# Service Bulletin

**Mazda North American Operations**
**Irvine, CA 92618-2922**



| **Subject:** | **Bulletin No:** 01-021/09 |
|---|---|
| **DETERMINING EVAPORATIVE SYSTEM LEAK LOCATION FOR DTCs P0441 / P0442 / P0455 / P0456** | **Last Issued:** 06/16/2009 |

## APPLICABLE MODEL(S) / VINS

2006-2009 MX-5

2007-2009 CX-7

2004-2009 MAZDA3

2007-2009 MAZDASPEED3

2006-2009 MAZDA5

2003-2008 MAZDA6

2006-2007 MAZDASPEED6

## DESCRIPTION

Some vehicles may have a MIL illumination with DTC's P0441, P0442, P0455, or P0456 stored in memory. To determine the location of the evaporative system leak, follow the repair procedure below.

P0441 - Evaporative emission control system incorrect purge flow

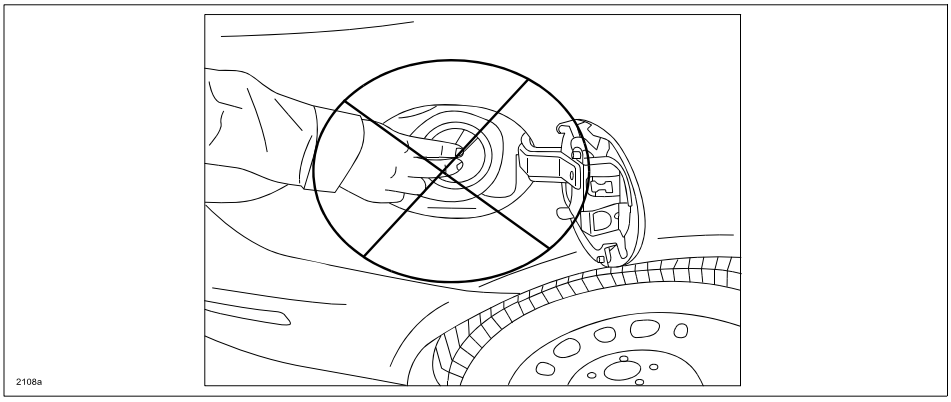
P0442 - EVAP system leak detected (small leak)

P0455 - EVAP system leak detected (gross leak)

P0456 - EVAP system leak detected (very small leak)

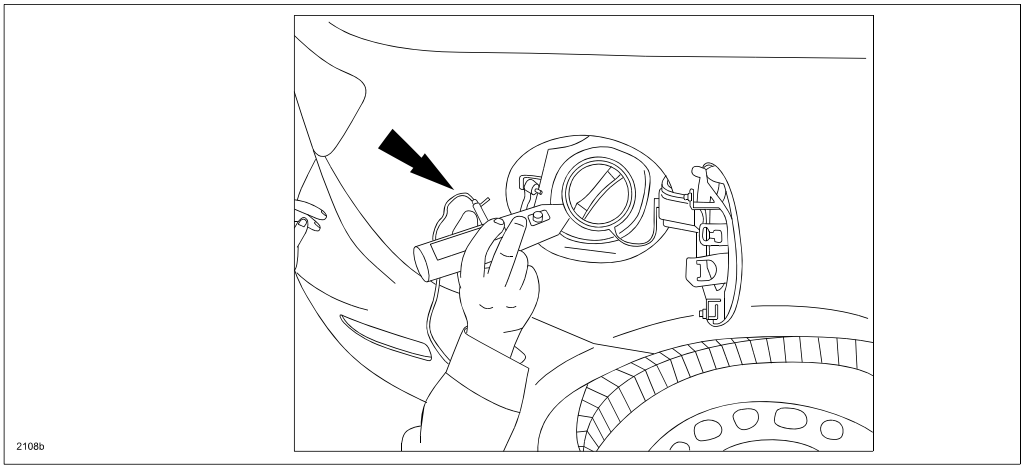
**NOTE:**

- P0441 is a DTC for purge flow, however, it can be stored when evaporative emissions are leaking from the fuel filler cap.
- Evaporative emissions leak from the fuel filler cap when the cap is not closed properly after refueling. When diagnosing an evaporative emissions leak from the fuel filler cap, DO NOT TOUCH the fuel filler cap.



