**CDX Distance Learning**

**Exercise #24**

**DTC Activity**

**Estimated Completion Time:** 30–45 mins.

**Student Name:** Click or tap here to enter text.

Click or tap the check box next to the correct answer choice. Answer these questions using the service information and procedure provided on the following pages.

1. A scan tool has been installed and the data is being reviewed. The fuel tank pressure signal voltage shown is 2.1 volts. What does this indicate?
	1. Positive fuel tank pressure [ ]
	2. Negative (vacuum) fuel tank pressure [ ]
	3. Neutral fuel tank pressure (BARO) [ ]
	4. Leaking (declining) tank pressure [ ]
2. Which of the following is NOT a required tool needed to perform the diagnosis?
	1. EVAP system nitrogen tester [ ]
	2. Fuel tank filler neck adapter [ ]
	3. DVOM [ ]
	4. Scan tool [ ]
3. A technician is attempting to run the test for the EVAP system. Which of the following would prevent the system test from running?
	1. Multiple DTCs in ECM memory [ ]
	2. Vehicle battery voltage is at 14.7 volts [ ]
	3. The engine coolant temperature at start up is 80° F [ ]
	4. A completely full tank of fuel [ ]
4. When performing the circuit/system verification, step 6, the result displayed on the scan tool is 4.5 volts. What is the next step?
	1. Perform system testing [ ]
	2. The system is okay, and no further testing is required [ ]
	3. Refer to DTC P0452 for further diagnosis [ ]
	4. Perform step 7 of the circuit/system verification [ ]
5. When performing the circuit/system verification, step 6, the result displayed on the scan tool is 1.5 volts. What is the next step?
	1. Perform system testing [ ]
	2. The system is okay, and no further testing is required [ ]
	3. Refer to DTC P0452 for further diagnosis [ ]
	4. Perform step 7 of the circuit/system verification [ ]
6. During the circuit/system testing, step 1, no blockage or restrictions are found. What is the next step?
	1. Replace the EVAP vent solenoid valve [ ]
	2. Replace the EVAP purge solenoid [ ]
	3. Continue to Step 2 [ ]
	4. Continue to Step 6 [ ]
7. During the circuit/system testing, step 3, what is connected to the vehicle?
	1. Scan tool [ ]
	2. DVOM [ ]
	3. EVAP vent filter and disconnected hoses [ ]
	4. Fuel filler neck tank adapter and nitrogen/smoke tester [ ]
8. During the circuit/system testing, step 6, the fuel tank pressure sensor data is 0″ of H20 when the vent is commanded to OFF and no other conditions are present. What is the next step?
	1. Replace the EVAP purge solenoid [ ]
	2. Replace the evaporative emission vent solenoid valve [ ]
	3. The system is okay [ ]
	4. Repeat the test at step 1 [ ]

**DTC P0446**

**Diagnostic Instructions**

* Perform the system diagnostic prior to using this diagnostic procedure.
* Review the diagnostic procedure for an overview of the diagnostic approach.
* The diagnostic procedure provides an overview of each diagnostic category.

**Diagnostic Aids**

An intermittent condition could be caused by:

* A damaged EVAP vent housing
* A temporary blockage at the EVAP vent solenoid valve inlet
* A pinched vent hose
* **NOTE:** A blockage in the vent system may also cause a poor fuel fill problem.

**DTC Description:**

DTC P0446: Evaporative emission (EVAP) vent system performance. This is a type B DTC.

**Expected Scan Tool Data**

* If the scan tool’s displayed fuel tank pressure signal voltage is less than 1.5 volts, the fuel tank pressure is positive.
* If the scan tool’s displayed fuel tank pressure signal voltage is more than 1.5 volts, the fuel tank pressure is negative (vacuum).
* If the scan tool’s displayed fuel tank pressure signal voltage is 1.5 volts, the fuel tank pressure is at atmospheric pressure (BARO).

**Tools Required**

* Scan tool
* Nitrogen/smoke EVAP system tester
* Fuel tank filler neck adapter

**Circuit/System Description**

This DTC tests the EVAP system for a restricted or blocked EVAP vent that would cause excess vacuum to accumulate in the EVAP system. The engine control module (ECM) commands the EVAP purge solenoid valve to *open* and the EVAP vent solenoid valve to *close*. This allows vacuum to be applied to the now closed EVAP system. Once the predetermined vacuum level has been reached, the ECM commands the EVAP purge solenoid valve *closed* and the EVAP vent solenoid valve *open*. The ECM then monitors the fuel tank pressure sensor for a drop in vacuum. If the vacuum does not drop to near zero in a predetermined amount time, DTC P0446 will set.

