July & August | 2013

ACDelco TechConnect

Finding Leaks in the New Evaporative Emissions Controls Course

The evaporation of the fuel in the fuel system of cars and trucks can release pollutants into the air. The evaporative emissions (EVAP) control system is designed to limit fuel vapors from escaping into the atmosphere, allowing vapors to move from the fuel tank through the vapor pipe and into the EVAP canister. The control module uses several tests to determine if the EVAP system is leaking.

The new ACDelco training course, Evaporative Emissions Controls: Why is there always a code but never a leak we can find? (S-EP08-08.02ILT), uses a variety of case studies, with real world examples of vehicle conditions from several manufacturers, to cover the different strategies and components used by manufacturers to detect evaporative emissions system leaks.

The case study format takes participants through a descriptive investigation of an event, with that information being used to find the fundamental reasons of a cause and condition.

The case studies cover a variety of EVAP control system conditions, including the following Diagnostic Trouble Codes (DTC):

- EVAP Purge Solenoid Control Circuit
- EVAP System Large Leak
- EVAP System Small Leak
- Fuel Tank Pressure Sensor Performance
- EVAP Purge System Small Leak
- System Too Lean; System Too Rich
- EVAP System Incorrect Purge Flow
- EVAP System Monitor Switch

After exploring the operation of the various systems and its components, OEM supported techniques and tools for finding leaks are examined.

Large Leak Detection

One example from the course covers DTC P0455 (EVAP System Large Leak) set on a 2008 Chevrolet Impala. To help locate leaks, recommended tools include the GE-41413-200 Evaporative Emissions System Tester, which can be used to test pressure and introduce smoke into the EVAP system, along with the GE-41413-SPT High Intensity White Light. The light can be used at different angles to improve the visibility of smoke at the suspected leak area.

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Using the GE-41413 Evaporative Emissions System Tester

The Evaporative Emissions System Tester (EEST), GE-41413-200, is an ideal tool to use when encountering an EVAP system issue related to a leak, such as DTC P0442 – EVAP System Small Leak or DTC P0455 – EVAP System Large Leak, as well as EVAP system restrictions, such as DTC P0497 – Evaporative Emission System No Flow During Purge. It also can be used to verify Fuel Tank Pressure (FTP) Sensor performance,.

The tester must be used properly and consistently to maintain accuracy. Here are some tips for using the tester when leak testing. The tips are listed in the order in which they should be performed.

Evaporative Emission System Tester

1. Use the Self-Test to "baseline" the tester. This ensures that there are no internal leaks. Be sure the blue hose is fully extended; otherwise, the flowmeter can become unstable. Over time, the smoke producing UV dye can collect in the hose and cause this instability. If the flowmeter floating indicator never stabilizes, remove the hose from the tester and flush the hose with Brake Kleen or equivalent. Then blow out the hose with shop air. Be sure to have a shop rag at the opposite end of the hose to catch the discharge. Reconnect the blue hose and perform the Self-Test again to verify a stable flowmeter floating indicator.
2. Establish 0.020 leak flow on the flowmeter, using the sliding pointer and the appropriate port on the bottom of the tester, to create a baseline for pressure testing the vehicle first, before smoke testing.
3. Flow test the vehicle to verify that a leak is present and is greater than 0.020. You may have to allow 1-2 minutes for this depending on how much fuel is in the tank. The tester is only pressurizing at 13 in. H2O (1/2 PSI).
4. If a leak is less than 0.020, the vehicle passes. In this case, review the conditions for setting the DTC in the Service Information.
5. If a leak is greater than 0.020, turn the control switch on the tester to "smoke," and use the smoke to help pinpoint the leak. Again, allow 1-2 minutes to fill the EVAP system depending on how much fuel is in the tank.

To check for a restriction using the tester, keep in mind:

- The 3 1/2-inch round vac/press gauge on the front panel measures in inches of water (in. H2O). It is designed to be very sensitive. If it moves at all during a Purge & Seal test, this indicates further investigation. (13 in. H20 = 0.469 PSI)
- Use the various adapters to test for flow restrictions at various points within the EVAP system.

