TECHlink
GM
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A Monthly Publication for GM Dealership Service Professionals

Fuel Tank System
Corvette and Cadillac XLR

Partway through model year 2003, a new fuel tank system was introduced on the Corvette. This system continues with slight differences in the 2004 Corvette and Cadillac XLR.

TIP: For 2003 Corvettes only, this system was designated by RPO code FFS. However, this name has been unofficially applied to all vehicles with the new system.

Advantages and Features

The new fuel tank system was designed to accommodate future LEV 2 emission requirements. This was accomplished by moving as many components and fuel lines as possible inside the fuel tanks, to minimize hydrocarbon emissions. A flexible metal crossover hose assembly replaces the former rubber one, because the permeable rubber allowed a small amount of hydrocarbon to pass through.

The redesign also includes more isolation and noise control for the electric fuel pump, which now has greater flow capacity to supply higher output engines.

TIP: On the XLR only, a speed control module (T) slows the fuel pump when the engine is idling, to further control pump noise.

Component Layout

TIP: Use the reference letters to identify and locate the various components.

Two fuel tanks are used, and they're joined by crossover plumbing. The left side (driver side) tank (A) is considered the primary, and the right side (passenger side) is secondary (B).

Each tank contains a sensor module, which includes a float and resistor card.

On the left side, the sender module includes a reservoir (C), containing the turbine fuel pump (D). There's also a primary fuel pressure regulator and a venturi pump (E). The left tank is also supplied by the fuel fill hose (F), and has a rollover vent valve.

On the right side, the sender module contains a secondary fuel pressure regulator (G) and a siphon jet pump (H). There is also a fill limiting vent valve (FLVV) (J).

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Techline News

Snapshot During Cranking

Here's a useful service tip. You can use your Vehicle Data Recorder J-42598 (either the original or the revised version) to take snapshots during engine cranking.

The VDR will capture data from the time the ignition is turned on, through the crank cycle, until the engine starts (or doesn't start).

The data collected can be useful in diagnosing an intermittent or hard-start condition.

To set up for this kind of snapshot, select the appropriate pre-built engine data list. Be sure the data you think you need is in the list you choose.

TIP: You can set the trigger point anywhere you wish, but the best result is probably to place the trigger point in the middle of the data collected.

Unless a diagnostic code sets as a result of the no-start, it will be necessary for you to trigger the VDR manually.

- Thanks to Mark Stesney and Mike Banar

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TECHlink GM

Contents

GM Service and Parts Operations

New Video Presentation of Recall Bulletin

Product Recall Bulletin 03044 has just been released, to explain a steering knuckle modification on 2003 Chevrolet Astro and GMC Safari 2WD M-vans.

This bulletin is being supplemented with a narrated video, available on SI.

This is a new method of delivering recall information. It allows you to actually see the repair being performed, using the special tools called for in the bulletin.

If this presentation method proves popular, it may be used in the future to portray unusual or new service procedures.

How to Access the Video

Go to the SI home page in normal fashion: http://service.gm.com (GMinfoNET in Canada).

Click on Service Information.

Go to the bottom of the topic list and locate the link for 2003 Astro/Safari 2WD Steering Knuckle Modification Video – Recall 03044.

TIP: The next step is important.

RIGHT CLICK on the link. Then click on OPEN IN NEW WINDOW. This opens the large-size video viewer. (If you left click, the viewer will open at reduced size.)

TIP: On some browsers, it may be necessary to drag the viewer to full size, using the arrow in the lower right corner of the viewer.

Once the video has downloaded, click the PLAY arrow to view the video. It runs about 4 minutes. Use the slider to control the volume of the narrative sound track.

You may rewind the video and view it additional times. When you are finished, click on the X in the upper right to close the video viewer.

TIP: Dealers without high-speed internet connections may order a CD copy of this repair procedure video at their own expense from the GM DealerWorld DWD online store or by calling 1.866.700.0001.

- Thanks to Gary Smits

New Style Catalytic Converter

The 2004 Chevrolet Malibu with the 3.5L V-6 (RPO LX9) is equipped with a new style of catalytic converter, technically known as the close-coupled catalytic converter. Each engine exhaust manifold bolts directly to a catalytic converter, providing quick catalyst warm-up, resulting in lower tail pipe emissions earlier in the vehicle operating cycle.

If a catastrophic engine failure were to occur (such as broken intake/exhaust valve or piston), debris may be deposited in the converter through engine exhaust ports. If a new engine were installed and debris is present, the replacement engine may fail due to the debris being reintroduced into the combustion chambers during negative exhaust back pressure events.

TIP: When servicing an LX9 for a catastrophic engine failure, perform an inspection of the catalytic converters for debris (on the exhaust manifold attachment end).

TIP: In addition, in cases where severe engine overheating is suspected of causing the engine failure, inspect each catalytic converter ceramic brick for signs of heat damage (melting or cracking of the ceramic brick). If heat damage is noted, the converter should be replaced.

