE ARRANGEMENT

I-E-I-E-I-E-I-E (Left bank, front to rear)
E-I-E-I-E-I-E-I (Right bank, front to rear)

VALVE GUIDE SERVICING

If valve stem-to-guide clearance is excessive, guides are removable and can be replaced, or valves with oversize stems are available. Use a reamer (J-7049) to ream guides to correct size for oversize valve stems.

VALVE STEM OIL SEALS

An "O" ring type oil seal is installed on valve stem before valve spring is installed. *See Valve Springs.*

VALVE SPRINGS

Removal

With cylinder head removed, compress valve spring and remove valve keepers. Release spring compressor and remove reatiner, spring, damper, seal and exhaust valve rotators.

6.2 LITER V8 DIESEL (Cont.)

Installation

To install valve springs, reverse removal procedure. Lubricate and install valve stem oil seal on valve stem before installing remaining components.

VALVE SPRING INSTALLED HEIGHT

Valve spring installed height is measure from top of shim at bottom of spring, or spring seat to top of valve spring. If distance exceeds specified height, install a $^{1}/_{16}$" (1.5875 mm) thick shim. Installed height should never be more than $^{1}/_{16}$" (1.5785 mm) less than specified height.

VALVE SPRING INSTALLED HEIGHT

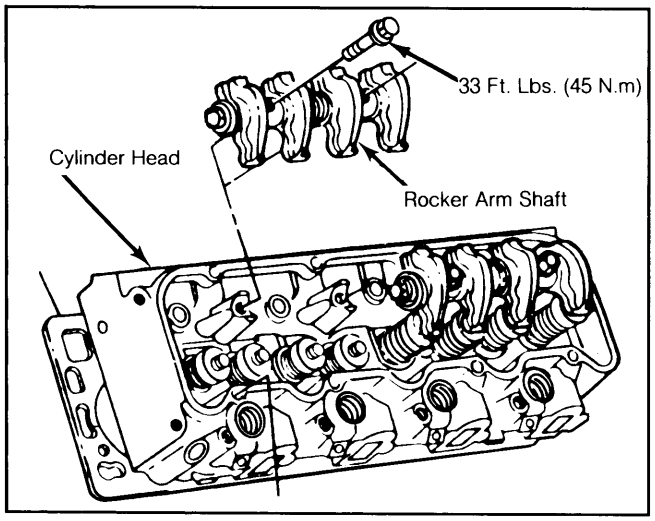
Application	Height
All	1.811" (46 mm)

ROCKER ARM SHAFTS

Removal & Installation

Remove valve covers. Loosen rocker arm shaft bolts gradually and evenly to release valve spring pressure. Remove bolts and rocker arm shafts. To install, reverse removal procedure.

Fig. 3: Rocker Arm Shaft Mounting



Loosen bolts gradually and evenly.

HYDRAULIC VALVE LIFTER ASSEMBLY

NOTE: Hydraulic lifters used on the diesel engine are of the roller type. Lifters are serviced as complete assemblies only and parts are not interchangeable between lifters.

Removal

Provide some means of keeping the lifters and push rods in order so that they can be installed in their original locations. Remove valve covers, rocker arm shafts and push rods. Remove the lifter guide clamps and guide plates. Remove lifters using removal tool (J-29834).

Disassembly

With valve lifter removed from engine, remove retainer ring. Remove push rod seat and oil metering valve. Remove plunger and plunger spring. Remove check valve retainer from plunger and remove valve spring.

Inspection

Clean all parts in clean solvent or diesel fuel. Check for nicks, burrs or scoring on parts. Make sure lifter roller operates smoothly and without excessive play.