Always keep in mind the operating pressure, 13 in. H2O or 1/2 PSI, during EVAP diagnosis. Some EVAP testers do not have the pressure regulation that the GE-41413 tester does, which can lead to mis-diagnosis.

Even though this tester has been around for many years, it is still very effective at helping pinpoint leaks and restrictions when it is operated properly and maintained.

– Thanks to Steve Apking

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Publisher:
Rick Balabon
ACDelco
E-mail
richard.balabon@gm.com

Editor:
Greg St. Aubin
ACDelco
E-mail
gregory.staubin@gm.com

Technical Editor:
Mark Spencer
E-mail
mspencer@gpworldwide.com

Production Manager:
Marie Meredith

Desktop Publishing:
5by5 Design LLC
E-mail
dkelly@5by5dzign.com

Write to:
ACDelco TechConnect
P.O. Box 500
Troy, MI 48007-0500

On the Web:
To read or print recent issues of TechConnect:

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New Evaporative Emissions Controls Course –

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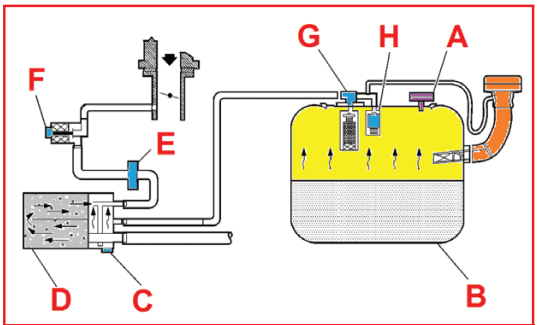
EVAP System Integrity

The course also reviews the integrity of the EVAP system on a 2009 Chrysler 300 Limited. The Evaporative System Integrity Monitor (ESIM), which controls evaporative emissions, features two check valves, a diaphragm, a switch and a cover. The larger check valve seals for pressure and the smaller one seals for vacuum.

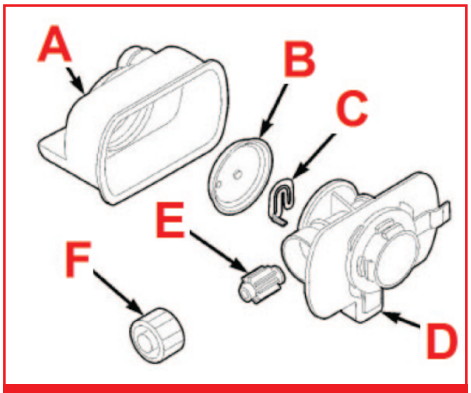


EVAP system components:

A. Fuel Tank Pressure sensor
B. Fuel Tank
C. EVAP Vent Solenoid Valve
D. EVAP Canister
E. Purge Flow Check Valve
F. EVAP Purge Solenoid Valve
G. Fill Limit Vent Valve
H. Grade Vent Valve

The ESIM conducts tests on the EVAP system, including an engine off, non-intrusive test for small leaks and an engine running, intrusive test for medium/large leaks. In order to pass the non-intrusive small leak test, the ESIM switch must close within a calculated amount of time and within a specified amount of key-off events. If it doesn't, the intrusive engine running test will run.

In addition to the case studies, the course also reviews a number of related technical service bulletins, providing more details about the various conditions that may be encountered during EVAP system diagnosis.



Evaporative System Integrity Monitor:

A. ESIM Housing
B. Diaphragm
C. Switch
D. Cover
E. Small Check Valve
F. Large Check Valve

More Training

In addition to the Evaporative Emissions Controls course, ACDelco offers many other instructor-led, hands-on courses at training center locations around the country. Log in to the ACDelco Learning Management System (LMS) by clicking the Training tab at www.acdelcotechconnect.com to view all the latest available training courses, including classroom training, web-based courses and much more.