- Thanks to John Fletcher

Techline News — *from page 1*

20-Inch Wheels and Tires Additional Information

IMPORTANT: The VCI fee and the labor to install the calibration cannot be charged as a warranty claim. Dealer claims will be reviewed and any dealer warranty claim for the installation of 20-inch wheels and tires will be debited to the dealer.

The January 2004 issue of TechLink announced a new 20-inch wheel and tire accessory package that dealers can offer to certain truck customers.

The article mentioned the need for obtaining a VCI number for reprogramming the PCM as a part of the installation procedure. Techline charges a fee for issuing the VCI number.

Installation of these accessory wheels, tires and additional parts and related procedures are entirely at customer expense.

GM *TechLink* is a monthly magazine for all GM retail technicians and service consultants providing timely information to help increase knowledge about GM products and improve the performance of the service department.

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General Motors service tips are intended for use by professional technicians, not a "do-it-yourselfer." They are written to inform those technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions and know-how to do a job properly and safely. If a condition is described, do not assume that the bulletin applies to your vehicle or that your vehicle will have that condition. See a General Motors dealer servicing your brand of General Motors vehicle for information on whether your vehicle may benefit from the information.

Inclusion in this publication is not necessarily an endorsement of the individual or the company.

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GM Oil Life System, One More Time

Attention Service Managers:

If your Service Consultants are already reading TechLink, great. If not, now is the time to include them when handing out our monthly newsletter. TechLink is a great source of information that can be used when discussing vehicle issues with your customers. The accompanying Oil Life System article is just one of many with helpful information.

Mark Stesney, Publisher

Where do you stand on the following issues?

1. Do you want to continue to build customer loyalty and grow your business?
2. Do you want to show your customers you truly have their best interests at heart?
3. Do you want to help improve the environment?
4. Would you like to quit being a part of the throw-away generation?

GM's development of the Oil Life System and its relationship to the new Simplified Maintenance Schedule have a direct bearing on how well you can answer YES to all of these questions.

How the Oil Life System Works

We've explained the GM Oil Life System (GMOLS) in detail before (March 2000, May 2003) so this is going to be brief.

GMOLS is a computer-based algorithm that assesses engine combustion events, temperature, vehicle use, and other parameters to determine optimum oil change intervals. Oil changes are now called for when actually needed, instead of depending on generic time or mileage interval tables. Mild highway driving in a mild climate can yield change intervals of 7,000 miles or more, and as high as 12,000 miles for some vehicles. Short trip driving in cold weather may reduce intervals to 3,000 miles or less. Most people driving a combination of city and highway will likely see intervals of about 6,000 miles.

When GMOLS determines that an oil and filter change is needed, the driver is notified by a Change Oil message on the instrument panel. Oil should be changed within 600 miles (1000 km).

TIP: The Oil Life System must be manually reset when the oil is changed.

How the Oil Life System is Related to Maintenance

The previously complicated, traditional normal/severe maintenance schedules required about 25 pages of explanation in the owner's manual. The new simplified maintenance schedules can be explained in about 3 pages (see TechLink May 2003 for a summary).

All routine maintenance is grouped into one of two schedules, Maintenance I and Maintenance II. These services should be performed alternately, each time the GMOLS message is displayed.

Benefits of GM Oil Life System and Simplified Maintenance

Benefits for the customer – GMOLS takes the guesswork out of when oil changes are needed; the owner doesn't have to keep track of anything. With maintenance intervals now aligned with oil changes, the customer can conveniently have both done during one service visit.

Benefits for the dealer – Because of the typically extended oil change intervals, the customer may come back less frequently. But when they do come back, it's for more services. The inspection and service points of both Maintenance I and Maintenance II are thorough, and are intended to keep the vehicle in good working order. They also give the technician the opportunity to locate, identify and recommend other needed services.

Benefits for the environment – With GMOLS now installed on upwards of 20 million vehicles, if it's used as intended, it can save almost 100 million gallons of oil in 5 years. And remember that every quart of oil poured into an engine eventually has to be drained out and properly disposed of.

What's Next?

In the next few months, GM is going to saturate owners with information about the GMOLS. Radio interviews, TV talk shows, magazines, newspapers, the internet and dealership kits will all be used to promote a proper understanding of GMOLS and its benefits, and to promote its proper use. GMOLS was also promoted at the National Auto Dealers Association (NADA) convention in January of this year.

How Can You Prepare?

Because of GM's media efforts, owners are going to become familiar with GMOLS. It'll be a good idea for you to get yourself up to speed as well.

IDL Courses – Three courses have been designed to promote GMOLS and customer retention.

- Understanding the GM Oil Life System (PPS03.P1D) explains the reasons and benefits behind the GMOLS and provides suggestions for explaining it to customers.
- The GM Oil Life Maintenance Schedule – Keeping the Customer at the Dealership (PPS03.P4D) covers the benefits of the new maintenance schedules and explains how to use them to benefit customer-pay business.
- Building Trust and Long-Term Customer Retention (PPS03.P6D) explains how to earn and build customers' trust and how to retain them.