## REPAIR PROCEDURE

1. Verify MIL illumination and which DTCs are stored in memory. If DTCs other than P0441, P0442, P0455 or P0456 are stored, troubleshoot and resolve those DTCs according to appropriate MS3 online instructions or Workshop Manual before proceeding.
2. Perform inspection for leakage from fuel filler cap:
   a. Connect Mazda Modular Diagnostic System (M-MDS) and perform EVAP test (KOEO).
   b. While performing EVAP test (KOEO), use an Ultrasonic Leak Detector Kit and check for leakage from fuel filler cap.

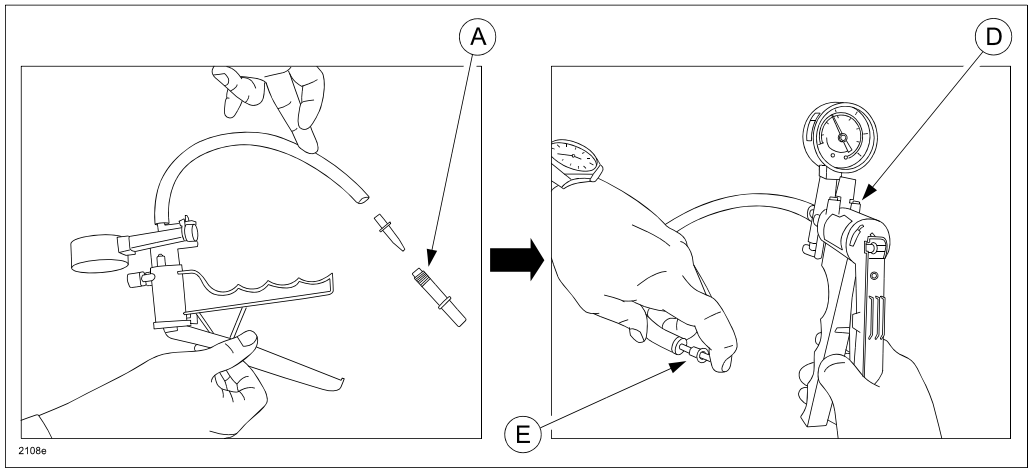



**NOTE:** EVAP test (KOEO) will finish in approx. two (2) minutes if fuel tank is nearly full. In this case, perform EVAP test (KOEO) again.

- If cause of evaporative emissions leak is found to be a loose fuel filler cap, explain to customer and advise on how to properly tighten cap.
- If cause of evaporative emissions leak is not found to be a loose fuel filler cap, proceed to Vacuum Pump Leak Test.

**Vacuum Pump Leak Test:**

1. Perform leak test between vacuum pump and appropriate generic adapter (A) to be used during the testing:
   a. Connect appropriate generic adapter to vacuum pump and ensure vacuum pressures (b and c) can be held between locations (D and E).
   b. Apply vacuum pressure of 60 kPa {18 inHg} of vacuum and monitor for 20 seconds.
   c. Apply vacuum pressure of 10 kPa {3 inHg} of vacuum and monitor for 20 seconds.