– Thanks to Rick Balabon

ACDelco Videos Debut on YouTube Channel

ACDelco has established an official YouTube channel to share product information videos. These videos can be viewed at youtube.com/user/acdelcoofficialpage.

The videos cover many ACDelco products along with installation and diagnostic tips, including:

- Alternators and starters
- Batteries
- Brakes
- Chassis
- Fuel pumps
- Steering and driveline
- Wire and cable

A variety of automotive service topics also are covered in videos featuring Two Guys Garage.

The ACDelco product video pages include links to acdelco.com product pages and the nearest ACDelco Professional Service Centers.

– Thanks to Cindy Schafer

New 2014 Cruze Clean Turbo Diesel Engine

Chevrolet is introducing the 2.0L Clean Turbo Diesel in the 2014 Cruze this summer. It is the cleanest diesel passenger car engine GM has ever produced.

The 2.0L turbo-diesel engine (RPO LUZ) provides greater fuel economy than a comparably sized gasoline engine through greater thermal efficiency, a higher compression ratio and an unthrottled combustion process.

2.0L turbo-diesel engine

It features an iron cylinder block and a forged steel crankshaft, each designed to stand up to the greater cylinder pressures that come with a turbo-diesel engine.

A lightweight aluminum cylinder head and aluminum intake manifold contribute to the engine's comparatively low weight of 408 pounds (185 kg). The engine has been designed to reduce the noise and vibration often associated with earlier generation diesel cars.

A precise Exhaust Gas Recirculation (EGR) control system features a high-capacity cooler and bypass feature that enable the engine to meet U.S. and Canadian diesel emissions regulations. The exhaust after-treatment system is similar to that used on Chevrolet's heavy-duty trucks and vans equipped with the Duramax diesel.

Diesel Particulate Filter (DPF)

The Cruze Turbo Diesel DPF features a porous material that allows exhaust gas to pass through while trapping or filtering solid matter from the exhaust. Occasionally, depending on a number of factors monitored by the ECM, the DPF needs to be cleaned of accumulated solids. The ECM will initiate the cleaning process by warming the exhaust gas temperature. The accumulated particulate matter in the DPF will be safely converted to harmless gases, and the DPF will then be clean and ready again to trap or filter additional particulate matter.

Cleaning the DPF

When the ECM detects that the DPF is nearly full of particulates and that the vehicle is not being operated in a manner that would allow effective automatic DPF cleaning, the DIC displays DIESEL PARTIC FILTER IS FULL CONTINUE DRIVING or DIESEL PARTIC FILTER IS FULL CONTINUED DRIVING IS MANDATORY.

The driver is advised to follow the cleaning warning to prevent damage to the engine. The vehicle may need to operate continuously for up to 20 minutes and at speeds greater than 30 mph (48 kph) to clean the DPF effectively.

Diesel Exhaust Fluid (DEF)

The Cruze Turbo Diesel is equipped with a 4.9-gallon (18.5L) DEF tank that is accessible by lifting the load floor in the trunk. The fluid level in the DEF tank must be maintained for the vehicle to run correctly.

The DEF level indicator is displayed in the Driver Information Center (DIC).

DEF fill in the trunk

When the DEF is getting low, the range will be displayed in the DIC. It is normal for the DEF range to vary based on vehicle and environmental driving conditions. When the low DEF message first displays at approximately 1,000 miles (1,600 km) of fluid range remaining, the fluid is approximately 3 gallons (11 liters) low.

The EXHAUST FLUID LOW SPEED LIMITED SOON message is displayed when the DEF range is less than 75 miles (120 km).

When the DEF tank is approaching empty, a EXHAUST FLUID EMPTY REFILL NOW message in the DIC will be displayed. If the DEF tank is not refilled, the ECM will begin to limit the vehicle to a maximum speed, starting at 65 mph (105 kph), and over time and mileage will reduce maximum speed to less than 10 mph (16 kph).