Reassembly

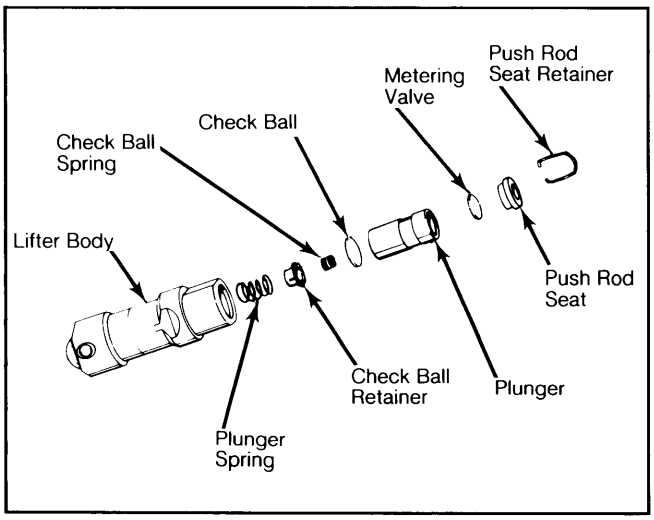
Coat all parts with clean engine oil, then reverse disassembly procedure.

NOTE: Oversize lifters are used and are identifiable by raised "O" on lifter bore casting on block. Oversize is .010".

Installation

Prime lifters by working plunger while lifter is submerged in clean kerosene or diesel fuel. Coat roller and bearings with assembly lube. Install lifters into their original position in block. Install lifter guide plate and clamp. Rotate crankshaft 2 full turns while checking to see that lifters are not binding against guide plates.

Fig. 4: Exploded View of Hydraulic Valve Lifter



Always prime lifters with oil before installing.

PISTONS, PINS & RINGS

OIL PAN REMOVAL

See Oil Pan Removal at end of ENGINE Section.

PISTON & ROD ASSEMBLY

Removal

1) With oil pan, oil pump and cylinder heads removed, remove any ridge in top of cylinder bore with a ridge reamer. Check connecting rod and cap for identification marks or numbers and identify if necessary.

NOTE: Each piston is fitted to its individual cylinder and should be marked for that cylinder.

2) Remove connecting rod cap nuts and rod cap. Cover rod bolts with hose to protect crankshaft journals. Push piston and rod assembly up and out of cylinder block. It will be necessary to rotate crankshaft to various positions to facilitate removing piston and rod assemblies.

6.2 LITER V8 DIESEL (Cont.)

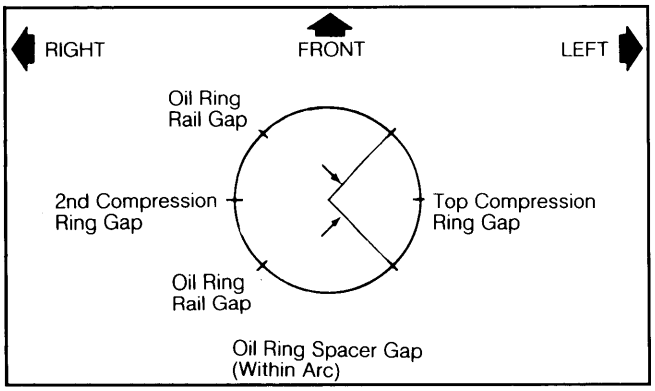
NOTE: When cleaning pistons, DO NOT wire brush any part of piston assembly.

Installation

1) Before installing piston and rod assembly, position ring gaps in positions shown in illustration. *See Fig. 5.* Place connecting rod in bore with bearing tang slots facing away from camshaft.

2) Lubricate rod bearings, cylinder bore and crankshaft journal. Compress piston rings and push piston and rod assembly into position. Install rod cap and tighten rod cap nuts to specifications.

Fig. 5: Piston Ring Gap Positioning



Stagger ring gaps to minimize compression loss.

FITTING PISTONS

NOTE: A cylinder requiring only minor clean-up (less than .005", .172 mm, taper or wear), that cannot be fitted to the original piston after honing, may be able to use a high-limit standard size piston instead of boring the cylinder to the next oversize.

1) With piston and rod assemblies removed, wipe cylinder bores clean and measure diameter of cylinder with a dial indicator. If cylinder is worn or is tapered more than .005" (.127 mm), cylinder must be bored for oversize pistons.

2) If bore is worn or tapered less than .005" (.127 mm), cylinder can be cleaned and honed. If cylinders are bored, various oversize pistons are available.

