

## BLOCKS

### **Chevrolet 60° V6**

The Chevrolet 60° V6 is a compact powerhouse. This innovative engine has beaten both the competition and the elements in off-road racing. It is a proven winner in sports car racing, and it has a promising future on America's oval tracks in the Midget classes. A Chevy V6/60° engine is the perfect power-plant for a high-tech street rod or an ultralight autocross machine. GM Performance Parts offers the basic building blocks for a high-performance V6/60°, including light alloy engine cases, high-compression pistons, and high-volume oil pumps.

Chevrolet's 60° V6 has been produced in two distinct versions. First generation V6/60°s have cast iron cylinder heads with inline valves; second generation engines have aluminum cylinder heads with splayed valves. First generation V6/60°s are produced for front-wheel-drive and rear-wheel-drive chassis, while "Generation II" engines are installed in front-wheel-drive vehicles exclusively. Parts are interchangeable between the two versions except as noted in the part descriptions below.

Chevy V6/60° engines are available with 2.8-liter (173 cubic inch) and 3.1-liter (189ci) and 3.4-liter (207ci) displacements. 1985 and later V6/60° blocks have larger main bearings than pre-1985 engines; these late-model blocks are recommended for high-performance and competition applications. All Chevy V6/60° engines use metric fasteners exclusively.

### **GROUP 0.001A ENGINE CONVERSION PACKAGES**

#### **12363230**

GM Performance Parts has released an emission-legal (all states except California) 3.4-liter V6 engine conversion package designed for 1982-85 S-10 pickups and Blazers originally equipped with 2.8-liter V6 engines. The 3.4-liter (207ci) version of Chevy's popular 60° V6 offers nearly a 20% increase in displacement over the 2.8-liter (173ci) V6 by utilizing a bore that is .120" larger and a stroke that is .320" longer. In addition to the larger displacement, the 3.4-liter engine benefits from an improved camshaft profile and valvetrain upgrades, which help it produce nearly 40 more horsepower than the stock 2.8-liter engine.

The bigger 3.4-liter V6 is virtually a bolt-in for the above applications, utilizing the existing intake manifold, ignition system, emission system, and water pump from the original 2.8-liter engine. Some models may also require using the oil pan or front cover from the original engine. The 1982-83 models with manual transmission use a clutch cross shaft with a ball stud boss on the block. This new 3.4-liter does not have that clutch boss cast on the block. The 3.4-liter engine conversion package (P/N 12363230) offers a considerable improvement in horsepower and torque over the 2.8-liter engine in an economical bolt-in package. This engine package includes the engine assembly, comprehensive installation instructions and decals.



### **3.4-LITER V6 ENGINE PACKAGE SPECIFICATIONS**

**Part Number:** 12363230

**Displacement:** 3.4-liter (207ci)

**Horsepower:** 160 at 5000 RPM

**Torque:** 194 at 2700 RPM

**Bore & Stroke:** 3.62" x 3.31"

**Compression Ratio:** 9.0:1

**Engine Block:** Cast iron

**Camshaft:** Hydraulic flat tappet design

**Valve Lift (Intake/Exhaust):** .427"/.454"

**Duration (Intake/Exhaust):** 204/216 at .050" lift

**Cylinder Heads:** Cast iron

**Intake Valve Diameter:** 1.60"

**Exhaust Valve Diameter:** 1.43"

**Fuel Requirement:** Unleaded regular

**Technical Note:** An in-line electric fuel pump is recommended for the conversion.

## GROUP 0.033 ENGINE BLOCKS AND COMPONENTS

### 10065456 — Cast Iron Block (Rear Wheel Drive)

This cast iron cylinder case is used in 1985–up 2.8-liter engines for rear-wheel-drive vehicles. It is a bare block with two-bolt main bearing caps.

**Technical Notes:** *This block has 89mm (3.50") cylinder bores and large 67mm main bearings. Block weight is 106 pounds.*

### 10051141 — Bow Tie Aluminum Block

This heavy-duty aluminum block is 47 pounds lighter than a production rear-wheel-drive cast iron block. It has extra-thick cylinder walls with dry nodular iron sleeves. The head bolt bosses are reinforced to improve head gasket sealing. This block has wider main bearing bulkheads than a production cylinder case; four-bolt caps are installed on the two intermediate main bearings. These billet steel main caps have splayed outer bolts that provide additional bearing support.

