

## GENERAL MOTORS SYSTEMS

### DESCRIPTION

Several systems are used to control emission of pollutants. System usage depends on model, engine and transmission combination. Each system is designed to control a particular vehicle emission.

**NOTE:** There are 2 light duty truck emission control standard classifications: Light Duty and Heavy Duty. Light Duty refers to vehicles up through 8,500 lbs. GVW; Heavy Duty refers to vehicles over 8,500 lbs. GVW.

### THERMAC AIR CLEANER (TAC)

Used on all models, this unit is designed to aid engine in more complete burning of air/fuel mixture and to provide smoother operation. It does this by controlling temperature of intake air. Heated or cooled portions of air are fed into air cleaner assembly as temperature sensor regulates.

### AIR INJECTION REACTOR (A.I.R.)

This system, uses an air pump to supply additional fresh air to exhaust ports, further burning exhaust gases before they reach exhaust system. This reduces hydrocarbon (HC) and carbon monoxide (CO) emissions. *For additional information, see "Air Injection Systems — Air Pump Type" article in this section.*

### PULSE AIR INJECTION REACTOR (PAIR)

This PAIR system, used on 4.1L 6-cylinder models, allows additional fresh air into exhaust system without using an air pump. A special set of check valves is used. These respond to exhaust system pulses, drawing in fresh air. As with the A.I.R. system, HC and CO emissions are reduced.

### EXHAUST GAS RECIRCULATION (EGR)

This system recirculates exhaust gases into the intake manifold and combustion chambers. This has the effect of lowering combustion temperatures, thereby lowering NO<sub>x</sub> emissions.

### VACUUM ADVANCE SPARK CONTROL

Used on all models, this system provides increased spark advance during cold engine operation. When engine coolant temperature is below 100°F (38°C), the thermal vacuum switch (TVS) closes. Manifold vacuum is supplied to distributor through a delay valve, which holds vacuum at high levels during acceleration. Above 100°F (38°C), TVS opens, causing manifold vacuum to bypass delay valve.

### EARLY FUEL EVAPORATION (EFE)

Used on all Light Duty and some Heavy Duty Emission models. During cold engine operation, system allows exhaust gases to base of carburetor. This improves driveability while reducing exhaust emissions.

### THROTTLE RETURN CONTROL (TRC)

Used on all Heavy Duty Emission models. Upon deceleration, system opens throttle slightly, thus reducing hydrocarbons during coastdown.

### CATALYTIC CONVERTER (CAT)

Used on all Light Duty Emission models, this unit is connected into exhaust system so exhaust gas passes through converter. Inside converter, a chemical reaction takes place which reduces exhaust emissions. *For additional information, see "Catalytic Converter" article in this section.*

### POSITIVE CRANKCASE VENTILATION (PCV)

System removes engine crankcase vapors which result from normal combustion. Vapors are drawn through a metered PCV valve, and routed back to intake manifold where they are reburned in combustion chamber. *For additional information, see "Crankcase Ventilation" article in this section.*

### EVAPORATIVE EMISSION CONTROL (EEC)

This system, used on all except Federal Heavy Duty Emissions models, is designed to keep fuel system vapors from escaping to atmosphere. This sealed system separates fuel vapors and routes them to engine to be burned, while retaining liquid fuel in tank. A carbon canister stores vapors until engine draws them off for burning. *For additional information, see appropriate "Fuel Evaporation System" article in this section.*