

TUNE-UP

ENGINE IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER CODE

The fifth digit of the Vehicle Identification Number, located on a plate attached to the left top of instrument panel and visible through windshield, is the engine code letter.

VIN Engine Codes

Application	Code
350" V8 EFI	8
350" V8 Diesel	N
368" V8 4-Bbl.	6
368" V8 Fuel Injection (DEFI)	9

ENGINE IDENTIFICATION NUMBER

Engine identification number for all Seville, Eldorado and Diesel engines is located on left side of cylinder block at front below cylinder head. For all other models, engine number is on cylinder block behind left cylinder head.

TUNE-UP NOTES

NOTE — In order to comply with emission standards, specifications shown on engine compartment emission control tune-up decal must be used in all instances.

CAUTION — Before making a compression test or cranking engine using a remote starting switch, disconnect ignition switch feed wire at distributor.

CAUTION — Do not remove spark plug wires with engine running. High Energy Ignition system secondary voltage is higher than standard ignition systems and may inflict harmful electrical shock.

CAUTION — Damage to H.E.I. electronic module may result if "TACH" terminal, in distributor cap connector, is directly grounded.

NOTE — Ensure that all diesel injection lines and fittings are thoroughly cleaned before removing. Cap all lines, nozzles and fittings when removed. Dirt in system may damage injection pump.

ENGINE COMPRESSION

GASOLINE ENGINES

Compression Ratio	
350" V8	8.0:1
368" V8	8.2:1
Recommended Fuel	Unleaded (87 AKI Minimum)
Compression Pressure	
350" V8	100 psi (minimum)
368" V8	140-165 psi
Max. Variation Between Cylinders	30%

Test compression pressure with engine at normal operating temperature, all spark plugs removed and throttle and choke valves wide open.

DIESEL ENGINES

NOTE — Prior to checking compression, be sure batteries are fully charged to avoid battery run-down. When turning engine over during test, 6 "puffs" per cylinder should be used to obtain reading.

Compression Ratio	22.5:1
Compression Pressure	275 psi (minimum)
Max. Variation Between Cylinders	30%
Recommended Fuel	⓪ Diesel 2-D

⓪ — Use 1-D for vehicles operated below 20°F.

1) Remove air cleaner. Install air crossover screened cover (J-26996-1).

2) Disconnect electrical wire from fuel solenoid terminal of injection pump.

3) Disconnect glow plug wires. Remove all glow plugs.

4) Use suitable compression tester (J-26999 or equivalent) to test individual cylinders.

NOTE — Compression should build up quickly and evenly to proper level while rotating engine past 6 compression strokes. If piston rings are worn or cracked, compression will read low on first stroke, will rise on each stroke thereafter, but will not reach normal level.

VALVE TAPPET CLEARANCE

Hydraulic Lifters

Zero Lash

VALVE ARRANGEMENT

350" V8 Gas	
E-I-E-E-I-E-I-E (Front-to-rear, both banks)	
350" V8 Diesel	
I-E-I-E-E-I-E-I (Front-to-rear, both banks)	
368" V8	
I-E-I-E-I-E-I-E (Front-to-rear, left bank)	
E-I-E-I-E-I-E-I (Front-to-rear, right bank)	

SPARK PLUGS

Gap (All)060"
Torque (All)	25 ft. lbs.

Spark Plug Type

Application	AC No.
Eldorado, Seville	R47SX
All Others	R45NSX

GLOW PLUGS

350" V8 Diesel	GM-5613680
Torque	12 ft. lbs.

TUNE-UP (Cont.)

HIGH TENSION WIRE RESISTANCE

Carefully remove ends of wire from spark plug and distributor. Using an ohmmeter, check resistance while gently twisting wire. If resistance is not to specification, or fluctuates from infinity to any value, replace wire.