Literature and Materials – GMSPO is making Oil Life System promotional material available through several sources. You can download service reminder letters and maintenance schedules at gmpartscoop.com. GMSPO-approved vendors have a wide selection of new service reminders including a message about GMOLS. A kit including poster, consumer brochures, and counter display is available from gm-dealerworld.com.

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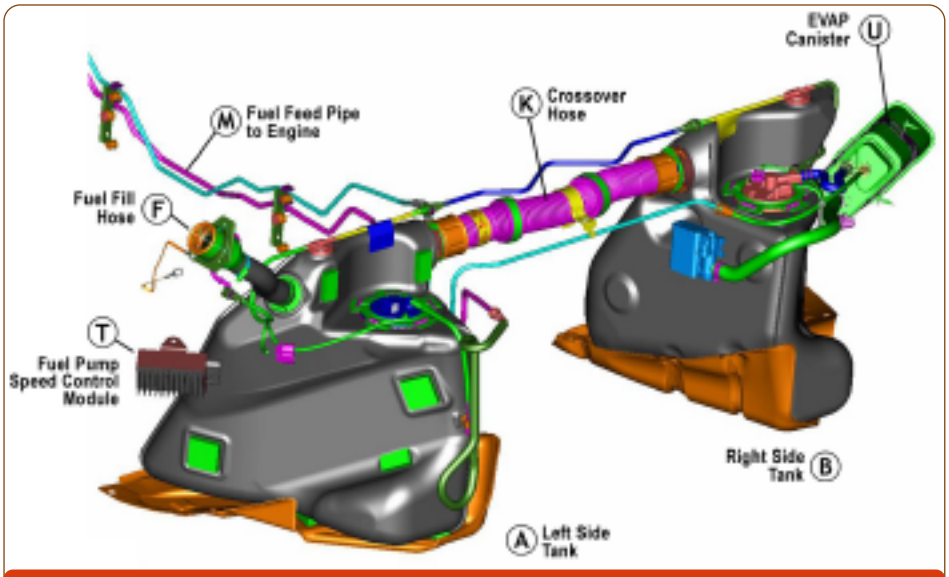


Component locations

Operation

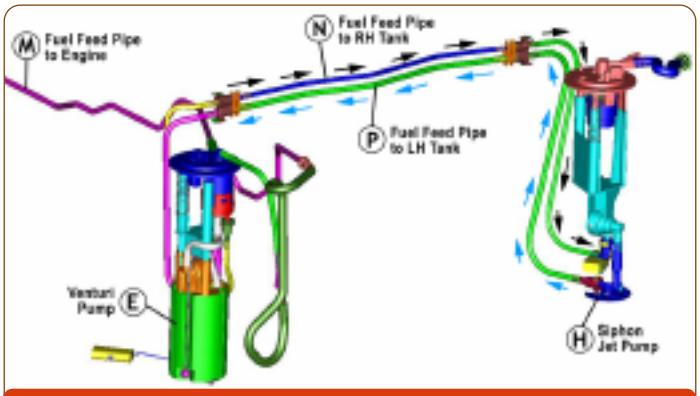
When the fuel tanks are filled, fuel first fills the left tank. As the fuel rises to the level of the crossover (K), fuel flows into the right tank. As fuel occupies the interconnected tanks, air is forced to vent from the tanks, through the FLVV in the right tank. When both tanks are full, the FLVV float in the right tank closes, preventing fuel from entering the vent system. This also causes fuel to back up in the fill hose, causing the gas pump nozzle to shut off.

When the engine is running, the turbine fuel pump (D) in the left tank pressurizes the fuel feed pipe (M). The entire fuel supply system, from the pump to the injectors, is pressurized. The turbine pump creates more pressure and more fuel flow than the engine needs. Excess pressure and excess fuel is allowed to bleed back into the left tank by the primary fuel pressure regulator within the tank.

TIP: The pressure regulator is in the fuel tank, not on the fuel rail on the engine. This type of fuel system is called returnless, or demand. This means that excess fuel is diverted before it leaves the tank, instead of passing through the fuel rail before being diverted. The result is that hot fuel is not constantly returning from the engine compartment, so the fuel in the tank stays cooler, improving evaporative emissions.

The majority of the pressurized fuel is directed through the filter (L) and on to the fuel feed pipe (M) to the engine, where it is injected into the cylinders for combustion.

Some of the pressurized fuel is directed through a feed pipe (N) inside the crossover hose, to a siphon jet pump in the right tank. The jet pump relies on the venturi effect to use pressurized fuel to draw additional fuel from the tank. The combined fuel then flows from the right tank to the left tank, through a return pipe (P) inside the crossover hose. The jet pump is able to move enough fuel to ensure that all of the fuel in the right tank is consumed before the level in the left tank begins to drop.