The aluminum Bow Tie V6/60° block features a revised lubrication system. The "priority main feed" oiling is similar to a Chevrolet small-block V8, with three oil galleries above the camshaft; production V6/60° blocks have only two oil galleries. Oil is routed directly to the main bearings in a Bow Tie block to ensure proper lubrication at high rpm. The main bearing saddles are grooved to increase the flow of oil to the crankshaft journals through additional feed holes drilled in the upper bearing inserts. Block weight is 59 lbs.

**Technical Notes:** *Aluminum Bow Tie V6/60° engine blocks have rough-bored 89mm (3.504") cylinders which can be safely overbored to 91mm (3.582"). Light alloy Bow Tie blocks have bosses for both front-wheel-drive and rear-wheel-drive engine mounts. The starter motor can be installed on either side of the block.*



### 476543 — Main Bearing Cap Bolt

11mm x 3.66" long, for cast iron production block.

### 10044990 — Main Bearing Cap Bolt

11mm bolt for outer holes on Bow Tie four-bolt caps.

### 10185054 — Washer

11mm washer for aluminum block studs.

## Chevrolet V6 60 Bow Tie Quick Reference Chart

Part Number	10051141
Block Material	Aluminum
Cylinder Wall Type	Non-Siamesed
Cylinder Deck Height	8.820"
Cylinder Bore Range	3.525-3.582"
No Bearing Cap Bolts	4
Cap Bolt Orientation	Splayed
Bearing Cap Type	Steel
Crankshaft Journal Dia.	2.65"
Oil Sump Type	wet
Crankshaft Seal Type	2 piece
Design Max. Stroke	3.20"
Weight (lbs. - bare)	59
Intended Usage	Professional Competition
Non-Standard Parts	Bossed for front or rear drive engine mount

## GROUPS 0.095 - .137 MAIN BEARINGS, CAPS, AND SEALS

### 10051177 — Four-Bolt Main Bearing Cap

This billet steel bearing cap is used on the #2 main bearing in a Bow Tie aluminum V6/60° block. Its outer bolt holes angle outward toward the oil pan rails. This splayed bolt design improves reliability in highly stressed racing engines by tying the cap to the strongest part of the block. It also reduces distortion of the main bearing bores by increasing the cap's resistance to closing up under high loads.

**Technical Note:** *For 67mm diameter main bearings.*

### 10051178 — Four-Bolt Main Bearing Cap

Same as above, for #3 main bearing.

### 14077802 — Front Main Bearing Cap

### 14077813 — Rear Main Bearing Cap

### 12480252 — Main Bearing Kit

Standard diameter for #1 and #4 main bearings, 1985 and later engines.

### 12480253 — Main Bearing Kit

Standard diameter for #2 main bearing, 1985 and later engines.

### 12480254 — Main Bearing Kit

Standard diameter for #3 main bearing, 1985 and later engines.

### 14085829 — Rear Crankshaft Seal Kit

One-piece rear crankshaft seal for 1985 and later engines.

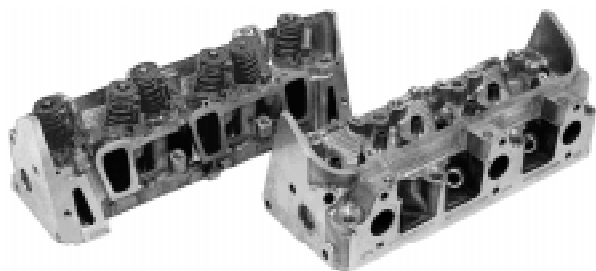
## HEADS

### GROUP 0.269 CYLINDER HEADS

#### 10048649 — Aluminum Cylinder Head

Production "Generation II" V6/60° transverse-mounted engines have aluminum cylinder heads with splayed intake and exhaust valves. This canted valve design enhances cylinder breathing by unshrouding the valves at maximum lift. The high-velocity intake runners and heart-shaped combustion chambers promote swirl in the cylinders for efficient combustion. Spark plugs are centrally located in the chambers.

**Technical Notes:** Aluminum cylinder heads are recommended for Midget racing classes and other applications where lightweight engines are preferred. Aluminum V6/60° heads are machined for 1.72" diameter intake valves and 1.42" exhaust valves.



#### ►NEW 10218168 — Cylinder Head V6/60°

These Gen III cylinder heads are used on late model V6/60° engines for improved performance. They feature an increase of 0.040" in intake valve diameter and a reshaped port for a flow improvement of 16.7% at 0.450" of valve lift. The exhaust port has been reshaped into a "D" port configuration for a flow improvement of 31.7% at 0.450" of valve lift.

