

# Chevrolet 4 Engines

## 1971-73 2300 cc ENGINES

GENERAL SPECIFICATIONS							
Year	Displ. Cu. Ins.	Carburetor	HP at RPM	Torque (Ft. Lbs. at RPM)	Compr. Ratio	Bore	Stroke
1971	140"	1-Bbl.	90 @ 4800	136 @ 2400	8.5-1	3.50"	3.625"
		2-Bbl.	110 @ 5000	138 @ 3200	8.5-1	3.50"	3.625"
1972	140"	1-Bbl.	80 @ 4400	121 @ 2800	8.0-1	3.50"	3.625"
		2-Bbl.	90 @ 4800	121 @ 3200	8.0-1	3.50"	3.625"
1973	140"	1-Bbl.	72@4400	100@2000	8.0-1	3.50"	3.625"
		2-Bbl.	85@4800	115@2400	8.0-1	3.50"	3.625"

► **NET HORSEPOWER & TORQUE NOTE** – Horsepower and Torque figures given for 1972 and later are NET. NET Horsepower and Torque represent power at the flywheel when the engine is installed in the vehicle, with wide open throttle and all systems operating such as; air cleaner, exhaust system, water pump, generator, oil pump and air conditioning.

### ENGINE IDENTIFICATION

Engine series number and suffix is stamped opposite No. 3 cylinder on the right side of the case on the pad on the left side as close to the rear of pad as possible. Suffix letters identify HP., carburetor and transmission type as follows:

#### 1971

Suffix	HP	Transmission (Carb.)
CHC.....	90.....	Man. Trans. (1-Bbl.)
CHA.....	90.....	Auto. Trans. (1-Bbl.)
CHD.....	110.....	Man. Trans. (2-Bbl.)
CHB.....	110.....	Auto. Trans. (2-Bbl.)

#### 1972

Suffix	HP	Transmission (Carb.)
CNA, CGB.....	80.....	Man. Trans. (1-Bbl.)
CND, CGD.....	80.....	Auto. Trans. (1-Bbl.)
CNB.....	90.....	Man. Trans. (2-Bbl.)
CSK, CBM.....	90.....	Auto. Trans. (2-Bbl.)

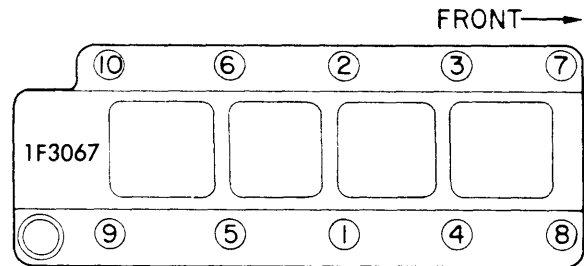
#### 1973

Suffix	HP	Transmission (Carb.)
CAA, CAJ.....	72.....	Man. Trans. (1-Bbl.)
CAB, CAH.....	72.....	Auto. Trans. (1-Bbl.)
CAD, CAL.....	85.....	Man. Trans. (2-Bbl.)
CAC, CAK.....	85.....	Auto. Trans. (2-Bbl.)

### CYLINDER HEAD REPLACEMENT

**Removal** – Remove engine front cover, camshaft cover, timing belt and camshaft timing sprocket. Remove intake and exhaust manifolds. Remove head bolts and remove head.

**Installation** – Install head gasket with smooth side up. Coat head bolt threads with anti-seize compound. *NOTE* – Head bolts are two different lengths; 6 3/8" on manifold side and 5 5/8" on spark plug side. Tighten head bolts a little at a time in the sequence shown until the specified torque is reached.



**CYLINDER HEAD TIGHTENING SEQUENCE**

PISTONS, PINS, RINGS						
Engine	PISTONS	PINS		RINGS		
	Clearance	Piston Fit	Rod Fit	Rings	End Gap	Side Clearance
140" 1971	.0018-.0028"	.0003-.0004"	.0008-.0021"	1 & 2	.009-.019"	.0012-.0027"
				3	.010-.030"	.000-.005"
1972-73	.0018-.0028"	.0003-.0004"	.0008-.0021"	1	.015-.025"	.0012-.0027"
				2	.009-.019"	.0012-.0027"
				3	.010-.030"	.000-.005"

## 1971-73 2300 cc ENGINES (Cont.)

VALVES								
Engine & Valve	Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Lift	
140" Int.	1.620"	45°	46°	3/64-1/16"	.3414"	.0010-.0027"	① .4199"	
	1.375"	45°	46°	3/64-5/64"	.3414"	.0010-.0027"	② .4302"	

- ① - 110 HP .4366", 85 HP .4367".
- ② - 110 HP .4366", 85 HP .4379".

### VALVE ARRANGEMENT

I-E-I-E-I-E Front to rear.