Wire Length	Resistance (Ohms)	Maximum
0-24"		30,000
24"+		50,000

DISTRIBUTOR

All gasoline engine models except the 368" V8 with Digital Electronic Fuel Injection (DEFI) use Electronic Spark Selection (ESS) with a standard nonadjustable High Energy Ignition (HEI) system. The 368" V8 DEFI uses an Electronic Spark Timing (EST) system with a modified HEI system. The distributor has no vacuum advance unit and no mechanical advance weights. It uses a 7-pin Electronic Control Module (ECM). Pickup coil and harness are not interchangeable with the standard HEI distributor. EST controls ignition timing with respect to crankshaft position and controls spark dwell ("ON" time). Spark advance is determined by engine speed and load.

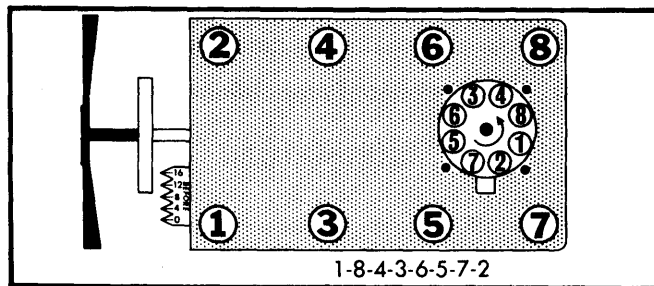


Fig. 1 350" Firing Order and Timing Mark Identification

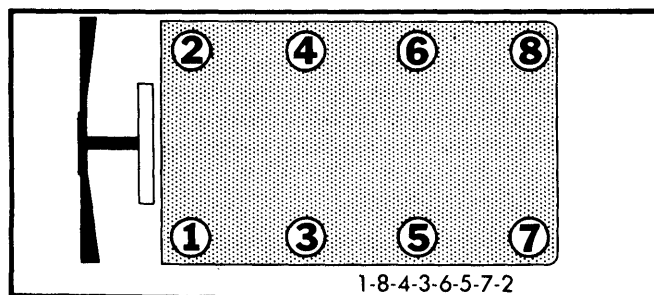


Fig. 2 350" Diesel Firing Order

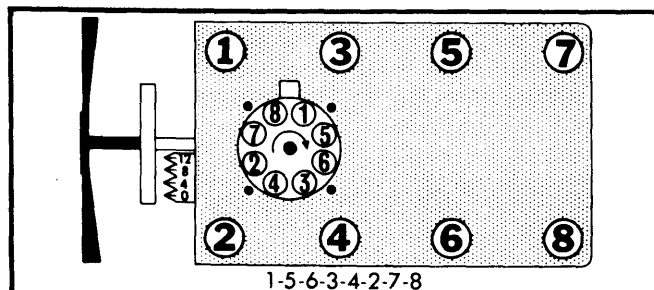


Fig. 3 368" Firing Order and Timing Mark Identification

IGNITION TIMING

NOTE — Engines are equipped with a receptacle for a magnetic probe timing light, located at 9.5° ATDC. Do not use this location for timing with a conventional light.

Check or adjust ignition timing with engine at normal operating temperature, distributor and EGR vacuum lines disconnected and plugged, and engine at specified RPM.

CAUTION — Do not puncture lead wire and do not attempt to time engine on 7 cylinders due to possible damage to catalytic converter from unburned fuel.

Ignition Timing Specifications (Degrees BTDC@RPM)

Application	Setting
368" Engine	
With Carburetor (ESS)	18@1400
With DEFI (EST)	①10 below 800
350" Engine With EFI (ESS)	10@600

① — Engine wiring harness test lead (green connector) must be grounded.

INJECTOR TIMING (DIESEL ENGINES ONLY)

Engine is properly timed when marks on top of injection pump adaptor and pump flange are aligned. If marks are not aligned, adjustment is necessary. Engine must be OFF.

1) Loosen 3 pump retaining nuts with suitable wrench (J-26987).

2) Align mark on pump with mark on adapter and tighten nuts. Torque to 35 ft. lbs.

NOTE — Use a 3/4" wrench on the boss at front of injection pump to aid in rotating pump to align marks.