Part Information	Part Number
Diesel Exhaust Fluid, 1 gallon	10-4022 (19286291)
Diesel Exhaust Fluid, 2.5 gallon	10-4023 (19286292)

Only use DEF that is GM approved, or fluid containing the API certified or ISO 22241 label. The use of other fluids could damage the system, requiring costly repairs that will not be covered by the vehicle warranty.

DEF is available from ACDelco in one gallon and 2.5 gallon containers.

Fuel and Fuel Filter

The Cruze Turbo Diesel uses Ultra Low Sulfur Diesel Fuel (ULSF) only. The engine is equipped with a fuel filter to protect the engine from water and other diesel fuel contaminants. Water should be drained from the fuel filter when the DIC displays WATER IN FUEL CONTACT SERVICE.

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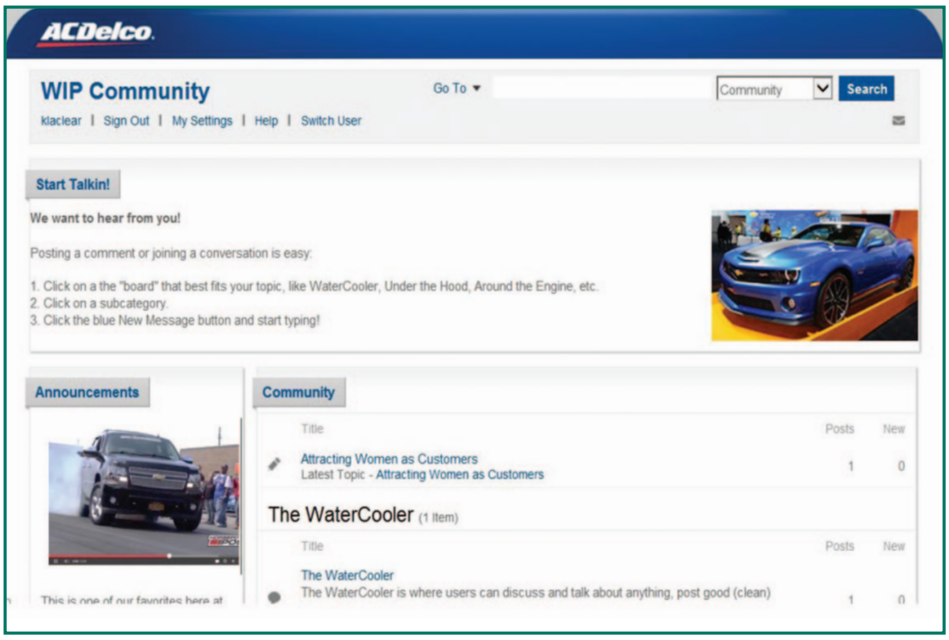
Connect with the ACDelco WIP Community

The ACDelco WIP Community gives you a place to share your insights on automotive repairs, ask questions, and offer solutions. The information you contribute on the social networking site can help build a valuable knowledge base for you, your peers, and your customers.

The Community, available through a link in ACDelco WIP, puts you a click away from connecting with other professionals across the country. The WIP Community enables you to post questions related to your work, such as asking advice on difficult repairs you've encountered or offering solutions to other professionals. You can show support for your peers by liking their post. Reading posts and blogs, responding to posts, voting in polls, and participating in surveys all create points for you to earn Super User status in the Community.



Join In

The ACDelco WIP Community is an ACDelco exclusive site, so registration is required. Once you have registered, you can sign in from any computer or your mobile phone at www.communityacdelco.com.

If you've already joined the WIP Community, it's time to visit again! The look of things has changed with some new features added, including a product blog. If you have suggestions for something you would like to see on the Community, post it in The WaterCooler. Together, we can build a wealth of information that you can access on a regular basis all in one spot.

What's Your Passion?

Have a great muscle car you've been working on? Does your shop have a project car? How about pictures from a recent race you attended? None of the above but you want to show off the 32-inch bass you caught last week?

