



Clean Air Car Check
 Envirotest Systems
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Case Study: 1995 Pontiac Firebird Hydrocarbon Failure *continued*

attached to the exhaust tailpipe. The CVS hose has negative pressure or a “vacuum” that is capable of pulling in gasoline vapors from the surrounding atmosphere. If there is a gas vapor leak from the fuel system, the hose will draw the vapors in with the vehicle’s exhaust while being tested. The leak doesn’t necessarily have to be in the rear of the vehicle either. A cooling fan is placed in front of the vehicle while it is being driven on the dynamometer; this can push vapors from the front of the vehicle back to the CVS hose as well.

Because the dealership was using a gas analyzer that requires a probe to be inserted into the tailpipe to measure gas output the diagnosis was missed. These types of analyzers are incapable of detecting external fuel leaks while the vehicle emissions are being measured because the probe is *inside* the tailpipe. 🚗

All O2 Sensors are not Created Equal *continued*

Since only a small amount of reference air is needed, enough will air will flow between the spaces of the wire strands inside the insulation. When you solder or crimp these wires while attaching the old connector, you will be obstructing these essential gaps. The sensor now no longer has the proper amount of vented air to provide the difference in oxygen levels to create the necessary voltage. Once the voltage drops to below 500mv in amplitude, the vehicle stores a failure code.

In both of the above cases the performance of the sensors were slightly reduced causing the failure codes to be stored. The faults were found through the use of an oscilloscope, which is the only sure way to test the performance of an oxygen sensor. The technicians that originally serviced the vehicles relied too heavily on observing the sensor voltage on a scan tool, stating the voltage was “switching the way it is supposed to”.

For more information contact Steve Popovich, Diagnostic Technician at 219-661-5456 or steven.popovich@esph.com. 🚗

technicallyspeaking.



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TECH NITE

Save the Date: The Use of Mode 5 & Mode 6 Aide to Setting Monitors *with Al Santini*

Technicians can sometimes experience difficulties getting OBDII monitors to run. This results in increased reject rates, especially for vehicles that are retesting after a failure.

It is estimated that lack of monitors run falls into two categories. In most cases (roughly 70%) the enabling criteria has not been met. In the remaining 30% of rejects something is inhibiting the monitors from running.

Al Santini’s four-hour seminar will demonstrate how useful information for running monitors may be buried in Mode 5 and Mode 6. Santini will also emphasize the need for manufacturer’s drive trace information and where to get it. 🚗

REMINDER

Reminder: Upcoming ASE Testing Dates

In order to remain in good standing as Indiana Certified Emission Repair Technicians, the technician’s ASE L1 and A8 certifications must be current. Below are upcoming certification testing dates and deadlines. More information is available at www.ase.com.

Summer 2009 Computer-Based Tests

Registration: July 10 – August 15, 2009
 Register by phone **ONLY**: 1-800-525-6929
 Testing Dates: July 17 – August 22

Fall 2009 Written Tests

Registration Deadline: September 30, 2009
 Register by mail, internet or phone
 Testing Dates: November 5, 10, and 12

CLIP & SAVE

The Use of Mode 5 & Mode 6 as an Aide to Setting Monitors

**Presented by Al Santini,
 Independent Automotive Trainer
 Tuesday, August 11, 2009 • 6 – 10 p.m.**

Please call 1-888-240-1684 or 219-661-8269 by August 7th to RSVP.

Envirotest Systems Training Center
 1171 Breuckman Drive, Crown Point

*Parking is available in the rear of the building.
 Enter through door marked “Training Entrance.”*

Case Study: 1995 Pontiac Firebird Hydrocarbon Failure



Clean Air Car Check's Diagnostic Technician (DT) was contacted by a local shop about a 1995 Pontiac Firebird with a 5.7 liter MFI engine that had repeated emissions failures due to high hydrocarbons.

The shop manager stated that every repair that could be made to the vehicle had been performed and he did not understand why this vehicle would not pass the emissions test. The shop manager explained that the vehicle was sent to a local Pontiac dealership where the car had a diagnostic inspection and was tested with a five-gas analyzer. He insisted that between the repairs made at his facility and the dealership analysis, there was absolutely no reason for the high HC failures.

The DT pulled the vehicle history; he found that the last test performed was the 6th failed test for the vehicle. The first test was almost two months earlier, and all six tests failed for high HC. The vehicle had been evaluated by Clean Air Car Check's Repair Advisor and the Repair Advisor's opinion was that the vehicle had an external HC leak. An HC leak test was performed and a high level of HCs was observed and noted on the left rear of the vehicle. The DT pulled all the drive traces from the previous tests, and after review he concurred with the Repair Advisor. The vehicle must have an external gas vapor leak.