#### 14054884 — Cast Iron Cylinder Head

This high-performance cast iron cylinder head is used on High Output transverse-mounted and fuel-injected rear-wheel-drive V6/60° engines. It is machined for 1.72" diameter intake valves and 1.42" exhaust valves. (Standard heads have 1.60" intakes and 1.30" exhausts.) This cylinder head is recommended for off-road V6/60° racing engines.

### GROUP 0.289 CYLINDER HEAD GASKETS

#### 10134322 — Cylinder Head Gasket

Cylinder head gasket for V6-60° with cast iron heads.

### GROUP 0.293 CYLINDER HEAD BOLTS AND STUDS

#### 476543 — Long Cylinder Head Bolt

11mm x 3.66" for cast iron heads.

#### 476572 — Short Cylinder Head Bolt

11mm x 2.68" for cast iron heads.

#### 10227593 — Long Cylinder Head Bolt

11mm x 4.33" for aluminum heads.

#### 10100033 — Short Cylinder Head Bolt

11mm x 3.50" for aluminum heads.

#### 10051155 — Washer

For V6/60° studs.

#### 14024244 — Cylinder Head Dowel Pin

For all V6/60° engines.

#### 12346004 — Sealer

For all cylinder head bolt threads.

## VALVETRAIN

### GROUP 0.296 - .297 INTAKE AND EXHAUST VALVES

#### 14024249 — Intake Valve

1.6" diameter, standard stem, for production cast iron cylinder heads.

#### 14031328 — Intake Valve

1.72" diameter, standard stem, for High Output V6/60° engines with cast iron cylinder heads.

#### 14091805 — Intake Valve

1.72" diameter, standard stem, for 1987 and later aluminum heads.

#### 14024254 — Exhaust Valve

1.3" diameter, standard stem, for production 1980-84 iron cylinder heads.

#### 14031332 — Exhaust Valve

1.42" diameter, standard stem, for High Output V6/60° engines with cast iron heads.

#### 10070124 — Exhaust Valve

1.42" diameter, standard stem, for 1987 and later aluminum heads.

### GROUP 0.303 - .310 VALVE SPRINGS, RETAINERS, AND LOCKS

#### 10207475 — Valve Spring

Production design valve spring and damper for cast iron cylinder heads.

**Technical Note:** Suitable for .420" maximum valve lift.

#### 10166343 — Valve Spring

Production design valve spring and damper for 1987 and later aluminum heads.

#### 12363215 — Valve Spring

This valve spring is used in the new 3.4-liter engine conversion package (P/N 12363230) and designed for moderate performance usage. Manufactured from chrome silicon wire, this spring produces 105 pounds of seat pressure at an installed height of 1.70" and 296 pounds open pressure at a height of 1.20".

**Technical Note:** Use with retainer P/N 12363216.



#### 330585 — Heavy-Duty Valve Spring

This dual valve spring is recommended for competition camshafts with .560" maximum valve lift. It produces 140 pounds seat pressure at an installed height of 1.75".

**Technical Notes:** This spring is 1.379" in diameter. Spring pockets on V6/60° cylinder heads must be machined to fit this spring. Umbrella-type valve stem seals are recommended. Use with aluminum valve spring retainer P/N 330586.

#### 14004099 — Valve Spring Retainer

For cast iron cylinder heads with production valve springs.

#### 14094168 — Valve Spring Retainer

For 1987 and later aluminum cylinder heads with production valve springs.

#### 12363216 — Valve Spring Retainer

This heavy-duty valve spring retainer is used in the new 3.4-liter engine conversion package (P/N 12363230). Manufactured from 4140 heat-treated steel, this retainer has a diameter of 1.203" and is designed for use with an 1<sup>1</sup>/<sub>32</sub>" valve stem.

**Technical Note:** Use with valve spring P/N 12363215.



### 330586 — Valve Spring Retainer

Aluminum valve spring retainer for dual coil valve spring P/N 330585.

### 24503856 — Valve Spring Split Lock

For all iron heads.

### 24503888 — Valve Spring Split Lock

For 1987 and later aluminum heads.

## GROUPS 0.333 - .439 VALVETRAIN

### ►NEW 24504436 — Roller Rocker Arms

These roller rocker arms are used on late model V6/60° engines for improved performance.

### 14002446 — Rocker Arm

Rocker arm and pivot ball for all cast iron cylinder heads.

### 10054525 — Rocker Arm

Rocker arm and pivot ball for 1987 and later aluminum cylinder heads.

### 476525 — Pushrod

Intake and exhaust pushrod for all cast iron cylinder heads.

### 14102521 — Pushrod

Exhaust pushrod for 1987 and later aluminum cylinder heads.