3) Adjust throttle rod. See Linkage Adjustment in G.M. Diesel Fuel Injection article in FUEL SYSTEM Section.

HOT (SLOW) IDLE RPM

GASOLINE ENGINES

NOTE — Idle mixture and ignition timing adjustments must be correct before idle speed adjustment can be made.

Models With Carburetor — 1) Disconnect and plug parking brake hose at vacuum release cylinder. Set parking brake and block drive wheels. Disconnect and plug air leveling compressor hose at air cleaner.

2) With engine at normal operating temperature, place transmission in drive, and turn air conditioning "OFF".

3) Turn idle speed screw on throttle lever side of carburetor to obtain specified "Curb Idle" RPM.

4) Reconnect all disconnected hoses. Disconnect A/C compressor wires at compressor and turn A/C to "AUTO" position.

TUNE-UP (Cont.)

5) Open throttle slightly to allow solenoid plunger to fully extend. Adjust solenoid to obtain specified "Solenoid Energized" RPM.

6) After adjustment is completed, reconnect A/C compressor wires.

Models With Electronic Fuel Injection (EFI) – 1) Disconnect and plug distributor vacuum advance hose and parking brake hose at vacuum release cylinder. Set parking brake and block drive wheels.

2) With engine at normal operating temperature, place transmission in drive, and turn air conditioning "OFF".

3) Loosen lock nut on idle by-pass adjusting screw on front of throttle body. Adjust by-pass screw to obtain specified "Curb Idle" RPM.

4) After adjustment is completed, tighten idle by-pass screw lock nut and reconnect all disconnected hoses.

Models With Digital Electronic Fuel Injection (DEFI) – Idle speed is controlled by the Idle Speed Control (ISC) motor and is not adjustable. See General Motors Digital Electronic Fuel Injection in FUEL SYSTEMS Section.

Application	Idle Speed (RPM) (Gasoline Engines)	
	Curb Idle	Solenoid Energized
350" V8 EFI	600
368" V8		
4-Bbl. Carburetor		
Federal	500	650
Calif.	575	650
DEFIⓄ

Ⓞ – Not adjustable. See General Motors Digital Electronic Fuel Injection in FUEL SYSTEMS Section.

DIESEL ENGINES

NOTE – Use magnetic pickup tachometer (J-26925 or equivalent) to check idle speed. Insert probe in timing indicator hole.

1) Disconnect and plug parking brake hose at vacuum release cylinder. Set parking brakes and block drive wheels.

2) With engine at normal operating temperature, place transmission in drive, and turn air conditioning "OFF".

3) Adjust slow idle screw on injection pump (Fig. 4) to obtain specified idle speed RPM.

4) After adjustment is completed, reconnect all disconnected hoses.

Idle Speed (RPM) (Diesel Engines)

Application	Idle Speed
350" V8 Diesel	575

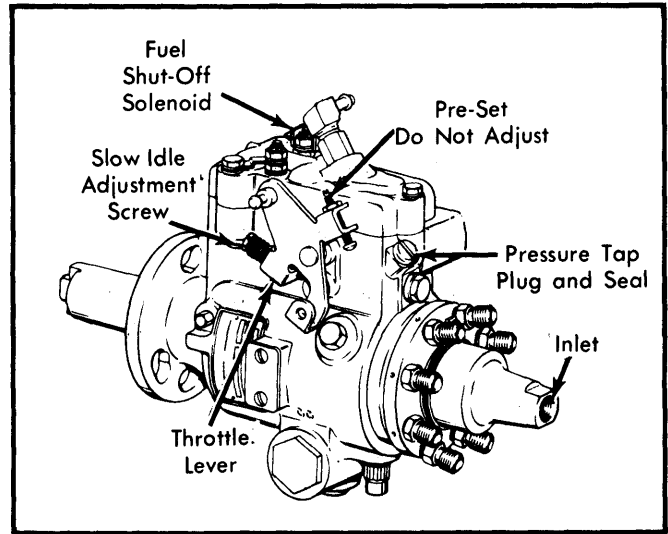


Fig. 4 Diesel Injection Pump Adjustment Locations

IDLE MIXTURE

NOTE – The idle mixture adjustment procedure is for carbureted models only. Fuel injection air/fuel mixture is programmed into the system and cannot be adjusted.