### VALVE SPRING INSTALLED HEIGHT

Specified height is 1 3/4", ( $\pm 1/32$ ") measured from spring seat to top of spring. If measured height exceeds specification, install spring seat shim approximately 1/16" thick. Do not shim to give an installed height under specification.

### VALVE GUIDES

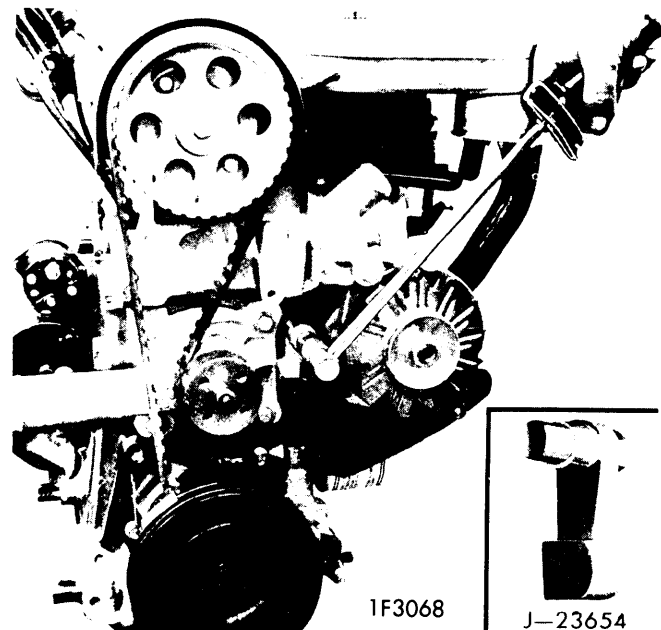
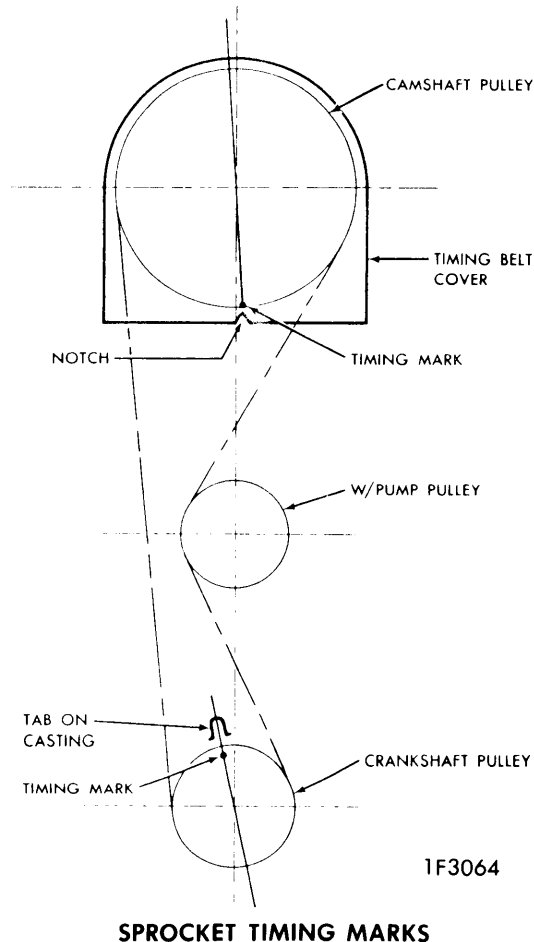
Guides are integral with cylinder head. If valve stem clearance in guide is excessive, valves with oversize stems are available in three sizes (.003", .015", .030") for replacement. Ream guide bores to accommodate oversize stems and afford specified clearance.

### TIMING BELT REPLACEMENT

**Removal** - Remove engine front cover and accessory drive pulley. Drain cooling system and loosen water pump bolts. Remove lower belt cover and remove belt. Remove water pump, install new gasket and loosely install water pump.

**Installation** - Align timing mark on cam sprocket with notch on timing belt upper cover. Align crankshaft sprocket timing mark with cast rib on oil pump cover. Install new belt and adjust belt tension.

**Belt Tension Adjustment** - Position suitable tool (Kent-Moore No. J-23564) in gauge hole adjacent to left side of water pump. Apply 15 ft. lbs. torque to water pump and while maintaining this torque tighten water pump bolts.



**Belt Tension Check With Strand Tension Gauge** - Position strand tension gauge onto belt so that bail wire is between cogs and foot of gauge is on grooved side of belt. Depress handle of gauge until it bottoms and observe gauge reading. Correct tension for timing belt is 100-140 lbs.

## 1971-73 2300 cc ENGINES (Cont.)

**PISTON PINS**

Pins are press fit in piston. Piston and pin are a matched set and are not serviced separately. Measure pin and piston pin bore. If clearance is in excess of the .001" wear limit, replace the piston and pin assembly.

