



Tech Tip

FUEL SYSTEM 141

THROTTLE BODY MAINTENANCE A System Clean-Up May Prevent Costly Repairs

When you perform maintenance or service a customer's vehicle, are you inspecting the throttle body for contamination and recommending a clean-up when needed? If you are like the majority, you are not doing that. Most technicians wait until the customer complains about a performance problem before suggesting any attention in this area. Waiting on a performance complaint could result in the replacement of some expensive components, especially if the vehicle is fitted with electronic throttle control. This will be covered later in more detail, supported by illustrations reflecting damage incurred due to contamination. It may influence your service recommendations.

Vehicles have been plagued with throttle body bore contamination since the introduction of port fuel injection (PFI). While the PFI systems provide many benefits, including improved performance, fuel economy and lower emission output, the system is plagued with intake and throttle bore contamination problems, by design. Unlike a throttle body injection (TBI) system, there is no fuel passing through the throttle bore on a PFI system, resulting in the buildup of contaminants. Eventually, those deposits must be removed to restore engine performance.

SOURCE OF CONTAMINATION

Deposit formations accumulating around the throttle plate, throttle bore and intake plenum restrict the air flow. Any obstruction that affects the air flow around the throttle plate will result in a rolling or hunting idle, poor idle or stalling condition. The source of these deposits is from the combustion and crankcase gases. The accumulation of the gases originates via the PCV system, especially on engines where the PCV valve is positioned near the throttle plate. EGR gases also mix with the gases from the PCV system to form the gummy or waxy residue. The piston strokes and the negative to positive pressure pulsations direct the gases toward the throttle bore and throttle plate, where they are baked on due to the intense heat, forming a gummy residue. Both foreign and domestic vehicles are susceptible to the same conditions. Some vehicles may encounter a sticking throttle sensation due to the build-up of the residue, while vehicles equipped with electronic throttle control may encounter broken gears

in the throttle body. Let's consider two cases of throttle resistance related problems:

MECHANICAL THROTTLE CONTROL

When the customer complaint involves an unstable idle condition, or excessive pedal pressure is necessary to depress the throttle, the conditions may be due to deposits forming in the throttle bore and on the throttle plate. The sticking throttle condition promotes a lunging symptom on acceleration, or loss of traction once the throttle resistance is overcome. Driving the vehicle with the symptoms present is frustrating and very dangerous.

GM has encountered the sticking throttle condition on 1999-2002 Chevrolet Silverado and GMC Sierra, 2000-2002 Suburban, Tahoe, GMC Yukon, Yukon XL, and 2002 Avalanche vehicles equipped with 4.8L and 5.3L engines, and year models up to 2004 fitted with the 6.0L engine.

To correct the throttle resistance condition, it will be necessary to perform a complete throttle body clean-up, seal the hole drilled in the throttle plate with a special plug, replace the variable orifice PCV valve with a fixed orifice style valve, and increase the TPS sensor voltage, via the minimum air rate screw. A complete description of this procedure, accompanied by the necessary GM parts, is illustrated in Mighty Tech Tip #118. ***This modification does not apply to vehicles fitted with electronic throttle control.***

Most vehicle owners are not aware of the mentioned factory modifications, or they elect not to have them performed. Those vehicles will require a frequent throttle body cleaning to prevent the sticking throttle sensation.

ELECTRONIC THROTTLE CONTROL

Some vehicles are equipped with an electronic throttle control (ETC) system, often referred to as a throttle-by-wire system. The throttle body on this system resembles that of a mechanical throttle body. The difference is that the ETC control system utilizes an electric motor to control the throttle plate, instead of a mechanical linkage attached to the accelerator pedal. This technology will become common in the automotive industry, as it solves many vehicle assembly challenges.