Fuel delivery and transfer

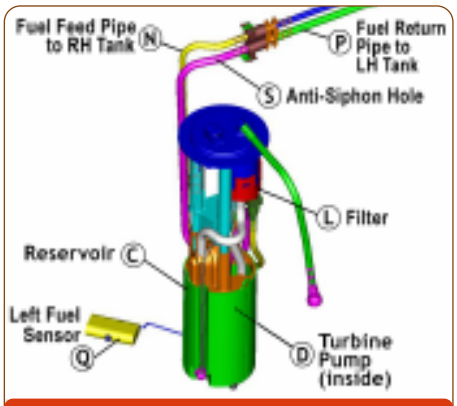
TIP: The return tube in the left tank has an anti-siphon hole (S), so the fuel in the left tank does not siphon back to the right side when the vehicle is shut down.

Some of the pressurized fuel is directed to a venturi pump in the left tank. This pump uses fuel flow to siphon fuel from the main tank into the reservoir, to keep the turbine pump supplied with fuel at all times. As the left tank fuel level drops, the venturi pump scavenges all of the remaining fuel into the reservoir, regardless of the vehicle's attitude.

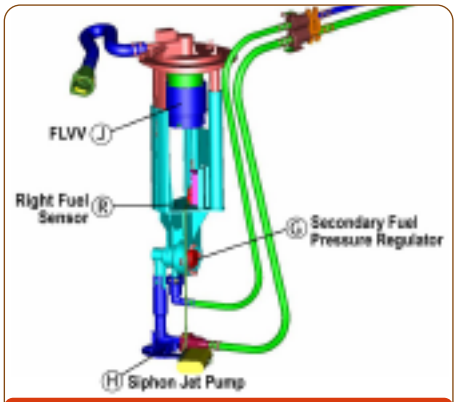
When the engine is shut off and the turbine pump stops, a reverse flow check valve maintains pressure in the system to ensure rapid pressure buildup during the next startup cycle.

Operation of Fuel Level Gauge

When the fuel system is operating as designed, starting with both tanks full, the left tank will remain full until the right tank is depleted. Then the left tank will be emptied.



LH module



RH module

Each fuel tank has its own sensor (Q and R in the illustration). The PCM supplies a reference of 5 volts to the two sensors. Each sensor operates across a range from full (2.5 volts) to empty (0.7 volts). The PCM monitors the fuel level sensor voltages and calculates how much fuel is in the two tanks. The readout of the IP fuel level gauge is a result of this calculation.

TIP: The fuel level sensors can be monitored with a Tech 2.

TIP: Service kits are available for each sensor, including:

- float
- wire arm
- wiper
- card
- card holder

Diagnostic Situations

The following situations may apply to the Corvette (C5), the Cadillac (XLR) or both, as noted.

Jet Pump Clog (C5, XLR) – If the jet pump in the RH tank becomes clogged, fuel will not transfer to the LH tank. When this occurs, the vehicle eventually runs out of fuel, even though there is actually some in the RH tank. When the DTC (1431, 2066 or 2636) sets, the fuel gauge drops to empty and the customer perceives an "erratic gauge." One cause of this condition was a piece of plastic left in the jet pump during the manufacturing process. This has been remedied.

Fill Quality (C5) – A customer may comment that the fuel nozzle shuts off prematurely, before the fuel tanks are full. The maximum flow rate for gas station pumps is supposed to be 10 gallons (37.9 L) per minute, and the fuel system is designed to accommodate this rate.

TIP: In reality, pump nozzles vary considerably in configuration, flow and shut-off sensitivity.

Ask the customer if the condition occurs at all stations, all the time, or at just one pump. This could point to a pump nozzle problem, not a vehicle problem.

Be sure the rubber hose to the canister vent solenoid (next to the transmission) is not restricted and that the vent solenoid is not stuck closed. Both can cause fuel to back up in the tanks and filler hose, causing the pump nozzle to shut off.

TIP: A replacement filler hose between the fill pipe and the LH fuel tank is available with a smaller inside diameter for C5. Although this sounds like it would make the condition worse, the smaller diameter allows less swirling, creating smoother fuel flow. A bulletin is pending.

Regulator Not Seated, Clip Loose (C5, XLR) – If the clip retaining either regulator is not fully engaged, the fuel system will lose pressure and the vehicle may stall. This condition was remedied in production.

If the secondary regulator (right tank) is not seated, it could result in fuel not transferring from the right tank. It could also cause long crank times, because residual pressure is lost in the fuel feed pipe to the engine when the engine is shut down.

TIP: With the engine off, a pressure gauge connected at the fuel rail should indicate 52 psi (359 kPa). If pressure drops rapidly, the regulator may be unseated.

Open Fuel Level Sensor Circuit (C5, XLR) – If an open occurs in a fuel level sensor circuit, the fuel gauge will drop to empty and a DTC will set. This could be caused by an unseated electrical terminal. Check the wiring circuits before replacing fuel system components. Another cause, which has been corrected, was the sensor wiper fingers not in contact with the resistor card, over the full sweep of the sensor.

TIP: The DTC specifies which sensor circuit has the issue. Only that sensor should be replaced.

LH Module Opening Too Small (C5, XLR) – In some LH tanks, the module opening was undersized, making it difficult or impossible to remove the module. This has been corrected in production.

TIP: In any case, be careful of the sensor float wire when removing the module, to avoid damage.