MIXTURE SCREW PLUG REMOVAL

NOTE – Idle mixture needles are recessed in the throttle body casting and sealed with hardened plugs. Manufacturer recommends plug removal and mixture adjustment only after major carburetor overhaul, throttle body replacement or emissions failure.

If plugs must be removed, proceed as follows:

1) Remove carburetor from engine, invert carburetor and drain fuel into a suitable container. Place inverted carburetor on suitable holding fixture with manifold side up.

2) Using a punch between the 2 locator points under throttle body (manifold side), break through throttle body and drive out hardened steel plug covering mixture needle.

NOTE – Plug will shatter rather than remain intact. Remove loose pieces.

3) Repeat procedure to remove remaining mixture screw plug. Reinstall carburetor on engine. Use a thin wall 3/16" deep socket to make mixture adjustments.

TUNE-UP (Cont.)

PROPANE ENRICHMENT PROCEDURE (CARBURETED MODELS - EXCEPT CALIFORNIA)

1) With engine at normal operating temperature, choke fully open and air conditioning "OFF", set parking brake and block drive wheels. Disconnect and plug hose at parking brake vacuum release cylinder. Disconnect and plug other hoses as specified on Emission Control Information Label under hood.

2) Connect a tachometer to engine. Disconnect vacuum advance and set timing to specification on Emission Label. Reconnect vacuum advance. Disconnect crankcase ventilation tube from air cleaner. Insert hose with rubber stopper tool J-26911 from propane valve into positive crankcase ventilation tube opening in air cleaner.

3) Propane cartridge must be in a vertical position. Slowly open propane control valve until maximum engine speed is reached with transmission in "D".

NOTE - Too much propane will cause engine speed to drop.

4) Observe propane flow meter to ensure propane cartridge is full. With propane flowing, adjust idle speed screw to the enriched setting of 535-545 RPM. Readjust propane flow to be certain of maximum engine speed and adjust idle speed if necessary.

5) Turn off propane. Place transmission in neutral and run at 2000 RPM for 30 seconds. Place transmission in "D". Check idle speed. If it is as shown on Emission Label, idle mixture is correct. Proceed to step 8).

6) If idle speed is too low, back out mixture screws equally (richer) $\frac{1}{8}$ turn at a time until specified speed is obtained. If speed is too high, turn in screws equally (leaner) $\frac{1}{8}$ turn at a time until specified speed is obtained.

NOTE - It may be necessary to remove air cleaner to reach idle mixture screws. Reinstall air cleaner to check idle speed.

7) Turn propane on again to check maximum engine idle speed. If speed is different from specification, readjust idle speed screw to enriched RPM with propane flowing. Turn off propane and accelerate engine to 2,000 RPM for 30 seconds and recheck idle speed. Idle speed should be to specification, if not repeat procedure starting with step 6.

8) If idle is unusually rough, turn mixture screws in until lightly seated. Back screws out equally to average previous position and rerun propane idle test starting with step 2. If idle is correct, turn engine off and remove propane tool. Connect positive crankcase ventilation and reconnect all other hoses.

IDLE BLEED VALVE ADJUSTMENT (C-4 SYSTEM)

1) Connect tachometer to distributor side of tachometer terminal harness or short brown pigtail wire at distributor cap. Connect dwell meter leads to engine harness green connector near carburetor and to ground.

2) With hoses disconnected and plugged as directed on emission control label, run engine for at least 3 minutes at normal operating temperature and ensure that curb idle speed is properly set. With engine idling in DRIVE, check dwell meter reading on 6 cylinder scale.