3) To check fit of rings in cylinder bore, insert ring in cylinder bore and push ring into bore 1/4" with head of piston and measure ring end gap with a feeler gauge. Before installing rings on pistons, ensure ring grooves are clean of carbon and inspect grooves for nicks or burrs. Install rings with gaps staggered. *See Fig. 5.*

PISTON PINS

Removal

With piston and rod assembly removed from engine, remove piston pin retaining rings. Slide pin out of piston and connecting rod.

Installation

Check clearance of pin in piston. If clearance exceeds specifications, piston and pin must be replaced. Lubricate piston pin and install into piston and rod. Secure pin with retaining rings. Rotate retaining rings in their grooves to ensure that they are completely seated. Check piston for freedom of movement on piston pin.

CRANKSHAFT & ROD BEARINGS

MAIN & CONNECTING ROD BEARINGS

NOTE: Following procedures are performed with oil pan and oil pump removed.

Connecting Rod Bearings

1) Mark or identify rod cap to rod before removing rod cap nuts. With rod nuts removed, remove rod cap and bearing. Cover rod bolts with hose to protect crankshaft. Push up on piston and rod assembly and remove bearing from rod. Inspect bearings for wear or damage and replace as necessary.

2) Check crankshaft rod bearing journal for out-of-round or taper conditions. If crankshaft is out-of-round or is tapered more than .001" (.0254 mm), crankshaft must be removed and ground for undersize bearings.

3) Check crankshaft clearance using the Plastigage method. If clearance exceeds specifications, a .001" (.0254 mm) or .002" (.0508 mm) undersize bearing may be installed to obtain correct clearance. If clearance is still excessive, crankshaft must be removed and ground for undersize bearings. connecting rod bearings are available in .010" (.254 mm) and .020" (.508 mm) undersize.

4) To install bearings, clean crankshaft journal and bearing surface in rod. Insert bearing in rod and cap. Lubricate journal an pull piston and rod assembly down, aligning bearing on journal. Install rod cap noting identification marks and tighten rod nuts evenly and to specifications.

Main Bearings

1) Main bearings are selective fit by manufacturer during production. A standard size bearing may be used in combination with a .001" (.0254 mm) undersize bearing to obtain correct clearance. This combination will decrease clearance .0005" (.0127 mm).

2) Main bearings may be removed and replaced with crankshaft still installed in engine. Mark or identify main bearing caps to cylinder block before removing caps. Bearings are removed from cylinder block using a bearing removal tool. Install tool in oil hole in crankshaft and rotate crankshaft clockwise.

3) Crankshaft clearance, taper or out-of-round conditions can be checked using the Plastigage method. If clearance exceeds specifications, a .001" (.0254 mm) or .002" (.0508 mm) undersize bearing may be installed to obtain correct clearance. Both bearings must be replaced on any journal not within specifications.

4) If correct clearance cannot be obtained or if journal is tapered or is out-of-round more than .0002" (.005 mm), crankshaft must be removed and ground for undersize bearings.

5) To install bearings, ensure crankshaft journal and bearing surface in cap and block are clean. Lubricate journal and install bearing cap. If bearings were removed with crankshaft still installed, use bearing removal and installation tool inserted in crankshaft oil hole to install upper hearing. Install main cap noting identification marks and tighten main bearing bolts evenly and to specifications.

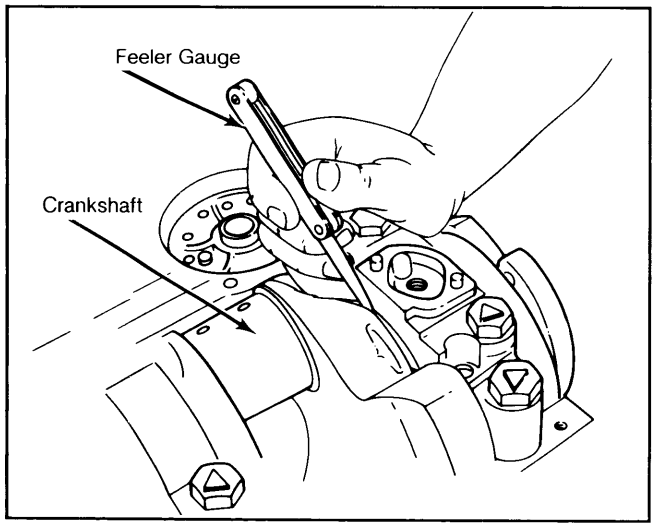
General Motors V8 Engines

6.2 LITER V8 DIESEL (Cont.)

THRUST BEARING ALIGNMENT

Pry crankshaft forward as far as possible and check crankshaft end play with a feeler gauge inserted between front of rear main bearing and crankshaft. Replace center main bearing if end play is not to specification.