**PISTON & ROD INSTALLATION**

Assemble rod to piston by pressing pin into piston and rod with an arbor press and suitable piston support and pin driver and pilot. Install piston and rod assembly in bore with the letter "F" on piston facing toward front of engine.

**FITTING PISTONS**

Production pistons are available in four sizes, increasing in diameter by .0005" for each part number. Oversize pistons are also available in .010" and .020" oversize. Measure cylinder bore 2½" from top of bore. Measure piston diameter at skirt across center line of piston pin. Subtract piston diameter from cylinder bore diameter to determine piston-to-bore clearance. If clearance is in excess of specification, a new piston may be required along with honing of cylinder bore. *NOTE - This procedure requires a special honing tool.*

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS							
Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	Journal Diam.	Clearance	Thrust Bearing	Crankshaft Endplay	Journal Diam.	Clearance	Sideplay
<b>140"</b>							
1971	2.2983"	.0003-.0029"	No.4	.002-.007"	1.999-2.000"	.0007-.0027"	.0085"-.0135"
1972	2.2983"	.0003-.003"	No. 4	.002-.008"	1.999-2.000"	.0007-.0027"	.0085-.0135"
1973	2.2988"	⓪.0035"	No.4	.002-.007"	1.999-2.000"	.0007-.0038"	.0085-.0135"

⓪ - No. 1 Bearing .002".

**REAR MAIN OIL SEAL REPLACEMENT**

- 1) Remove rear main bearing cap and discard lower seal. Loosen remaining bearing caps to allow crankshaft to be lowered slightly.
- 2) Use brass punch to push upper seal out of bearing sufficiently to permit it to be fully removed with pliers. Rotating the crankshaft while pulling on the seal will aid in removal.
- 3) Install new seal in bearing cap using a suitable forming tool. Cut ends of seal off flush to 1/64" below surface of bearing cap.
- 4) Install new upper seal by inserting a piece of soft wire in end of seal and wrapping wire a few turns around end of seal (if "Chinese Finger" type installer available it will be more efficient than the soft wire). Use wire to pull seal into place in bearing. Rotate crankshaft if necessary.
- 5) Install bearing cap and torque to specification after torquing all other main bearing bolts. Apply rear main cap side-sealant which is available with instructions when new seal is obtained. Follow instructions with sealant.

**MAIN BEARINGS**

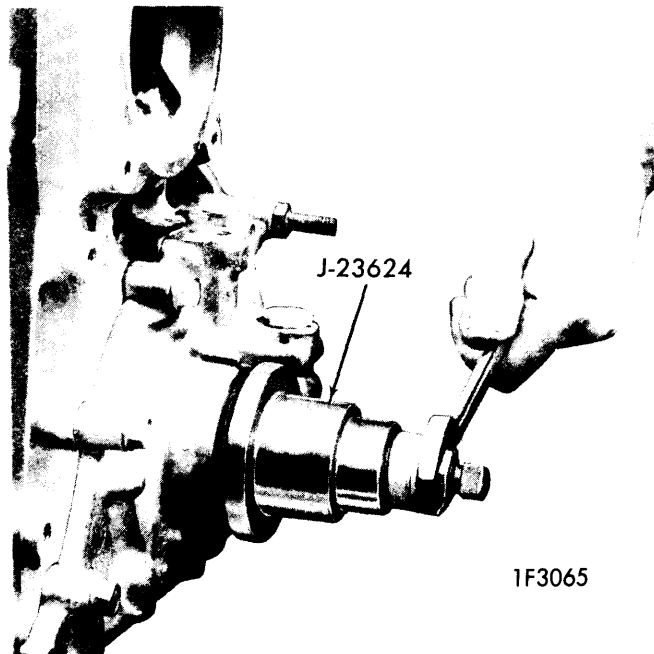
Measure bearing clearance by use of Plastigage. If clearance is excessive, bearings are available in standard size and .001", .002", .010", and .020" undersize. After main bearings have been installed and cap bolts torqued, check endplay of crankshaft at thrust bearing (No. 4).

**ENGINE FRONT COVER**

Disconnect negative battery cable and remove fan and spacer. Loosen (not remove) lower cover screws (cover is slotted). Remove upper screws and remove cover.