3) If dwell varies between 10° and 15°, adjustment is correct. If not, shut engine off and cover internal bowl vents and air inlets to bleed valve with masking tape. Cover primary and secondary carburetor air intakes with cloth to prevent chips from entering carburetor and engine.

4) Use a #35 drill (.110") to remove rivet head holding idle air bleed valve cover in place. Drill remaining rivet heads carefully and lift out cover over idle air bleed valve. Using compressed air, carefully blow out any remaining chips inside tower. Discard cover after removal.

NOTE - A missing cover indicates the air bleed valve setting has been changed from its original factory setting.

5) With engine idling in drive, slowly turn valve up or down until dwell varies within the 25°-35° range, as close to 30° as possible. If unable to meet these conditions, it will be necessary to remove carburetor and adjust idle mixture.

NOTE - Idle air bleed valve is very sensitive and should be turned only in $\frac{1}{8}$ turn increments.

IDLE MIXTURE ADJUSTMENT (C-4 SYSTEM)

1) Remove and drain carburetor, then place in a suitable mounting device with manifold side UP. Using a punch between the 2 locator points in throttle body under idle mixture plug (manifold side), break out throttle body to gain access to idle mixture needle plug.

2) Drive out hardened steel plug (it will shatter) and remove loose pieces. Use tool (J-29030) and turn each idle mixture needle in until lightly seated. Back out each needle $3\frac{1}{2}$ turns, and install carburetor without air cleaner. Repeat Idle Bleed Valve Adjustment.

COLD (FAST) IDLE RPM

CARBURETED MODELS ONLY

1) With ignition timing set, disconnect and plug distributor and EGR vacuum hoses. Start and warm-up engine to normal operating temperature with transmission in park and air conditioning "OFF".

2) Open throttle and place cam follower on second step of fast idle cam. Turn fast idle speed adjusting screw to obtain specified fast idle RPM. Reconnect all disconnected hoses.

Fast Idle Speed (RPM) (Carbureted Models Only)

Application	RPM
368" V8 4-Bbl.	
Federal	1450
California	1350

TUNE-UP (Cont.)

**FAST IDLE SOLENOID
(DIESEL MODELS ONLY)**

- 1) Disconnect and plug parking brake hose at vacuum release cylinder. Set parking brake and block drive wheels. Disconnect A/C compressor wires.
- 2) Place transmission in drive and turn air conditioning "ON". Adjust fast idle solenoid plunger to obtain an engine speed of 650 RPM.
- 3) After adjustment is completed, reconnect A/C compressor wires and all disconnected hoses.

AUTOMATIC CHOKE

Choke cover is held in position by pop-rivets and should not be adjusted.

FUEL PUMP**CARBURETED MODELS**

Pressure (At 1800 RPM) 5.25-6.5 psi
Volume (At Idle) 1 pint in 30 sec.

FUEL INJECTED MODELS

350" V8 EFI
Pressure (At Idle) 39 psi
Delivery Rate 33 gals. per hour
368" V8 DEFI
Pressure at Injectors 10.5 psi

**INJECTION PUMP FUEL PRESSURE
(DIESEL ENGINES ONLY)**

- 1) Remove air crossover. Install screened covers (J-26996-2). Remove fuel return pressure tap plug. See Fig. 4.
- 2) Screw pressure tap adaptor (J-28526 or equivalent) into pump housing. Be sure to use seal from tap plug on tap adaptor before installing. Connect a low pressure gauge to adaptor.

GENERAL SERVICING**IGNITION****DISTRIBUTOR****Delco High Energy Ignition (HEI)**

368" V8 engines with Digital Electronic Fuel Injection (DEFI) use a modified HEI distributor with Electronic Spark Timing (EST). This distributor does not use a vacuum advance unit or mechanical advance weights. Spark timing is calculated by a digital computer (ECM). Remaining models use HEI with Electronic Spark Selection (ESS) which has vacuum advance and centrifugal advance weights in the distributor.

NOTE — Module must be replaced as a unit. A liberal coat of silicone grease **MUST** be applied to surface on which module will be mounted.