Fig. 6: Checking Crankshaft End Play



Use a feeler gauge to check for maximum of .002-.007" (.05-.18 mm) end play.

REAR MAIN BEARING OIL SEAL

To perform in-vehicle repair on rear main seal, General Motors recommends packing 1 piece of old main seal (lower half) into each side of block seal groove (using tools J-29114-2, J-33154-2 and J-33154-1) along with old upper half of the seal.

After packing extra seal material into block, the excess is trimmed and then bottom half of seal is replaced with new material. However, if replacement of complete seal is desired, it can be done using a tool kit (K-D Tools #492 or S&G Tools #31700) and the following procedure:

Removal & Installation

1) With oil pan removed, remove rear main bearing cap. Loosen all main cap bolts slightly. Thread the screw threads of removal tool into upper half of rear main seal. Withdraw upper half of seal from block.

2) Feed the steel mesh cable through upper rear main seal groove until it comes out on the opposite side of crankshaft. Install a guide funnel over cable end. Lubricate new upper rear main seal and insert it in the gripping end of mesh cable.

3) Pull on opposite end of mesh cable and guide new seal into groove. Remove tool from end of seal. Apply sealer (Loctite 496) to rear main cap seal groove and install seal. Seat seal in groove and trim end of seal flush with bearing cap.

4) Place a piece of Plastigage on rear main journal. Install rear main cap and tighten all main bearing caps to specifications. Remove rear main cap and check Plastigage for bearing clearance.

5) If out of specification, check ends of seal for frayed ends or excess material that may be preventing main cap from seating properly. Clean Plastigage from journal and bearing.

6) Apply a thin film of anaerobic sealant to surface of cap that mates with block. Keep sealant off bearing and seal. Apply a light coat of engine oil to surface of crankshaft that rides on seal. Install rear main bearing cap and tighten to specifications.

CAMSHAFT

ENGINE FRONT COVER

Removal

1) Drain coolant from engine. Disconnect battery ground cable. Remove fan belt, fan, fan shroud and pulley. Remove A/C hose bracket nuts. Remove oil fill tube. Remove alternator pivot bolt and drive belt. Remove alternator lower bracket.

2) Remove power steering belt and pump. Remove A/C compressor. Do not disconnect hoses or lines from either device. Support pump and compressor out of the way. Remove air conditioning compressor belt. Disconnect by-pass and lower radiator hose. Remove water pump bolts. Remove water pump plate and water pump.

3) Rotate engine and align marks on injection pump gear and camshaft gear. Scribe an alignment mark on injection pump flange and on front cover. Remove crankshaft pulley. Remove harmonic balancer using a puller.

4) Remove front cover-to-oil pan bolts. Remove fuel return line clips. Remove injection pump driven gear. Remove injection pump retaining nuts from front cover. Remove baffle and remaining front cover bolts. Remove front cover.

Installation

1) Clean sealing surfaces and apply a $^{3}/_{32}$" bead of sealer to surface of cover that mates with engine and oil pan. Install front cover and baffle.

2) Install injection pump, noting alignment marks made during removal. Install injection pump drive gear, making sure to align timing marks on pump gear and cam gear. To complete installation, reverse remainder of removal procedure.

FRONT COVER OIL SEAL

With Cover Removed

Pry seal out of cover with a screwdriver. Install new seal with open end of seal toward inside of cover and drive into position. Support cover at seal area before driving in seal.

With Cover Installed

With harmonic balancer removed, pry seal out of front cover. Install seal with open end of seal toward engine and drive into place with a driver (J-22102) and a hammer.

TIMING CHAIN & SPROCKETS

Removal

Remove front engine cover as previously outlined. Remove bolts securing camshaft gear. Remove injection pump drive gear. Remove cam sprocket, crank sprocket and timing chain.