Service Procedure Notes

TIP: Refer to IDL course 10260.22D, Technology Close-Up from October 2002, for additional information.

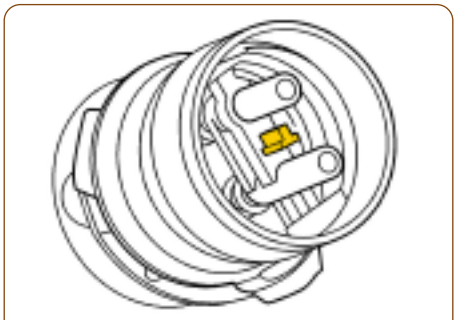
TIP: Always consult SI before performing a service procedure. The following are highlights and tips only.

Removing Fuel Tanks – The crossover hose must be disconnected from a fuel tank which is being removed. The crossover is located above the driveline and exhaust system, making removal appear difficult. Both SI and the Labor Time Guide allow lowering the driveline and exhaust for access. See Driveline Support Assembly Replacement in SI. Once you have performed this procedure, you will gain enough knowledge of the components that you may be able to do the procedure in the future without lowering the driveline.

Crossover Hose – The crossover hose is made of corrugated flexible stainless steel. It is retained to each fuel tank by a collar and a CPA (Connector Position Assurance). With the CPA aside, the collar can be turned by hand. It may be necessary to wiggle the crossover while pulling it straight out – DO NOT TWIST.

The fuel feed and fuel return pipes for the transfer pump are inside the crossover, and are sealed with O-rings. The crossover is sealed to each tank with two O-rings. When installing the crossover, lube the O-rings and O-ring sealing surfaces with 1051717 rubber lubricant. Then align the pipes and push the crossover into place. DO NOT FORCE.

TIP: There is a T-shaped alignment feature between the feed pipes which can be assembled only one way.



Alignment feature

With the crossover in place, turn the collar. If the crossover and pipes are properly aligned and assembled, the collar can be turned with two fingers. Then snap the CPA into place.

Fuel Tank Module Replacement – It is necessary to remove the fuel tank from the vehicle before removing the module. Procedures are different for LH and RH tanks.

TIP: Fuel Sensor Lock Ring Tool J-39765A is required.

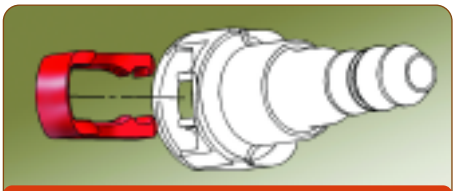
When the lock ring is loosened, the module will spring upward, because it is spring-loaded to ensure it is bottom-referenced and to resist noise.

Follow the SI procedure exactly. It is necessary to disconnect and reconnect numerous fuel lines. The only access is through the module and crossover openings.

TIP: When the module is installed, be sure to check the empty and full readings of the fuel level sensor. Your DMM should read 40 ohms with the tank in vehicle orientation (simulating empty) and 250 ohms with the tank upside down (simulating full).

Fuel Line Quick Connectors

Fuel lines use quick connectors, described in the February 2004 TechLink. See page 6 for details.



Replacement retainer

TIP: To release, push on the retainer using hand pressure only. Do not attempt to remove it.

If the retainer becomes broken, it can be replaced using the following part number.

5/16-inch (0.3125)	3/8- inch (0.375)	5/8-inch (0.625)
External vapor and internal liquid lines	Internal liquid lines	FLVV connector to the evap canister
21992748	22717568	21992746

Bulletin 02-06-04-010A – This bulletin applies only to vehicles with the previous fuel system, which could be affected by fuel with an aggressive sulfur content. It does not apply to any XLR or 2003-04 Corvette with the FFS fuel system. DO NOT use this bulletin to justify reprogramming the PCM or replacing fuel sensors/modules in vehicles with the FFS fuel system.

TIP: In the new system, DO NOT reprogram the PCM unless specifically told to do so by a diagnostic procedure.

- Thanks to Dave Libby, Terry Stone and Dave Peacy

Cooling System Seal Tabs

What's made of ground-up ginger root, almond shells and binder? And causes confusion in auto service departments?

Some people call them coolant pellets, but the proper name is Cooling System Seal Tabs. And we hope to clear up some misunderstandings about them.

How They Work

Seal tabs are dissolved in the engine coolant and the resulting fibers circulate through the cooling system. At a microscopic level, the tabs break down into irregular, long, thin fibers. When a small leak or seepage occurs, the coolant carries the fibers into the opening, where they cluster up and jam together. (Think of logs and branches in a beaver dam.) This mechanism is very effective at stopping leaks. Any fibers that make it to the surface will crust over and enhance the seal.

This sealing method is useful only for small-scale leaks and seepage, and tends to work best in conditions where the surrounding parts aren't moving. The seals tend to break down in areas between metals that are expanding and contracting with temperature changes, for instance.

A Secondary Benefit

The traditional green-colored coolant, used until DEXCOOL® was introduced in 1996, contained silicates, which deposit on cooling system surfaces. The tiny fibers from the seal tabs acted as scouring pads, removing silicate deposits from the water pump seal faces, which contributed to longer water pump seal life.