### 14102522 — Pushrod

Intake pushrod for 1987 and later aluminum cylinder heads.

### 10078973 — Pushrod Guideplate

For 1987 and later aluminum heads.

**Technical Note:** Use on cylinders #1, 3, 4, and 6.

### 10078974 — Pushrod Guideplate

For 1987 and later aluminum heads.

**Technical Note:** Use on cylinders #2 and 5.

## GROUPS 0.519 - .539 CAMSHAFTS, CAMSHAFT KITS AND BEARINGS

### 14031378 — High Output Camshaft

This flat tappet hydraulic cam is used in high-performance X-11 and fuel-injected V6/60° engines. It has .394" intake lift and .410" exhaust lift. The intake duration is 276° at the lash point and 196° at .050" from the base circle. The exhaust duration is 293° at the lash point and 203° at .050" from the base circle.

### ►NEW 24505674 — Camshaft "Roller Lifter Design"

This Gen III Roller lifter design camshaft features 6000 rpm operation (spring installed at 1.66") with a power peak at 5200 rpm. It features a cast iron distributor drive gear for improved durability.

**Technical Note:** Requires fabrication to secure anti-rotation bars and installation of thrust control device.

The following camshaft kits were designed and manufactured by Crane Camshaft Co.® for GM Service Parts Division. These camshaft kits include (1) camshaft and (12) tappets.

### 12363220 — Camshaft

This performance flat tappet hydraulic camshaft is used in the new 3.4-liter engine conversion package (P/N 12363230) and is also applicable to 2.8-liter and 3.1-liter engines. Designed to increase mid-range torque and horsepower, this camshaft is ideal for daily performance usage. The duration at .050" lift (intake/exhaust) is 204°/216°, while the valve lift is .427"/.454". The basic RPM range is 1500-4500, and the lobe separation is 107°.

**Technical Note:** Use with valve spring P/N 12363215 and retainer P/N 12363216.



### 12353919 — Camshaft Kit

All models car and truck Chevrolet V6/60° (2.8L & 3.1L) for off highway use. Smooth idle, daily usage, off road, towing, economy, mild turbo-charged 8.0 - 9.5 to compression ratio, 2200 - 2600 cruising RPM. Basic RPM range 1500 - 4000, 6500 RPM attainable with proper valve springs and lifters.

Duration .050	Lift	Lobe Centerline
Int. Exh.	Int. Exh.	
204° 214°	.420" .442"	112

### 12364059 — Camshaft Kit

Applicable to all 1980-94 Chevrolet 60° V6 (2.8-liter & 3.1-liter) engines, this performance-oriented camshaft kit is designed to significantly improve mid-range torque and horsepower without sacrificing idle quality. The basic RPM range is

1500-4500 with 6500 RPM attainable using proper valve springs. Cruise RPM is designed for 2200-2600 RPM, and a compression ratio of 8.0-9.5 to 1 is recommended. This kit is not legal for pollution-controlled vehicles.

**Technical Note:** This is a hydraulic flat tappet camshaft kit which includes tappets.

Duration .050	Lift	Lobe Centerline
Int. Exh.	Int. Exh.	
204° 216°	.427" .454"	112

### 12453171 — Camshaft Bearing

This small-block V8 cam bearing provides a wider bearing surface than standard V6/60° bearings. This bearing should be installed in the front and rear bearing housings.

**Technical Notes:** Check bearing position in block after installation. Oil hole should be located between 4 o'clock and 5 o'clock position when viewed from front of block.

### 12453172 — Camshaft Bearing

Small-block V8 cam bearing for #2 and 3 bearing housings.

**Technical Note:** See above.

### 17120070 — Roller Tappet

These roller tappets are used on late model V6/60° engines for improved performance.

**Technical Note:** Must be used with late model cylinder blocks.

## GROUP 0.603 CONNECTING RODS

### 12515767 — Connecting Rod

This forged steel connecting rod is used in all V6/60° Chevrolet engines. It has a 5.700" center-to-center length.

**Technical Notes:** Production rods are suitable for off-highway V6/60° engines which operate at a maximum engine speed of 7000 rpm. See the Chevy Power manual for recommended modifications. Use bolt P/N 466337 and nut P/N 361970 for service.

### 12480255 — Connecting Rod Bearing

Standard diameter, for all V6/60° engines.

## CRANKSHAFTS

### GROUPS 0.646 - .649 CRANKSHAFTS AND PILOT BEARINGS

#### 10048682 — Crankshaft

This 76mm (2.99") stroke cast nodular iron crankshaft is used in 1985–87 2.8-liter V6/60° engines.