Installation

Install camshaft sprocket, crankshaft sprocket and timing chain, making sure timing marks on sprockets are aligned. Install and tighten sprocket bolts. Rotate crankshaft 360°. Install front cover as previously outlined,

6.2 LITER V8 DIESEL (Cont.)

making sure to align marks on injection pump gear and injection pump drive gear. Whenever the timing chain, sprockets or gears are replaced, it is necessary to retime the engine.

CAMSHAFT

Removal

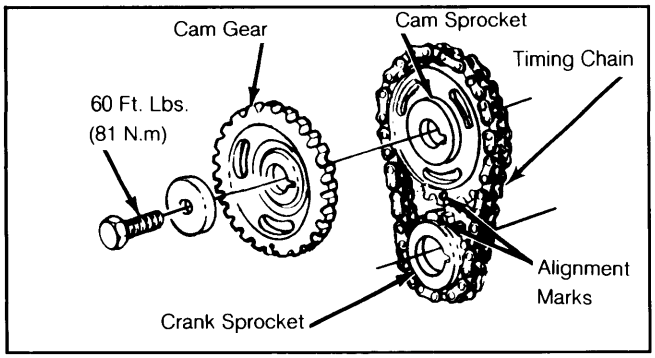
1) Remove intake manifold, engine front cover and timing chain. Remove valve covers, rocker arms and push rods, keeping parts in order to enable installation in the same location. Disconnect exhaust pipe from manifolds.

2) Remove cylinder heads with exhaust manifolds attached. Remove grille, A/C condenser and radiator if necessary. Remove vacuum pump. Remove lifters, guide plates and clamps, keeping parts in order to enable installation in same location. Remove fuel pump. Remove camshaft retainer plate and camshaft.

Installation

Lubricate camshaft journals and lobes with motor oil. If a new camshaft is being installed, coat camshaft lobes with Molykote. Position camshaft to align timing marks on sprockets. Install remaining components in reverse order of removal.

Fig. 7: Timing Chain Sprocket Alignment



CAMSHAFT BEARINGS

Use camshaft bearing installation and removal tool (J-6098) to remove bearings. Install front and rear bearings first by driving toward center of cylinder block. Align oil holes in front 4 bearings with oil holes in bearing bore in block. Position rear camshaft bearing oil hole at or near the 6 o'clock position. Install new rear cam bore plug flush with block, using sealer

CAM LOBE LIFT

With valve cover removed, remove rocker arm. Mount dial indicator on cylinder head. Position indicator stem on push rod with an adapter (J-8520). Rotate engine slowly until lifter is on heel of camshaft and set dial indicator to "O". Rotate engine slowly until push rod is at fully raised position. Dial indicator will give total camshaft lobe lift. Lift should be within specifications.

ENGINE OILING

Crankcase Capacity

7 quarts (6.7L) including filter change.

Oil Pressure

40 psi at 2000-3000 RPM.
(2.81 kg/cm² at 2000-3000 RPM.)

Oil Filter

Replace every 5,000 miles or 12 months, whichever comes first.

Pressure Regulator Valve

In oil pump body, non-adjustable.

ENGINE OILING SYSTEM

Full pressure lubrication through a full flow oil filter and oil cooler is supplied by a gear-type oil pump. Main oil gallery feeds oil through drilled passages to camshaft and crankshaft to lubricate bearings. Valve lifter gallery feeds the valve lifters, which feed the rocker arms through hollow push rods.

OIL PUMP

Removal

Remove oil pan. Remove pump-to-rear main bearing cap bolt. Remove oil pump and extension shaft.

Disassembly

1) Remove pump cover attaching screws and pump cover. Mark gears so they may be reassembled with same tooth indexing. Remove idler gear, drive gear and shaft from pump housing.

2) Remove pressure regulator valve retaining pin from pump cover. Remove regulator valve from pump cover. Do not disassemble pickup screen and pipe. Screen and pipe are only serviced as an assembly with the pump.

NOTE: If pump gears or body are damaged or worn, replacement of entire pump assembly is necessary.

Reassembly & Installation

Clean and check all parts for fit and wear. Reverse removal and disassembly procedure to assemble and install. Smooth side of idler gear faces cover. Check operation of pump before installing.