You can post pictures of your favorite hobby on the Community. Posting a photo is easy. If you need a little help getting started on the Community, watch the quick video on how to post and upload photos. You can find the video on the lower left of the Community home page. Your photo will only be identified by your user name.

Here are a few general guidelines for posting a photo:

- The photo must belong to you.
- The only person in the photo is you.
- All photos will be reviewed by an ACDelco moderator before they appear on the Community.
- ACDelco reserves the right to reject a photo if we encounter a kind of picture we didn't anticipate.
- Your photo could be featured on the WIP Community, but it will not be used by ACDelco for any other purpose.

– Thanks to Kelli Abbott

New 2014 Cruze Clean Turbo Diesel Engine –

continued from page 4

Fuel filter cartridges must be replaced every 30,000 miles (48,000 km) or as indicated on the DIC. The fuel filter is located under the vehicle on the passenger side.

Engine Oil

The Cruze Turbo Diesel uses dexos2 engine oil. Oil meeting the requirements of the vehicle should have the dexos2 certification mark on the container. This certification mark indicates that the oil has been approved to the dexos2 specification.

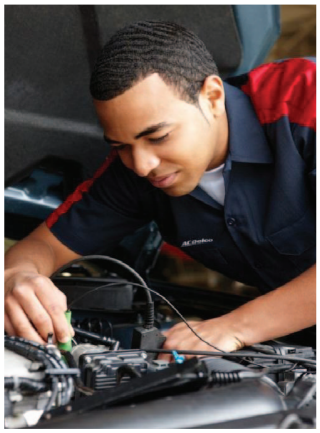
Part Information	Part Number
Engine Oil dexos2, 5W-30, 1L	88865157 (U.S.) 88865338 (Canada)

In the event that dexos2-approved engine oil is not available at an oil change or for maintaining proper oil level, it is acceptable to substitute engine oil that meets ACEA C3 of the appropriate viscosity grade.

– Thanks to Tod Stump

Recruiting Technicians through GM ASEP

The GM Automotive Service Educational Program (GM ASEP) can help ACDelco Professional Service Center (PSC) members find and train qualified technicians.



All PSC members have the opportunity to hand-pick and sponsor an ASEP student, who will alternate between working at the service center and attending local college classes.

ASEP Benefits

ACDelco PSC members benefit by:

- Participating in a GM training program comprised of students who are pursuing or have received their Associate in Applied Science Degree (or similar)
- Growing your "own" technician, trained to your standards, to meet the needs and expectations of your shop
- Partnering with local ASEP colleges and universities may result in successful service technician recruitment as the candidates are qualified, enthusiastic, and eager to learn
- Lowering the costs of recruitment, screening, and training over time
- Creating a positive career image for shop technicians
- Fostering long-term employee retention

PSC members are responsible for providing uniforms to ASEP students as well as paying students an hourly wage during their internship in the service center. The ASEP program requires a two-year sponsorship of the student.

To participate in ASEP:

1. Contact a local, participating college
2. Interview and select a student
3. Provide coordinated work experience in accordance with the program schedule for the program duration
4. Pay the students an hourly wage during the duration of the program (pay should reflect a student's progress in the program)
5. Support the GM ASEP program by participating in the appropriate quarterly or bi-annual advisory committee meetings

Finding an ASEP Student

To find students who are interested and available to sponsor, contact your local NATEF certified high school and/or GM ASEP College.

- To locate your local NATEF certified High Schools, go to: http://www.natef.org/NATEF-and-You/Students-Parents/Find-Accredited-Schools.aspx
- To locate your local GM ASEP schools, visit https://gmasep.org/automotive-colleges.php

- ASEP schools will also direct students to ACDelco PSC shops looking for sponsorship opportunities