Side Effects of Seal Tabs

In addition to the benefits of sealing small leaks and scrubbing silicates from water pump seals, seal tabs also have some side effects.

After awhile, a brown, dirty-looking stain may form on translucent coolant bottles. Residue may form on the backside of the radiator cap. And deposits that resemble rust may be found in the cooling system.

These are not problems, in the sense that they cause no physical harm. But their appearance can be alarming, especially on a new vehicle. Both customers and well-intentioned technicians can be misled by these deposits.

Another side effect comes from overuse. When seal tabs are used in the prescribed amounts, they will not cause restrictions or plugging in an otherwise properly operating cooling system.

But, if a little is good, a lot must be better. Wrong!! Overuse can lead to plugging, especially in the relatively small tubes used in heater cores.

Some History

There was a time when seal tabs were installed in every new vehicle, at the factory, to account for the inevitable small leaks that occur in castings, joints, and so on. By the mid '90s, manufacturing and machining techniques had improved to the point where the seal tabs were no longer needed on a universal basis.

With the introduction of long-life coolant, silicate deposits were no longer a concern, so the scrubbing action from the seal tab fibers was no longer needed.

TIP: GM plants, as well as other manufacturers, still occasionally use seal tabs to address specific concerns.

Today's Recommendations

In short, GM no longer endorses universal use of seal tabs. Procedures in SI have been specifically written to discourage their use in most cases.

When a condition appears in which seal tabs may be beneficial, a specific bulletin is released, describing their proper use. One such bulletin is Customer Satisfaction Program 03034, dated 7/7/03. This applies to specific 3.8L engines only, and is in effect until July 31, 2005.

TIP: After performing the procedure in the bulletin, be sure to install a recall identification label to the vehicle to indicate that the seal tabs have been installed.

TIP: If seal tabs were installed in a vehicle at the factory, it's OK that the proper amount of tabs be installed if the coolant must be drained and replaced.

What's a Recommended Dose?

TIP: Use this information only when instructed to do so by bulletin or SI procedure.

The proper number of Cooling System Seal Tabs depends on the capacity of the vehicle's cooling system. Use between 1 and 1 1/2 grams of tabs per liter of cooling system capacity.

TIP: Cooling System Seal Tabs are packaged in two sizes.

12378254	Small tabs (4 grams each)	5 tabs per package
3634621	Large tabs (10 grams each)	6 tabs per package

- Thanks to Greg Cockerill and Gary McAdam

Service Tips for Chevrolet Aveo (and Optra and Epica)

The service manuals (SI) for the Chevrolet Aveo, Optra, and Epica incorporate content for more than 80 countries. Add-on titles are based upon region. Three regions are used to differentiate content:

- North America
- Europe
- Neither North America nor Europe.

Too many countries are involved to list each country that uses a procedure. If no add-on title is listed with the procedure or diagnostic title, the procedure is common to all regions.

The Tech 2 software for the Chevrolet Aveo, Optra, and Epica incorporates content for more than 80 countries. Technicians will need to select the emissions package that is used in their country. The four options are:

- ECE 83
- Euro II
- Euro III
- ULEV

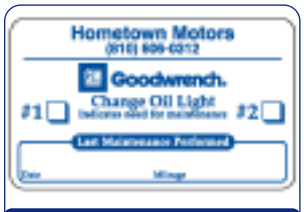
Technicians in the US, Canada, and any other country that uses US emissions (for example Guam) need to select ULEV.

- Thanks to John Bowman

GM Oil Life System, One More Time — from page 3

Maintenance Reminder Stickers – Traditional stickers provided a place to write the date and/or mileage for the next oil change. To encourage use of the Oil Life System, a new maintenance reminder sticker says the Change Oil Light indicates a need for maintenance. It provides a place to check off whether the next service should include Maintenance I or Maintenance II, plus the date and mileage of the last maintenance performed.

TechLink Articles – See the March 2000 and May 2003 issues of TechLink for summary information. If you cannot locate these back issues, they're still available on the internet at http://service.gm.com.



Maintenance Reminder Sticker

TIP: TechLink also published procedures for resetting Oil Life Systems in January/February 2002, and May/June 2003.

- Thanks to Chuck Burns

TAC*Corner*

Be Prepared

Before calling the Technical Assistance Center, use the TAC form and diagnostic worksheet to organize your call. The forms are tools to help you provide quality service that will keep your customers coming back to your dealership.

TIP: You can locate the forms in the P&P Manual, Section 5.3.1.

The TAC Form is designed to help you make sure you have the essential information you need in isolating a diagnostic path. When you take the time to organize the information on the TAC form (TAIF), as well as the diagnostic worksheet (DWS-01) which is filled out by the customer, it may help get to the issue without generating a call to TAC. If a call is necessary, using the form will reduce the time TAC needs to assist you.

New Product Action Center

Another important topic is the Technical Assistance New Product Launch Action Center. As most of you are already aware, TAC has initiated action centers for each of the new products launched this past year.