NOTE: Bottom of screen must be parallel with bottom of pan.

TIGHTENING SPECIFICATIONS

Application	Ft.Lbs. (N.m)
Injection Pump Driven Gear Bolt	16 (22)
Injection Pump Attaching Bolts	31 (42)
Injection Nozzle	52 (71)
Inner Main Bearing Cap Bolts	111 (150)
Outer Main Bearing Cap Bolts	100 (136)
Oil Pump Attaching Bolts	67 (91)
Rocker Arm Shaft Bolts	33 (45)
Crankshaft Balancer Bolt	151 (205)
Front Cover Bolts	31 (42)
Water Pump Attaching Bolts	31 (42)
Water Pump Cover Bolts	17 (23)
Thermostat Housing Bolts	31 (42)
Intake Manifold Bolts	31 (42)
Exhaust Manifold Bolts	22 (30)
Vacuum Pump Retaining Bolts	31 (42)
Cylinder Head Bolts	95 (129)
Connecting Rod Nuts	48 (65)
Camshaft Sprocket Bolt	60 (81)

General Motors V8 Engines

6.2 LITER V8 DIESEL (Cont.)

ENGINE SPECIFICATIONS

GENERAL SPECIFICATIONS

Engine	Cycle	Displ. Cu. Ins.	Compr. Ratio	Bore In. (mm)	Stroke In. (mm)	Firing Order	Inj. Timing
6.2L	4	378	21.5:1	3.976 (101)	3.819 (97)	1-8-7-2-6-5-4-3	.....

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

	MAIN BEARINGS				CONNECTING ROD BEARINGS		
Engine	Journal Diam. In. (mm)	Clearance In. (mm)	Thrust Bearing	Crankshaft End Play In. (mm)	Journal Diam. In. (mm)	Clearance In. (mm)	Side Play In. (mm)
6.2L	[1] 2.9494-2.9504 (74.917-74.941) [2] 2.9492-2.9502 (74.912-74.936)	[1] .0018-.033 (.045-.083) [2] .0022-.0037 (.055-.093)	No. 3	.0019-.0070 (.05-.18)	2.398-2.399 (60.913-60.939)	.0018-.0039 (.046-.099)	.0248-.0067 (.63-.17)

[1] — Journals 1, 2, 3, 4.
[2] — Journal 5.

PISTONS, PINS, RINGS

	PISTONS	PINS		RINGS		
Engine	Clearance In. (mm)	Piston Fit In. (mm)	Rod Fit In. (mm)	Rings	End Gap In. (mm)	Side Clearance In. (mm)
6.2L	.004-.005 (.102-.138)	.0004-.0006 (.0101-.0153)	.0003-.0012 (.0081-.0309)	1	.012-.022 (.30-.55)	.003-.007 (.080-.178)
				2	.030-.039 (.75-1.0)	.002-.003 (.040-.080)
				3	.010-.020 (.25-.51)	.002-.004 (.040-.096)

VALVES

Engine & Valve	Head Diam. In. (mm)	Face Angle	Seat Angle	Seat Width In. (mm)	Stem Diameter In. (mm)	Stem Clearance In. (mm)	Valve Lift In. (mm)
6.2L							
Int.	.....	45°	46°	.035-.060 (.89-1.53)	.....	.001-.003 (.026-.069)	.421 (10.7)
Exh.	.....	45°	46°	.062-.093 (1.57-2.36)	.....	.001-.003 (.026-.069)	.421 (10.7)

VALVE SPRINGS

Engine	Free. Length In. (mm)	PRESSURE Lbs. @ In. (kg @ mm)	
		Valve Closed	Valve Open
6.2L	.....	80@1.81 (36@46)	230@1.39 (105@35)

CAMSHAFT

Engine	Journal In. (mm)	Clearance In. (mm)	Lobe Lift In. (mm)
6.2L	[1] 2.166-2.164 (55.025-54.975) [2] 2.008-2.006 (51.025-50.975)	.001-.004 (.026-.010)	.2808 (7.133)

[1] — Journals 1, 2, 3, 4.
[2] — Journal 5.