**Technical Notes:** This crank has 67mm main bearings, and is recommended for heavy-duty applications. Its rod and main bearing journals have rolled fillets. This crankshaft is externally balanced, and requires a counter-weighted flywheel for proper engine balance.

#### 14085481 — Crankshaft

This 76mm (2.99") stroke cast nodular iron crankshaft is used in 1987 and later 2.8-liter Generation II V6/60° engines with aluminum cylinder heads. It has an integral timing disc that provides reference signals for an ignition control module.

**Technical Notes:** This crankshaft has 67mm main bearings. It is internally balanced; use with a neutral balanced flywheel for proper engine balance.

#### 10146900 — Crankshaft

This 84mm (3.31") stroke cast nodular iron crankshaft is used in 1989–up 3.1-liter V6/60° engines with aluminum cylinder heads.

**Technical Note:** This crankshaft can be used to increase the displacement of off-highway V6/60° engines. The piston compression height must be reduced to compensate for the longer crankshaft stroke.

#### 476574 — Clutch Pilot Bearing

For all Camaro and S-10 applications.

## DAMPERS & FLYWHEELS

### GROUPS 0.659 - .685 DAMPERS AND FLYWHEELS

#### 14085401 — Torsional Damper

All V6/60° Chevrolets use a neutral balanced torsional damper. This damper is used on V6/60° engines installed in Camaros and S-10 trucks.

#### 14001828 — Torsional Damper Bolt

#### 14085472 — Flexplate

Counterweighted flexplate for automatic transmissions in 1982–87 Camaro and S-10.

#### 12338144 — Flexplate Bolt

For all V6/60° automatic transmission flexplates used in Camaros and S-10s.

#### 476576 — Flywheel Bolt

For all V6/60° manual transmission flywheels used in Camaros and S-10s.

### GROUP 0.724 TIMING CHAINS

#### 14102670 — Timing Chain

Silent link timing chain for all V6/60° engines.

## OIL PANS & GASKETS

### GROUPS 1.426 - .429 OIL PANS AND GASKETS

#### 14077878 — Oil Pan

For 1982–86 Camaro and S-10 truck.

**Technical Note:** Use rear seal P/N 476591.

#### 10078999 — Oil Pan

For 1987 Camaro and S-10 truck.

#### 14089825 — Oil Pan Reinforcement

Front pan reinforcement for all 1987 and later V6/60° engines.

### GROUPS 1.609 - .652 OIL PUMPS AND SPRINGS

#### 10044435 — Oil Pump Spring

Oil pressure in V6/60° engines is regulated by a spring in the oil pump cover. This spring (color coded with a blue stripe) will produce approximately 70 psi oil pressure.

#### 10051104 — High Volume Oil Pump

This heavy-duty cast iron oil pump has longer gears than a production V6/60° oil pump. It has 25% more capacity than a standard pump, and is highly recommended for all off-highway V6/60° Chevrolets.

**Technical Note:** This unit does not include oil pump screen.

## INDUCTION

### GROUPS 3.265 - .270 INTAKE MANIFOLDS AND GASKETS

#### 14044991 — Intake Manifold

This two-barrel aluminum intake manifold is used on rear-wheel-drive V6/60° Chevrolets.

**Technical Note:** Manifold can be modified to mount a two-barrel Holley carburetor for off-highway applications.

#### 24508393 — Intake Manifold "Lower"

This high flow intake manifold is used on late Gen III design model V6/60° engines. This manifold matches to port locations of the Gen III head with revised fuel injection locations for improved targeting on the intake valve.

**Technical Note:** Must be used with new cylinder head P/N 10218167 and upper manifold P/N 24508396.

#### 24508396 — Intake Manifold "Upper"

This high flow intake manifold is used on late Gen III design model V6/60° engines. This manifold is the upper half of manifold P/N 24508393.

**Technical Note:** Must be used with new cylinder head P/N 10218167.

#### 477203 — Manifold Oil Shield

Similar to above, for intake manifold P/N 14067630.

#### 12520756 — Manifold Gasket Kit

For all 1982 and later models.

#### 17122147 — Throttle Body V6/60°

This Gen III throttle body is used on late model V6/60° engines for improved performance.

## FUEL PUMPS

### GROUP 3.900 FUEL PUMPS

#### 6471930 — Fuel Pump

For carbureted V6/60° engines in Camaros and S-10 trucks.

#### 6472020 — Fuel Pump

For transverse-mounted carbureted V6/60° engines.

#### 14033175 — Fuel Pump Pushrod

16mm diameter for all carbureted models.