The purpose of the Action Center is to quickly identify, communicate and resolve product concerns on new vehicle launches. Special teams receive dealer calls and take action as new vehicles arrive at GM dealerships. This information is quickly relayed to the assembly plant, engineering and Brand Quality to insure quick resolution of the customer's issue and to help prevent additional occurrences.

The Action Centers are joint activities, which include the SPO Contact Centers (TAC, SPAC, and Partech), Brand Quality, Assembly Plant Quality Teams, Plant Training, Raytheon, Regional Service Engineers and the CDC.

Each time a call comes in to the Action Center, the TAC call prompts will guide the caller to an expert on the new product.

1. A TAC case is created, or updated.
2. Case closings on these cases are very important, as the information is used by the Launch Team several ways:
   - allows for real time changes to be made at the plant.
   - reduces the number of quality related issues from reaching the customer.

There is a goal of 24-hour resolution/escalation. The Action Center, as you can see, is tied directly to our Technical Assistance Center, as well as to the assembly plants.

- Thanks to Technical Assistance

TAC*Tips*

Leaking or Broken Transmission Case

The 4L60E/4L65E automatic transmission may experience a leak, inoperative/slipping 2nd, 3rd, and 4th gears or no movement (no forward or reverse) due to excess fluid loss. This condition normally occurs at low mileage, usually under 1,000 (1600 KM), and diagnosis may show a cracked or broken case at the 2/4 servo bore.

This condition may be caused by a 2/4 servo cover retaining ring that was not fully seated during transmission assembly. Pressure from the servo cover against the partially seated retaining ring can cause the case to crack or break.

If the fluid level drops due to the leak, it is likely that the 3/4 clutches will be damaged. This condition can usually be repaired by replacing the case and any damaged clutches.

- Thanks to Mark Gordon

XLR Window Initialization

This information applies to the XLR if:

- the battery is disconnected
- the battery is in a run-down condition and requires a charge (such as in an extended storage period)
- the window module has been disconnected.

If the window module loses battery power, the window module needs to be initialized. The top will not operate and the window express-up and express-down will not function unless the window module knows the window position.

To initialize a window module, the top must be up, and the door for the window being initialized must be fully closed. Turn the ignition ON, engine OFF. (See February 2004 TechLink for this procedure.) Run the window to the UP position and hold the switch continuously for a minimum of 0.5 second. Run the window to the DOWN position and hold the switch continuously for a minimum of 0.5 second. Once the window module learns the window's positions, the top will operate properly.

TIP: If the door window express-up or express-down function does not operate, use the window initialization process before attempting any other repairs.

- Thanks to Jim Mikolaizik and Jason Macco

Allison LCT1000 Transmission Conditions

Chevrolet and GMC C/K2500HD and C/K3500 trucks equipped with the Allison LCT1000 transmission may experience a condition in which the PRNDL display is inoperative and the Tech 2 scan tool is unable to communicate with the TCM. There are no transmission performance issues noted with this concern.

Circuit 2470 (yellow wire) may be backed out at terminal R of the C100 connector. See SI document 1243943 for clarity. C100 is located in the I/P harness to engine harness, under the fuse block - underhood. See SI document ID 799333 for clarity.

Terminal R should be seated and the harness positioned to prevent further strain on the connector.

- Thanks to Mark Gordon

GTO Vehicle Theft Deterrent

The GTO has a vehicle theft deterrent system which is unique to this vehicle. When diagnosing this system, there are common symptoms which will shorten the time spent attempting to resolve a concern with this system.

VTD Diagnostic

TIP: The vehicle will momentarily start and stall, even if the wrong security code is received. It takes a full second for the information from the key fob to travel from the ignition contacts to the PCM and back.

The security light will give a clue as to where the breakdown in communication may have occurred, if the vehicle will not stay running. After having attempted to start the vehicle and the engine has started and stalled, these symptoms maybe helpful in diagnosis:

- If the security light is flashing fast with the key in the ON position, the concern is between the fob and the BCM.
- If the security light is not on with the key in the ON position, the concern is between the BCM and the PIM.
- If the engine starts and stalls after waiting one second or longer in the ON/RUN position, the concern is between the PIM and the PCM.

Recommendations

Repair switches, wiring and/or module connections as required.