The shop manager was informed of the findings, but still insisted there was nothing wrong with the vehicle. He said the vehicle was on a rack right then and his technician said he could see no gas leaks, and the car runs like new. The shop manager was angry because the vehicle owner had spent a lot of money at his shop and at

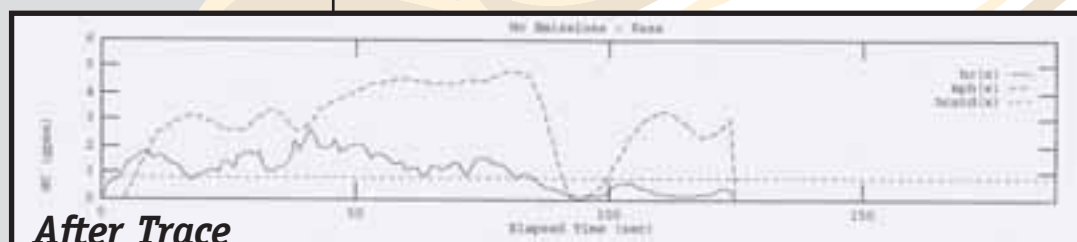
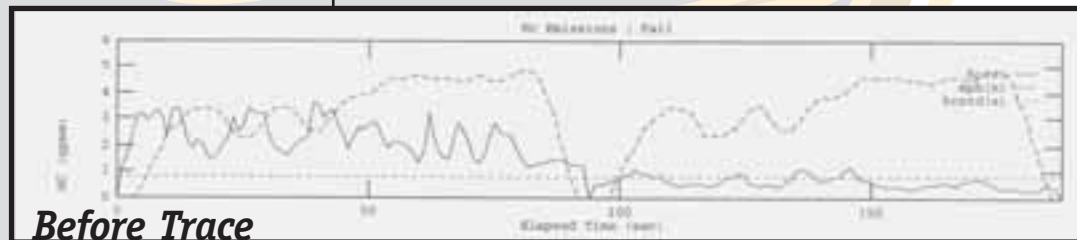
the dealership only to have repeated failures.

The DT arranged a time to inspect the vehicle at the dealership that had been involved in the vehicle's diagnosis.

The DT, along with a Dealership Technician, connected a GM Tech 2 scanner to check the inputs and outputs of the ECM. The technicians agreed that the vehicle was in "fuel control." The vehicle was then put on a lift and raised so an HC leak test could be performed with a leak detector. The detector showed over 25 ppm when it was placed near the top of the fuel tank. The dealer technician agreed that there had to be a leak. The dealership Service Manager said he would contact both the customer and repair shop to give an estimate to lower the fuel tank and inspect to inspect the topside for leaks. About a week later, Clean Air Car Check was notified that the vehicle had corrosion on the topside of the fuel tank. The fuel tank was replaced and the car passed the emissions test on its 7th try.

A better understanding of the testing procedure would likely have prevented the multiple failures and missed diagnosis. During the I/M 93 test, the vehicles are put on a dynamometer and a Constant Volume Sampling (CVS) hose is

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All O2 Sensors are not Created Equal

While employed at an import car dealer, one of the problems that I often ran into were vehicles sent to me after multiple attempts at replacing oxygen sensors. I would look at previous repair orders and notice that the same oxygen sensor was changed two or three times. The prior repair technician was adamant that the sensor was the problem and the parts supplier was sending faulty parts. After a final attempt at replacing the sensor with a factory part, the vehicle was then sent to dealership out of frustration. Through experience, I noticed a reoccurring trend and minor oversight that led to this problem.

First, the technician was usually correct in his initial diagnosis. When the original oxygen sensor was put back in, it did end up being a failed part. The trouble, I noticed, was in the ordering of the replacement sensor. Parts databases at both aftermarket stores and dealerships will sometimes list several different oxygen sensors for a vehicle depending on the vehicle's emission rating. These ratings may vary depending on the geographical area in which the vehicle was initially sold. It is common to have identical engines with different EPA ratings for a single car model.

Some vehicles that are sold in different parts of the country may have different emission ratings than vehicles sold here in the Midwest. When these vehicles migrate to the Midwest through owner relocation, car auctions, or used car chain stores, technicians and parts personnel who have become accustomed to servicing vehicles in their particular geographic area may not check the EPA Vehicle Emissions Control Information label located under the hood before servicing the vehicle.

You typically cannot differentiate between the engines during a visual inspection because the differences are so subtle. Most of the mechanical differences are completely internal and require slightly different software and sensor configurations.

Manufacturers want to keep production costs down, so often you will find no variances in the

oxygen sensor connector configuration on the engine room harness. Although there may be a few different O2 sensors available for the particular vehicle model being repaired, all the sensors can be plugged in to the harness without restriction. The sensors themselves have very subtle differences in the metal probe cover. For example, the spacing, width, or number of the slots in the end of the probe cover may vary slightly. The purpose of the slot variance is so the sensing element is protected from thermal shock and to control the temperature of the element as well. This is done because the exhaust manifold design of the different engines may have slight variances, placing the position of the oxygen sensor closer or further from the exhaust ports depending on EPA rating of the vehicle. If the probe slots are too narrow or few, and the sensor is slightly downstream, you can incur a condition where the sensor element isn't getting the proper amount of contact in the exhaust stream. I have actually seen misfire problems caused by the PCM shutting down the injectors due to a lean condition caused by the wrong oxygen sensor installation. Taking a quick look at the emission label can save a lot of headaches, especially if faulty parts are suspected.

Another common problem seen in the dealer service department was the splicing of oxygen sensor wires with either solder or crimp type connectors. There are "universal" oxygen sensors sold through the local parts stores that are sold new with no connector plug attached to them. The idea is to cut the connector off of the old sensor and either crimp or solder the connector onto the new sensor wires. The problem with performing this repair is that some oxygen sensors are "waterproof" by design. The way they receive ambient air is different than sensors that are normally vented through the body. With this particular design, the stainless steel body is sealed to prevent water and other contaminants from entering. The reference air is instead picked up through the sleeve of insulation around the wires that run into the harness connector, or all the way to the PCM, before it is exposed to the atmosphere.

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