- 3) Connect magnetic pickup tachometer (J-26925 or equivalent). Start engine and check pressure with engine at 1000 RPM. Pressure should be 8-12 psi with not more than 2 psi fluctuation.

- 4) If pressure is incorrect, replace fuel return line connector assembly and if still incorrect, remove injection pump and repair.

- 5) Remove tachometer, pressure gauge and adaptor. Put a new pressure tap plug seal on pressure tap plug, then screw in tap plug. Remove screened covers and install air crossover.

**INJECTION NOZZLES
(DIESEL ENGINES ONLY)**

If engine starts, but idles roughly, check injection nozzles as follows:

- 1) Start and idle engine. Loosen line fitting at each nozzle, one at a time. Ensure that fuel is directed away from any sources that could ignite spray or vapor.

- 2) If, when nozzle fitting is loosened, idle speed or quality does not change, replace that nozzle and repeat test.

OXYGEN SENSOR

1980 DeVilles and Broughams sold in California are equipped with the Computer Controlled Catalytic Converter (C-4) system which, in addition to other components, uses an Exhaust Gas Oxygen Sensor. This closed end Zirconia sensor is placed in the exhaust system and provides signals to the Electronic Control Module (ECM) to vary the air/fuel mixture as required. Oxygen sensor requires replacement every 15,000 miles. Disconnect sensor and remove from right side exhaust manifold. Apply high temperature anti-seize compound and install new sensor. Reset odometer "SENSOR" indicator by lowering steering column cover and pulling lightly on reset cable at bottom left of speedometer cluster.

EXHAUST EMISSION SYSTEMS

See EXHAUST EMISSION SYSTEMS section.

IGNITION COIL**Resistance**

Primary (at 80°F) 0.4-0.5 ohms
Secondary (at 80°F) 8,000-9,500 ohms

Coil Output

At all engine speeds 25-35 KV Minimum ⊙
⊙ — Replace if below 25 KV.

GENERAL SERVICING (Cont.)

CARBURETION/FUEL INJECTION

CARBURETOR

Application	Model
368" V8 4-Bbl.	
Federal	Rochester M4ME
Calif.	Rochester E4ME

Other Data & Specifications — See *Tune-Up and Rochester Carburetors* in **FUEL SYSTEMS** Section.

FUEL INJECTION

Electronic Fuel Injection (EFI) is used on all 350" V8 gasoline engines. Digital Electronic Fuel Injection (DEFI) is offered as standard equipment on all Federal Eldorado models and as an option on 368" V8 Seville models. EFI delivers precisely metered fuel to injectors at the intake manifold, while the DEFI system delivers this calculated amount through injectors mounted on the throttle body above the throttle plates.

Other Data & Specifications — See *Tune-Up and General Motors Electronic Fuel Injection* in **FUEL SYSTEMS** Section.

FUEL INJECTOR DELIVERY SEQUENCE

- First Group — Cylinders 1,2,& 7,8.
- Second Group — Cylinders 3,4 & 5,6.

All injectors in each group are open simultaneously and each group is opened alternately.

DIESEL FUEL INJECTION

Application	Type
350" V8 Diesel	Gear Driven Mechanical Fuel Injection Pump (High Pressure Rotary)

Other Data & Specifications — See *Tune-Up and General Motors Diesel Fuel Injection* in **FUEL SYSTEMS** Section.

ELECTRICAL

BATTERY

12 Volt — Negative Ground.

Application	Cranking Power Amps at 0°F
All Models	⓪540

⓪ — Diesel engine models use 2 batteries.

STARTER

Delco-Remy solenoid actuated with overrunning clutch.

Free Speed Voltage	Free Speed Amperage
Exc. Diesel	9 at 7000-10,500 RPM
Diesel	9 at 9500-13,000 RPM
All	65-95 at 7,000-13,000 RPM

ALTERNATOR

Application	Rated Amp. Output
Standard	
DeVile & Brougham	63
DeVile & Brougham W/Rear Defogger	70
Diesel, Eldorado, Fleetwood & Seville	80
Heavy Duty (Optional all models)	100

ALTERNATOR REGULATOR

Delco-Remy nonadjustable, integral with alternator.