- Thanks to Jim Mikolaizik

Car Issues -- Fix It Right the First Time (new issues in **bold**)

Model Year(s)	Vehicle Line(s) - Condition	Do This	Don't Do This	Reference Information / Bulletin
1999-2004	**All Cars and Trucks – Brake Warranty, Service and Procedures**	**Measure/document rotor thickness and LRO – Turn rotor and brake align procedure.**	**Don't replace brake rotor for pulsation.**	**00-05-22-002 Know How Video 15040.01B**
2003-2004	**Buick Regal – Perceived Headliner Sag**	**Show customer Bulletin 03-08-110-007. Houses sunroof motor.**	**Don't replace headliner for perceived "sag"**	**03-08-110-007**
2001-2003	**Venture/Montana/Silhouette/Aztek – Rattle/Buzz from Exhaust System**	**Install clamp.**	**Don't replace catalytic converter.**	**03-06-05-003**
2003	DeVille – No Crank/No Start Condition	Inspect base of UBEC to ensure wire connectors are fully seated and not loose.	Don't replace PCM.	03-06-03-009
2004	Grand Prix – Steering, Suspension or Cradle Click Noise	Re-torque right steering gear mount.	Don't replace steering gear or cradle.	03-02-32-048
2000-2004	XLR, Impala/Monte Carlo/Grand Prix – Headlamp Replacement for Condensation in Lamp	Explain that this is normal condition when limited to fog or fine mist appearance in high humidity conditions.	Don't replace headlamp assembly when no water droplets are evident or condensation covers less than 50% of lens.	01-08-42-001A November 2003 TechLink
2003-2004	Cavalier/Sunfire – Grinding Noise on Clutch Apply (very low mileage)	Replace clutch hydraulic line.	Don't replace clutch/bearing.	03-07-31-005
2002-2004	All cars with 4T40/4T45E and 4T65E – DTC P0716/P0717 and other codes	Disconnect, inspect and reconnect transaxle wiring harness at transaxle.	Don't replace input speed sensor.	02-07-30-022B September 2003 TechLink December 2003 IDL
2003-2004	CTS – Variable Effort Steering (VES) "Service Steering Message," DTC C1241 or C0450	Replace only VES solenoid.	Don't replace entire steering gear.	03-02-36-001
2003	All cars with 4T40/45E, 4T65E and 4T80E – Code P0742	Replace TCC PWM Solenoid	Don't replace transmission or valve body assembly	02-07-30-039B Part numbers in bulletin have been superseded

Truck Issues -- Fix It Right the First Time (new issues in **bold**)

Model Year(s)	Vehicle Line(s) - Condition	Do This	Don't Do This	Reference Information / Bulletin
2002-2004	Fullsize and Midsize Pickups and Utilities – Transfer Case CNND Labor Operation	Use Labor Operation K9993 whenever a transfer case issue on a 4WD or AWD vehicle cannot be duplicated or resolved after diagnostic efforts.	Don't use K9992, which is for manual concerns or K9995, which is for automatic concerns.	Service VME VSSM20030117
1999-2003	Fullsize Pickups – Rear Leaf Spring Slap Noise	Replace inserts and rubber washers.	Don't replace leaf spring.	03-03-09-002
1993-2004	All Passenger Cars and Trucks – Air Conditioner Compressor Diagnosis	Follow SI and bulletin for diagnostic information before compressor replacement.	Don't replace air conditioning compressor	Service VME, 10/31/03 01-01-38-013A
2002-2004 (models with HomeLink option)	All TrailBlazers, All Envoys, Bravada, Rainier with HomeLink Universal Transmitter – Programming Diagnosis	Use J 41540 – GM Integrated HomeLink Tester. Follow SI and refer to customers to Owner's Manual.	Don't replace HomeLink Transceiver without validating internal fault recognized by J 41540.	01-08-97-001B
2002-2003	All TrailBlazers, All Envoys, Bravada – Squeak/Rub/Scrub Type Noise in Steering Column	Lubricate and remove material, per bulletin.	Don't replace upper or lower intermediate shaft.	02-02-35-006A
2002-2004	All TrailBlazers, Envoy, Envoy XL, Bravada, Rainier – Tail Lamp Socket Circuit Board	Replace both tail lamp circuit boards	Don't replace complete tail lamp assembly.	Service VME, 9/22/03 03-08-42-006A
2003-2004	Fullsize Pickups and Utilities – Servicing Wide Load Mirrors (RPO DPF)	Replace individual parts as needed.	Don't replace complete mirror assembly.	03-08-64-028
2003	Fullsize Pickups and Utilities – Transfer Case Service Light/New Venture Gear Transfer Case	Verify that encoder motor is primary cause. Replace encoder motor sensor and reprogram TCCM.	Don't replace module, encoder motor or transfer case for DTCs C0327, P0836, P0500	03-04-21-001D
2003	Fullsize Pickups – 6.6L Diesel Engine ECM	Follow SI and bulletins for proper diagnostics for P0181. Refer to Owner's Manual (block heater and front cover)	Don't replace ECM (DTCs P0540 and P0181) unless diagnostics confirm need to replace	02-06-04-048, 03-06-04-021, 02-06-04-058
2002-2003	TrailBlazer, TrailBlazer EXT – Wavy Front Fascia	Repair fascia with Dual Lock	Don't replace front fascia	02-08-62-004

Know-How Broadcasts for April

10280.04D Emerging Issues	April 15, 2004	NOTE TIME CHANGE	9:00 AM, 12:30 PM, 3:00 PM Eastern Time
10280.16D New Model Features – HUMMER H2 SUT	April 29, 2004	NOTE TIME CHANGE	9:00 AM, 12:30 PM, 3:00 PM Eastern Time

IDL

– Thanks to Tracy Timmerman