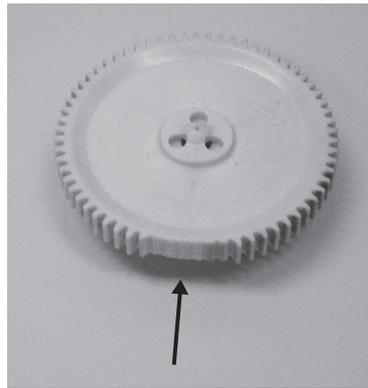
A typical GM ETC system may include a throttle position sensor (TPS) mounted on the throttle body, opposite the side containing the actuator motor. The TPS sensor is actually two sensors in one. One provides a voltage increase as the throttle is depressed, and the second sensor voltage decreases during the same throttle depression. The system also incorporates an accelerator pedal position (APP) sensor mounted on the accelerator pedal. It contains three individual sensors in one housing, providing varying voltage signals in relation to accelerator pedal position. The sensors are monitored by the throttle actuator control module (TAC), which is the controller for the system, and the powertrain control module (PCM).

A sticking throttle plate on an ETC equipped vehicle can be elusive, as there is no mechanical attachment to transfer the resistance to the driver's foot. The vehicle owner will usually complain of a hesitation or stumble when the sticking throttle conditions occur. Some technicians associate the symptoms with a defective throttle position sensor.

CONTAMINATION PROMOTES MECHANICAL FAILURE

Contamination in the throttle bore can result in damage to the ETC system, requiring a throttle body replacement. The GM throttle body illustrated in Fig. 1 reflects damage incurred to the plastic gear that opens and closes the throttle plate, resulting from throttle bore residue. The component parts are not available, requiring a complete throttle body replacement at a cost exceeding three hundred dollars.

The system illustrated had been plagued with some driveability symptoms that reflected throttle bore



Detail of damaged plastic gear shown in Fig. 1

A system clean-up could have prevented the damage to the gear mechanism and saved the costly throttle body replacement.

SAY NO TO NISSAN'S ETC SYSTEM

Cleaning of Nissan's electronic throttle control system is not recommended, as idle RPM problems may be present following the procedure. The symptoms may require an "Idle Air Volume Learn" procedure to be performed. This procedure involves re-programming the computer with Nissan's Consult II.

THROTTLE BODY CLEANING

In previous years, some vehicle manufacturers have made claims that their throttle body design was resistant to sludge. That has not proven to be factual. Some vehicle manufacturers have used by-pass plates to redirect the air, and others have drilled holes in the throttle plates to circumvent idle quality problems, due to air restrictions caused by contamination. A thorough inspection and cleaning, when necessary, should be a part of your maintenance recommendation. It can save the customer the cost of some expensive repairs, especially on systems equipped with electronic throttle control.

Ask your Mighty Rep for a free demonstration of available throttle plate cleaners and the Total Intake System Cleaner. Mighty offers a Foaming Throttle Plate Cleaner which consists of a special blend of solvents that quickly removes the residue from around the throttle plate. The unique foaming action penetrates difficult-to-reach areas without scrubbing.

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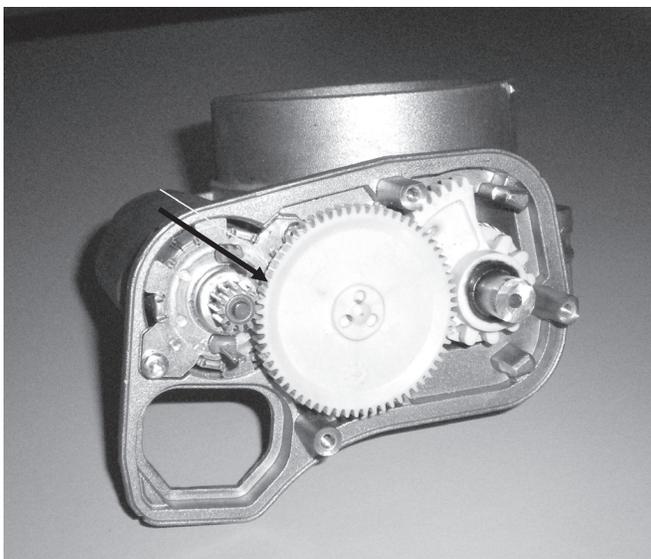


Fig. 1



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