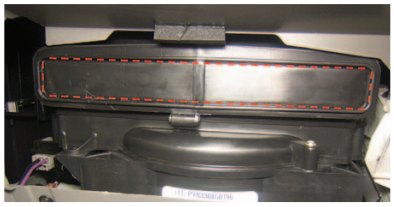
– Thanks to Jill Brown

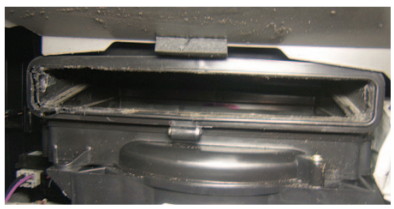
Installing a Cabin Air Filter

A cabin air filter was not offered on 2008-2011 Buick Enclave, 2009-2011 Chevrolet Traverse, 2007-2011 GMC Acadia, and 2007-2010 Saturn Outlook models. A cabin air filter can be installed if desired.

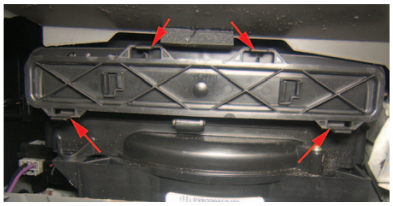
To install a cabin charcoal filter into the HVAC module:

1. Remove the instrument panel compartment.
2. Cut out the molded access panel on the HVAC module using the appropriate tool.
3. File down any rough edges to ensure a proper fit.





4. Install the filter element into the tray.
5. Slide the tray into the HVAC module and press it into position, ensuring the four locking tabs are fully seated.



6. Remove any debris.
7. Install the instrument panel compartment.

Parts can be found in the GM Dealers Parts Catalog under Group: 09.786, Description: Filter (Charcoal), Passenger Compartment Air; and Group: 09.786, Description: Cover, Passenger Compartment Air Filter Access Hole (Filter Tray).

– Thanks to Rick Balabon

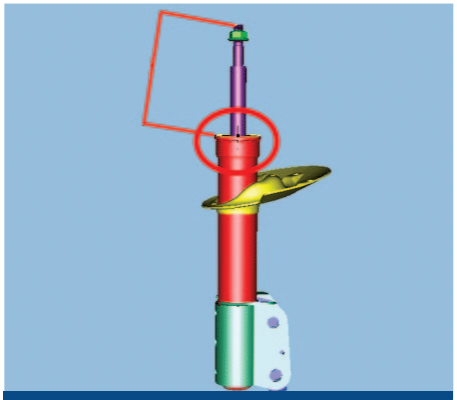
TechTips

The following technical tips provide repair information about specific conditions on a variety of vehicles. If you have a tough or unusual service repair, the ***Diagnostic Hotline*** *can help. Call* ***1-800-825-5886, prompt #2****, from 8 a.m. to 8 p.m. ET Monday–Friday, to speak with a technical expert with the latest OEM information.*

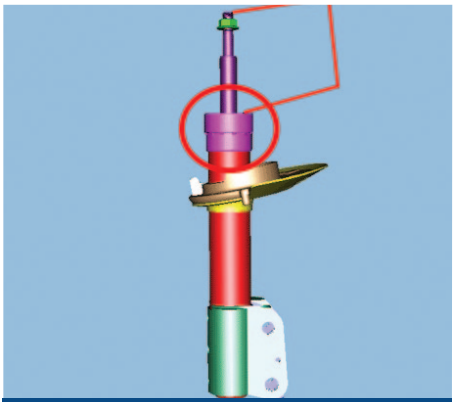
Front Strut Replacement

2006-2011 Impala former Police Vehicles with RPO 9C1 (SEO Vehicle – Police Car) or 9C3 (SEO Vehicle – Police Car, Limited Content)

When replacing the front struts on a 2006-2011 Impala former police vehicle now out of service, keep in mind there are two different strut designs for the vehicle.



GM P/N 19257874 – 154.44 mm from top of rod to striker plate (Note: smaller strut cap)



GM P/N 22796874 – 130.71 mm from top of rod to striker plate (Note: larger strut cap)

Either strut may be used on a vehicle, but they must have the same design for both left and right sides. Strut designs cannot be mixed on a vehicle. If changing from one design to another, the jounce bumpers will need replacement as well.