ENGINE

INTAKE MANIFOLD TIGHTENING

350" V8 Gas and Diesel — Tighten intake manifold, in sequence shown in Fig. 5, to 40 ft. lbs.

368" V8 — Tighten intake manifold bolts in a criss-cross pattern, beginning with bolts nearest center, to 30 ft. lbs.

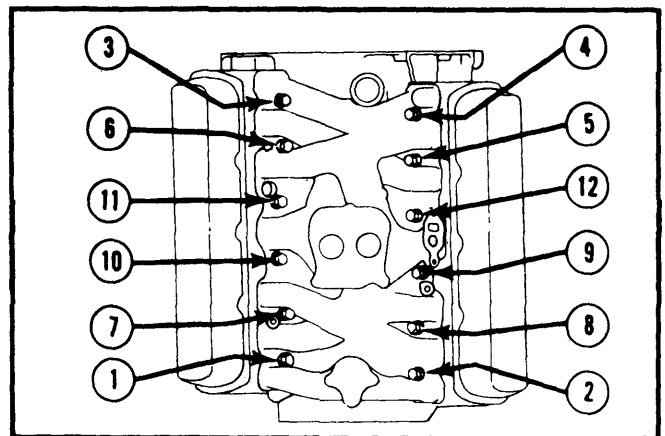


Fig. 5 Intake Manifold Tightening Sequence 350" V8 Gas and Diesel

CAPACITIES (COOLING)

Application	Quantity (Qts.)	
	Gasoline Engine	Diesel Engine
Seville	⓪22.4	18.5
Eldorado	ⓑ15.2	18.5
All Others	21.4	23.7

⓪ — 15.2 qts. California.
 ⓑ — 22.4 qts. California.

1980 Cadillac V8 Tune-Up

GENERAL SERVICING (Cont.)

CAPACITIES (EXCEPT COOLING)

Application	Quantity
Crankcase ^①	
350" Gasoline Engine	4.0 qts.
368" Gasoline Engine	5.0 qts.
350" Diesel Engine	6.0 qts.
Auto. Trans. (Dextron II) ^②	
THM 200	8.5 pts.
THM 325 (Eldorado & Seville)	10.0 pts.
THM 400	9.0 pts.
Rear Axle (SAE 80W-90)	4.25 pts.
Final Drive (SAE 80W-90)	
Eldorado & Seville	3.2 pts.
Fuel Tank	
Seville & Eldorado	
Diesel	23.0 gals.
Gasoline	20.6 gals.
All Others	
Diesel	26.0 gals.
Gasoline	20.7 gals.

① - Add 1 qt. with filter change.
② - Drain and refill capacity.

BELT ADJUSTMENT

Tension (Lbs.) Using Strand Tension Gauge

Application	New Belt	Used Belt
350" & 425"		
All Models	110-140	60-120

FILTERS & CLEANERS (GASOLINE ENGINES)

Filter or Cleaner	Service Interval (Miles)
Oil Filter	Replace every other oil change
Air Filter	Replace every 30,000
Fuel Filter	Replace every 15,000
PCV Valve	Replace every 30,000
Canister Filter	Replace every 30,000

FILTERS & CLEANERS (DIESEL ENGINES)

Service Item	Service Interval (Miles)
Engine Oil ^①	Change every 3000
Oil Filter	Replace every 3000
Fuel Filter	Replace every 24,000
Air Cleaner	Replace every 30,000
Crankcase Ventilation System	②15,000

- ① - Use ONLY engine oils labeled with the A.P.I. designations SE and CC. Be sure the oil has both the SE and CC designations. DO NOT use an oil if the designation CD appears anywhere on the can.
- ② - Clean breather cap/valve assembly and ventilation filter assemblies (both valve covers) every 6000 miles. Replace breather cap/valve assembly and flow control valve every 30,000 miles.