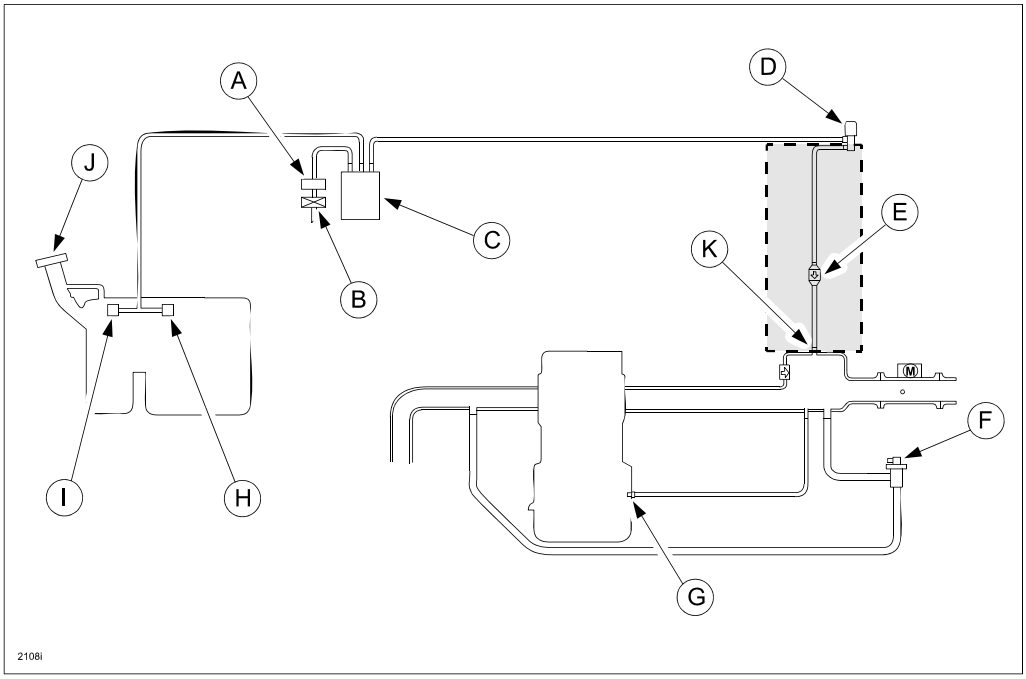



2. Proceed to “Purge Control Valve Inspection (Stuck Open)”.

**Purge Control Valve Inspection (Stuck Open):**

1. Disconnect purge control valve vacuum tube, then connect vacuum pump using appropriate generic adapter at location (K) (intake manifold side).

   **NOTE:** DO NOT connect to the charcoal canister side (C).



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| --- | --- |
| A - EVAP System Leak Detection Pump | G - PCV Valve |
| B - Air Filter | H - Rollover Valve |
| C - Charcoal Canister | I - Fuel Shut-Off Valve |
| D - Purge Solenoid Valve | J - Fuel Filler Cap |
| E - Check Valve - (DISI Engine only) | K - Insert Generic Adapter (Purge Side) |
| F - EGR Valve | --- |

2. Make sure that both vacuum (a and b below) can be held between locations (K and D above).
   a. Apply 60 kPa {18 inHg} of vacuum and verify it is within 60 kPa – 30 kPa {18 inHg - 9 inHg} when checked ten (10) seconds later.
   b. Apply 10 kPa {3 inHg} of vacuum and verify it is within 10 kPa – 5 kPa {3 inHg - 2 inHg} when checked ten (10) seconds later.
   - If BOTH conditions (a and b) are not met, replace purge solenoid valve (D) with a new part according to appropriate MS3 online instructions or Workshop Manual (section 01-16 PURGE SOLENOID VALVE REMOVAL/INSTALLATION).
   - If BOTH conditions (a and b) are met, proceed to “Purge Control Valve Inspection (Stuck Closed)”.

**Purge Control Valve Inspection (Stuck Closed):**

1. Perform inspection for a stuck closed purge solenoid valve (D) (DTC P0441):
   a. Re-connect intake manifold side vacuum hose previously disconnected.
   b. Connect M-MDS, then perform KOER (Self Test) for purge flow.
   - If KOER (Self Test) failed (DTC P0441 is confirmed), replace purge solenoid valve with a new part according to appropriate MS3 online instructions or Workshop Manual (section 01-16 PURGE SOLENOID VALVE REMOVAL/INSTALLATION).
   - If an evaporative emissions leak was not found, refer to appropriate MS3 online instructions or Workshop Manual (Section 01-03A Evaporative Emission (EVAP) System Leak Inspection) to perform “EVAP System Leak Detection Using Smoke Tester”.

**EVAP System Leak Detection Using Smoke Tester:**

**NOTE:** For additional information regarding the following procedure, reference the EVAP system leak detection owners manual.