Refer to the illustrations to determine which design strut is installed on the vehicle.

Body Control Module Grounds

2006-2011 Buick Lucerne, Cadillac DTS

2008-2014 Buick Enclave, Cadillac CTS, Chevrolet Express, Chevrolet Traverse, GMC Savana

2007-2009 Cadillac SRX, Chevrolet Equinox, Pontiac Torrent

2007-2014 Cadillac Escalade models, Chevrolet Suburban, Chevrolet Tahoe, GMC Acadia, GMC Yukon models

2006-2008 Chevrolet Monte Carlo

2006-2013 Chevrolet Impala

2007-2013 Chevrolet Avalanche, Chevrolet Silverado, GMC Sierra

2007-2010 Saturn Outlook

2008-2010 Saturn VUE, HUMMER H2

The Body Control Module (BCM) may be damaged when the module is supplied with battery power and the ground path is removed. Remove the negative battery cable first before removing a BCM ground.

BCM Ground Path

The BCM ground path passes through the following components. The negative battery cable must be removed on these vehicles when removing the components.

- Instrument panel electrical center, 2008-2010 HUMMER H2
- I/P splice pack, 2008-2010 Saturn VUE

Other Affected Components

When removing a ring terminal ground, splice pack connector, or inline harness connector on all the models listed, remove the negative battery cable if it is determined that it is a BCM ground path.

For example: If the BCM grounds become disconnected, internal damage to the BCM will occur. Other systems controlled by the BCM will also be affected, such as an inoperative or intermittent condition in one or more of the following systems:

- Interior lighting will remain on or will not work
- Exterior lighting will remain on or will not work
- Remote keyless entry
- Door locks
- Power windows and mirrors
- Remote vehicle start
- Remote trunk release

Rainsense Wipers Operate in Delay Mode

2006-2011 Buick Lucerne and Cadillac DTS

If the Rainsense wipers are not working correctly or are inoperative, look for for the following conditions:

- The wipers will swipe when water is placed on the windshield in the area of the sensor, they may also swipe as if the vehicle does not have the Rainsense feature (wipers are performing similar to a traditional pulse delay wiper system)
- While reviewing BCM data on the scan tool for the wipers, the "Rainsense Signal" may read "No Glass"

If these conditions are present, check to see if the windshield has been replaced with non-OEM glass. If it is found that the windshield is not OEM glass, it should be replaced with a windshield from GM.

Product Information

For free technical assistance and product information regarding specific ACDelco products, contact these toll-free information hotlines staffed by ASE-certified technicians:

Brakes – 1-888-701-6169 (prompt #1)
Chassis – 1-888-701-6169 (prompt #2)
Clutches – 1-888-725-8625
Lift Supports – 1-800-790-5438
Shocks – 1-877-466-7752
Starters and Alternators – 1-800-228-9672
Steering (Pumps, Rack and Pinion, Gears) – 1-866-833-5567
Wiper Blades – 1-800-810-7096

New Training Courses

New courses available through the ACDelco Learning Management System include:

S-AC07-08.02WBT – HVAC Systems and Operation Stage 1: Covers the various types of compressors as well as the characteristics of refrigerants and the operation of fixed orifice systems.

S-AC07-09.02WBT – HVAC Systems and Operation Stage 2: Focuses on air conditioning performance diagnosis, recovery and recharging stations, air distribution fundamentals, and control head input and output components.

S-EL06-52.02WBT – GM Global Electrical Systems: Highlights the common circuit types and functions used in GM electrical architecture as well as the types and characteristics of serial data circuits.

S-EP08-08.02ILT – Evaporative Emissions Controls: Why is there always a code but never a leak we can find?: Explores the operation of various evaporative emissions control systems and their components, OEM-supported diagnostic techniques, and tools for finding leaks.

S-EP08-09.01ILT – Spark Generation: Is a lack of spark sending you up in flames?: Examines various strategies and components used to generate spark with an emphasis on misfire diagnosis related to spark delivery.