**OIL PUMP (FRONT CRANKCASE) SEAL REPLACEMENT**

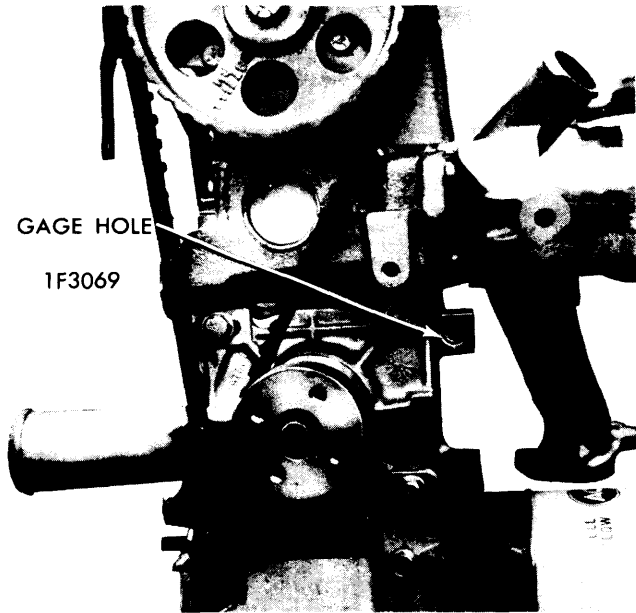
- 1) Remove engine front cover, accessory drive pulley, timing belt, lower cover, and crankshaft timing sprocket. Pry old seal from front cover.
- 2) Coat new seal lips with oil and apply sealing compound to outside diameter. Position seal, closed end outward, onto crankshaft and install in bore of cover with suitable tool (Kent Moore No. J-23624).



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**INSTALLING CRANKSHAFT FRONT SEAL**

## 1971-73 2300 cc ENGINES (Cont.)



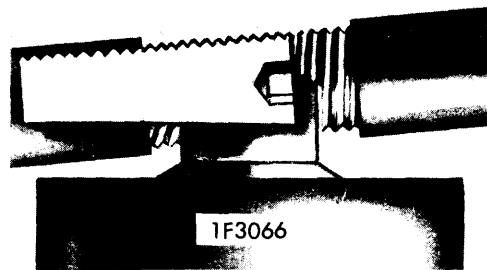
TENSIONING ADAPTOR LOCATING HOLE

Use a feeler gauge to measure clearance between tappet and cam lobe. Adjust as required to obtain specified clearance. Adjust with engine shut off.

2) Rotate camshaft sprocket 180° so that timing mark is at 12 o'clock position and in line with notch on upper belt cover. The following valves can be adjusted with camshaft in this position.

- No. 2 cylinder ..... Exhaust.
- No. 3 cylinder ..... Intake.
- No. 4 cylinder ..... Intake & Exhaust.

3) Tappet Adjustment Specifications – Intake; .014-.016", Exhaust; .029-.031".



VALVE TAPPET ADJUSTMENT SCREW

VALVE SPRINGS			
Engine	Free Length	PRESSURE (LBS.)	
		Valve Closed	Valve Open
140"	2.03"	71-79 @ 1.75"	179-193 @ 1.29" ①

① – 110 HP & 85 HP, 183-197 @ 1.31".

### VALVE SPRINGS

Compress springs to specified height with suitable spring tester and check pressure against specifications. Springs should be replaced if not within 10 lbs. of specified load (without dampers).

### VALVE TAPPET ADJUSTMENT

**NOTE** – Adjusting screw in tappet is threaded in all areas except the "flat" of the screw that contacts the valve stem (see illustration). Therefore the adjusting screw must always be turned a complete revolution to maintain correct position of the "flat" in relation to the valve stem.

Adjust valve lash with tappet on base circle of camshaft lobe as follows:

1) Rotate camshaft timing sprocket to align timing mark on sprocket with inverted "V" notch on timing belt upper cover. The following valves can be adjusted with camshaft in this position

- No. 1 cylinder ..... Intake & Exhaust.
- No. 2 cylinder ..... Intake.
- No. 3 cylinder ..... Exhaust.

CAMSHAFT			
Engine	Journal Diam.	Clearance ①	Lobe Lift
140"	2.2817"	.....	Int. .4199" Exh. .4302"

① – End Play – .004-.012"

② – 85 HP – Int. .4369", Exh. .4379".

### CAMSHAFT & BEARING REPLACEMENT

**Removal** – With distributor and all necessary belt covers and engine accessories removed, proceed as follows:

1) Disconnect engine front mounts at body attachment, raise front of engine and install wood blocks approximately 1½" thick between engine mounts and body.

2) Install suitable camshaft removal tool (Kent Moore No. J-23591) to cylinder head and depress tappets necessary to permit withdrawal of camshaft from bearings. **NOTE** – Use a torque wrench on depressing screws. Approximately 10 ft. lbs. of torque will be necessary to fully depress tappets. If more than 10 ft. lbs. is required, check tool for proper installation.

3) Using a suitable bearing remover/installer tool (Kent Moore No. J-23638) remove cam bearings.

**Installation** – Install new bearings (beginning with rear bearing and working forward) as follows:

1) Align oil holes in three rear bearings with oil holes in case. Oil holes in first two bearings should be in the 11 o'clock position (viewed from front of engine). Oil groove in No. 1 bearing toward front of engine.