1. Calibrate the leak tester for diagnosis.
   a. Verify that the control valve on the panel is in the HOLD position, then open the nitrogen bottle valve.
   b. Connect the vehicle interface hose (part of generic adapter) to the SELF-TEST port located on the control panel. Hand tighten the fitting (do not over-tighten).
   c. Turn the control valve to the TEST position (the gauge should read 331 - 381 mm {13 - 15 in} of water).

      **NOTE:** If the gauge is not reading in above range, adjust the pressure by turning the black knob on the low pressure regulator on the nitrogen bottle.

   d. After verifying the regulator is properly calibrated, turn the control valve to the HOLD position.
   e. Verify the gauge holds pressure and the flow meter reads no flow.
2. Disconnect the vacuum tube at or near the purge control valve on the charcoal canister side (shaded area); Insert the appropriate smoke tester adapter into the vacuum tube at location (K) on next illustration.

   **NOTE:** If the smoke tester is input using the fuel filler cap adapter (as shown on MS3 online instructions or the Workshop Manual), leakage from the fuel filler cap will not be detected.
   a. Close the change over valve (COV) using Mode 8.

      **NOTE:** M-MDS Mode 8 will release the COV after ten (10) minutes. Close the COV again as necessary to finish the inspection.

   b. Induce smoke into the system.
   c. Loosen the fuel cap (J) until the smoke starts coming out. Close the fuel cap and inspect the EVAP system for leaks.

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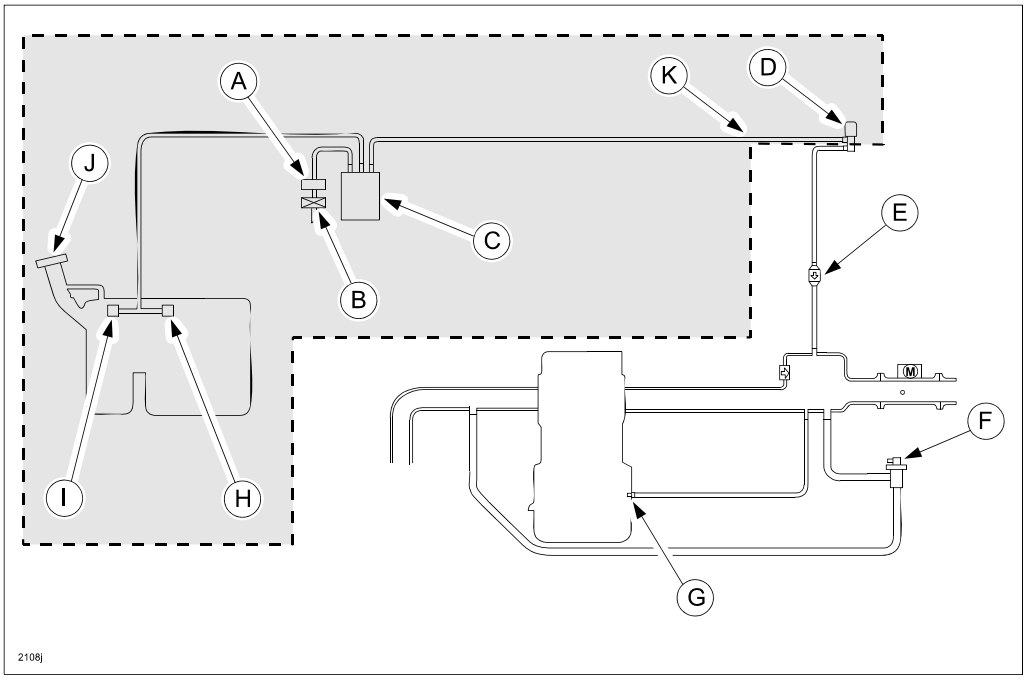


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| B - Air Filter | H - Rollover Valve |
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| D - Purge Solenoid Valve | J - Fuel Filler Cap |
| E - Check Valve | K - Hook Up SmokeTester (Canister Side) |
| F - EGR Valve | --- |