GENERAL MOTORS
INVALID ENGINE TORQUE SIGNAL

COMPLAINT: In this example, a 2007 Pontiac Solstice with 2.4 Liter engine and 5L40E transmission has a complaint of a harsh shift. The scan tool reveals that DTC P2637 is set for an Invalid Engine Torque Signal being sent to the TCM from the ECM. This was the only stored code at this time. There was a previously stored code of P0171 for Fuel System Lean, but was not present at this time.

NOTE: The torque reduction request is sent to the ECM through the CAN communication network. If the TCM receives a torque reduction failure message from the ECM, the torque signal DTC will be set. A fault in the CAN system will not cause a torque reduction signal code.

The engine was running fine and the ECM and the TCM were both replaced yet the complaint would return after one mile of driving.

CAUSE: Realizing that there are many faults that can generate a torque signal failure message, when it was learned that this vehicle had once stored P0171 for Fuel System Lean, the scan tool was set to display the Fuel Trim Data. The Long Term Fuel Trim (LTFT) indicated +20 which means the ECM is adding fuel supply to the engine to try and compensate for what the ECM perceives to be a lean running condition, therefore, it was decided to inspect the fuel system. It was then noticed that the fuel had an unusual odor and feel.

The technician connected a container of fuel to the fuel rail, bypassing the vehicles fuel supply and ran the vehicle on this fuel supply.

On the test drive the complaints disappeared instantly! The P2637 did not return and the harsh shift condition was gone. The cause of these complaints was the use of E85 Ethanol fuel (figure 1), in a vehicle that was not designed to use E85. This is indicated on the Vehicle Emission Control Information sticker located in the engine bay as seen in figure 2.

CORRECTION: The fuel tank was drained and refilled with straight gasoline and the vehicle performed normally.

SERVICE INFORMATION:

To determine how much Ethanol by percentage is in the fuel tank, a 50 millimeter sample of the vehicles fuel will require testing. A 100 millimeter graduated test tube will be needed to perform this test.

Continued

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SERVICE INFORMATION Continued:

Start by filling the test tube with 50 millimeters of water, then pour in the 50 millimeters of fuel (see figure 3).
Mix the solution by shaking it and then let the mixture settle until a distinct separation can be seen. This will occur due to the fact that gasoline will float on top of the water. Ethanol will mix with water which is why a dividing line develops in the test tube. The location of the separation above or below the 50 millimeter mark depends on how much Ethanol is in the fuel.

Count the number of graduated millimeters that are above the original separation of the 50 millimeter mark. The example shown in figure 3 shows that to be 16 millimeters above the 50 millimeter line.

Multiply 16 by 2 which equals 32, this means there is 32% Ethanol in the fuel tank which would cause the complaints listed above when used in a vehicle that is not designed for Flex Fuel use.

Using E85 Fuel requires an increase in the fuel system's ability to feed the engine 45% more fuel at WOT than when using conventional gasoline fuel. This means higher volume fuel pumps are needed as well as larger fuel lines. This also means it needs adequate fuel pressure regulators along with higher capacity fuel injectors. Especially if it is being used in high performance applications.

E85 Fuel should ONLY be used in a Flex Fuel compatible vehicle. Items that must be avoided in the fuel system are:

1. Mild Steel
2. Standard Rubber Compounds
3. Copper Components
4. Non-Anodized Aluminum
5. Zinc and other soft metals

The above mentioned items when used with E85 fuel will corrode or severely deteriorate.

Flex Fuel built vehicles are designed to use higher levels of Ethanol by using materials compatible with E85 Fuel.

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Figure 1

Figure 2

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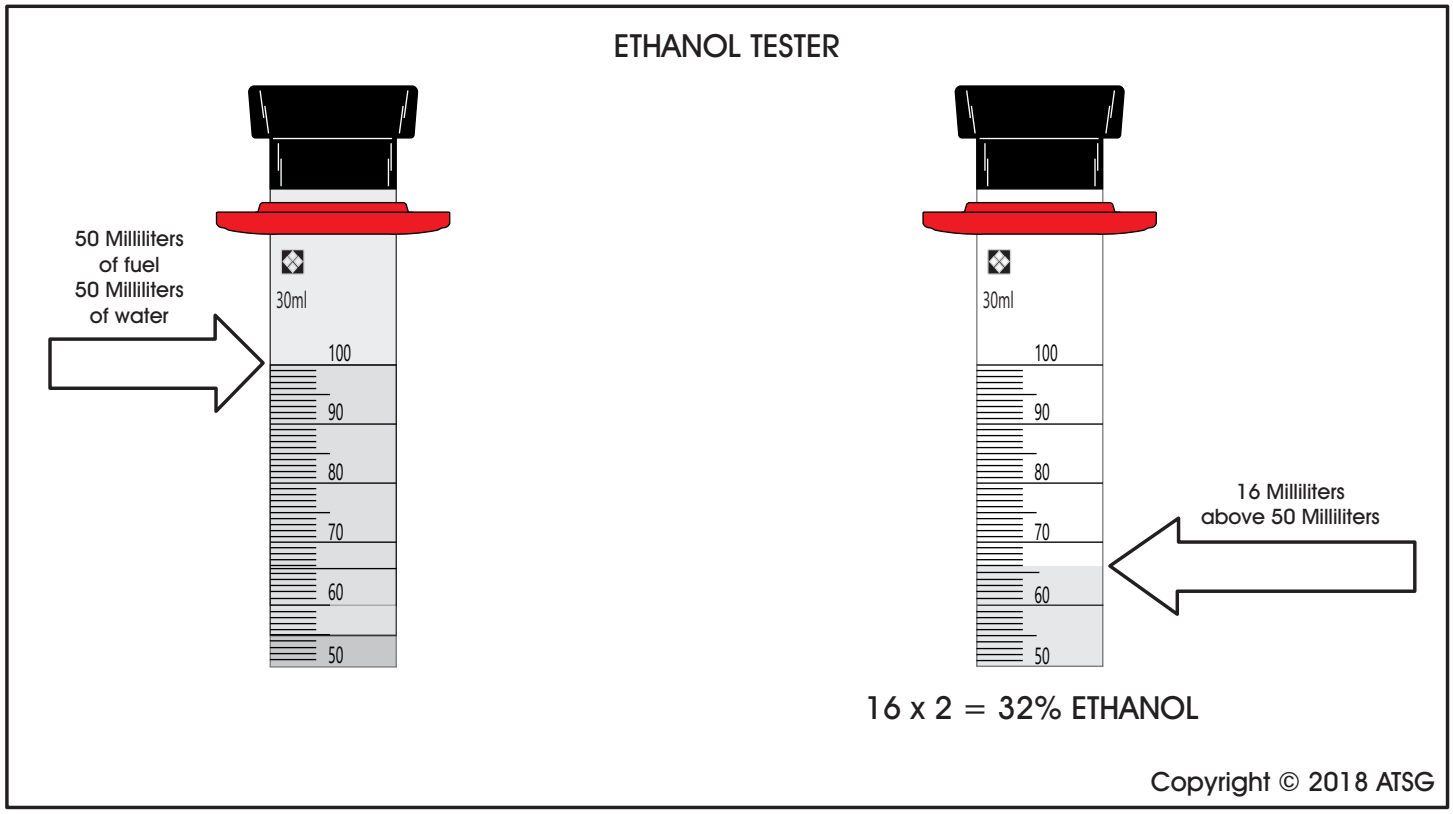

Figure 3