S-EP08-29.01WBT – Bi-Fuel System Operation: Reviews the GM bi-fuel system that uses a combination of Compressed Natural Gas (CNG) fuel and a traditional gasoline system, including no-start conditions, leak checking, and tank removal safety.

S-FN00-07.01WBT – GM Safety Systems 3: Covers the active safety control module components, including the Rear Cross Traffic Alert system components and the Adaptive Cruise Control components.

Training Schedule

To search for currently scheduled courses in your area, view the Training in Your Area section on the Home page. Select search terms from the dropdown menus and click the Submit button.

Current Instructor-Led Training Courses

The following ILT courses are currently being scheduled:

Course Number	Course Name
S-AC07-02.01ILT	Automotive Air Conditioning Advanced Refrigerant System Diagnostics
S-AC07-03.01ILT	HVAC Control System Operation and Diagnostics
S-AC07-07.01ILT	Chrysler HVAC
S-BK05-01.01ILT	Braking Systems
S-BK05-02.01ILT	ABS Operation and Diagnosis
S-BK05-03.01ILT	Electronic Brake and Chassis Controls: Is the vehicle really smarter than the driver?
S-DS11-13.01ILT	Vehicle Network Communications: When modules talk, who is really listening?
S-EL06-04.02ILT	Network Communication Diagnosis
S-EL06-10.02ILT	Electrical Power Management
S-EL06-11.01ILT	Automotive Electrical Circuit Diagnosis and Repair
S-EL06-11.02ILT	Enhanced Automotive Circuit Diagnosis
S-EL06-12.01ILT	Hybrid Technology and Service
S-EL06-13.01ILT	Body Electrical Global Diagnostics
S-EL06-14.01ILT	Advanced Body Control System Electrical Diagnostics
S-EL06-16.01ILT	Hybrid Vehicle Service and Safety: Batteries Included
S-EP08-02.01ILT	Engine Performance Computer Controls and Ignition System Diagnostics
S-EP08-03.01ILT	Engine Performance Air Induction and Fuel System Diagnostics
S-EP08-04.01ILT	Engine Performance Fault Monitoring and Emission System Diagnostics
S-EP08-05.01ILT	Engine Performance Advanced Drivability Diagnostics
S-EP08-06.01ILT	After Combustion Sensors: Is what is in the exhaust making your engine run rough?
S-EP08-07.01ILT	Air Induction and Fuel Injection Systems
S-EP08-08.01ILT	Evaporative Emissions Controls: Why is there always a code but never a leak we can find?
S-EP08-09.01ILT	Spark Generation: Is a lack of spark sending you up in flames?
S-EP08-21.01ILT	Chrysler Engine Performance
S-EP08-81.02ILT	Duramax Diesel Operation and Diagnosis
S-SS04-01.01ILT	Vibration Correction Diagnostics
S-ST10-01.01ILT	Supplemental Restraint Systems

Current Virtual Classroom Training Courses

The following VCT courses are currently available:

Course Number	Course Name
S-AC07-01.01VCT-R	HVAC System Components and Lubricants
S-AC07-02.01VCT-R	HVAC System Operation and Service Hints
S-AC07-03.01VCT-R	HVAC System Flushing, Recovery and Diagnostics
S-AC07-04.01VCT-R	HVAC System Engine Cooling, Controls and Communication
S-EL06-01.01VCT-R	Electrical Circuit Function and Diagnosis
S-EL06-02.01VCT-R	Testing Electrical Signal and Control Circuits
S-EL06-03.01VCT-R	Serial Data Communication Networks
S-EL06-04.01VCT-R	Communication Network Diagnosis
S-EM01-01.01VCT-R	Camshaft Position Actuator Systems
S-EM01-02.01VCT-R	Active Fuel Management Operation
S-EM01-03.01VCT-R	Active Fuel Management Diagnosis
S-EP08-03.01VCT-R	6.6L Duramax LGH and LML Diesel Engines

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