The following table illustrates the relationship between the ON and OFF states, and the OPEN or CLOSED states of the EVAP purge and vent solenoid valves.

* When the output command of ON is given the EVAP purge solenoid valve will be *open*, and the EVAP vent solenoid will be *closed*.
* When the output command is turned OFF, the EVAP purge solenoid will be *closed*, and the EVAP vent solenoid will be *open*.

**Conditions for Running the DTC**

* No other DTCs are set.
* The ignition voltage is between 11–15 V.
* The startup IAT is between 39–86° F.
* The startup ECT is less than 95° F.
* The barometric pressure (BARO) is greater than 70 kPa.
* The fuel level is not completely full or completely empty (between 10% and 90%).
* This test will start and run once per cold start for no greater than 17 minutes.

**Conditions for Setting the DTC**

* It sets if the fuel tank pressure sensor reading is less than −3 kPa (−12″) H2O of vacuum for 5 seconds before 6 L (1.6 gal) of purge volume.

**OR**

* If the fuel tank pressure sensor reading is greater than 0.62 kPa (2.5″) H2O of pressure or less than −1.24 kPa (−5″) H2O of vacuum for 60 seconds.
* After setting the DTC for the first time, 2 L (0.5 gal) of fuel must be consumed before setting the DTC for the second time.

**Circuit/System Verification**

1. Ignition ON
2. No other DTCs are set.
3. Ignition OFF, remove the fuel tank filler cap. Turn ignition ON.
4. Verify the scan tool fuel tank pressure (FTP) sensor voltage parameter is within 1.3–1.7 V.
	* **If not between the 1.3–1.7 V:**

Refer to DTC diagnostic procedures for P0452 and/or P0453.

* + **If between the 1.3–1.7 V, proceed to step 5.**
1. Install the fuel tank filler cap. Allow the engine to idle at operating temperature for 5 minutes.
2. Verify that the scan tool FTP sensor parameter does not increase to greater than 2.5 V when commanding the EVAP purge solenoid valve to at least 50%.
	* **If greater than 2.5 V:**

Refer to the circuit/system testing below.

* + **If 2.5 V or less, proceed to step 7.**
1. Operate the vehicle within the conditions for running the DTC. You may also operate the vehicle within the conditions that you observed from the freeze frame/failure records data.
	* **If the DTC sets:**

Refer to the circuit/system testing below.

* + **If the DTC does not set, proceed to step 8.**
1. System is okay.

**Circuit/System Testing**

1. Verify that a blockage or restriction does not exist in the EVAP system components listed below.
	* Evaporative emission vent system hoses
	* Evaporative emission canister
	* Evaporative emission vent solenoid valve
	* Evaporative emission vent filter
	* **If a condition exists:**

Repair or replace the component as necessary.

* + **If none of the conditions exist, proceed to step 2.**
1. Reconnect all previously disconnected EVAP hardware.
2. Remove the fuel fill cap and connect a fuel tank adapter to the fuel tank filler neck. Connect a nitrogen/smoke system tester to the tank adapter.
3. With ignition ON, command the EVAP system to *seal* or *vent off* with a scan tool to seal the EVAP system.
4. Turn the nitrogen/smoke system tester valve to nitrogen and pressurize the fuel tank to 5″ H20.
5. Verify that the scan tool fuel tank pressure sensor parameter is 0″ H20 when commanding the EVAP vent solenoid valve to OFF or VENTING.
	* **If not 0″ H20:**

Turn the ignition OFF. Verify that the EVAP vent hose is clear and not blocked, pinched, or restricted.

* + **If a condition exists:**

Repair or replace the component as necessary.

* + **If none of the conditions exist:**

Replace the evaporative emission vent solenoid valve.

* + **If 0″ H20, proceed to step 7.**
1. Operate the vehicle within the conditions for running the DTC.
	* **If the DTC sets:**

Refer to step 1 above.

* + **If the DTC does not set, proceed to step 8.**
1. All okay