Computers and Control Systems: Pinpoint Tests
HX - Evaporative Emission (EVAP) Monitor and System

Test Notes

Enter this Pinpoint Test only when directed here.

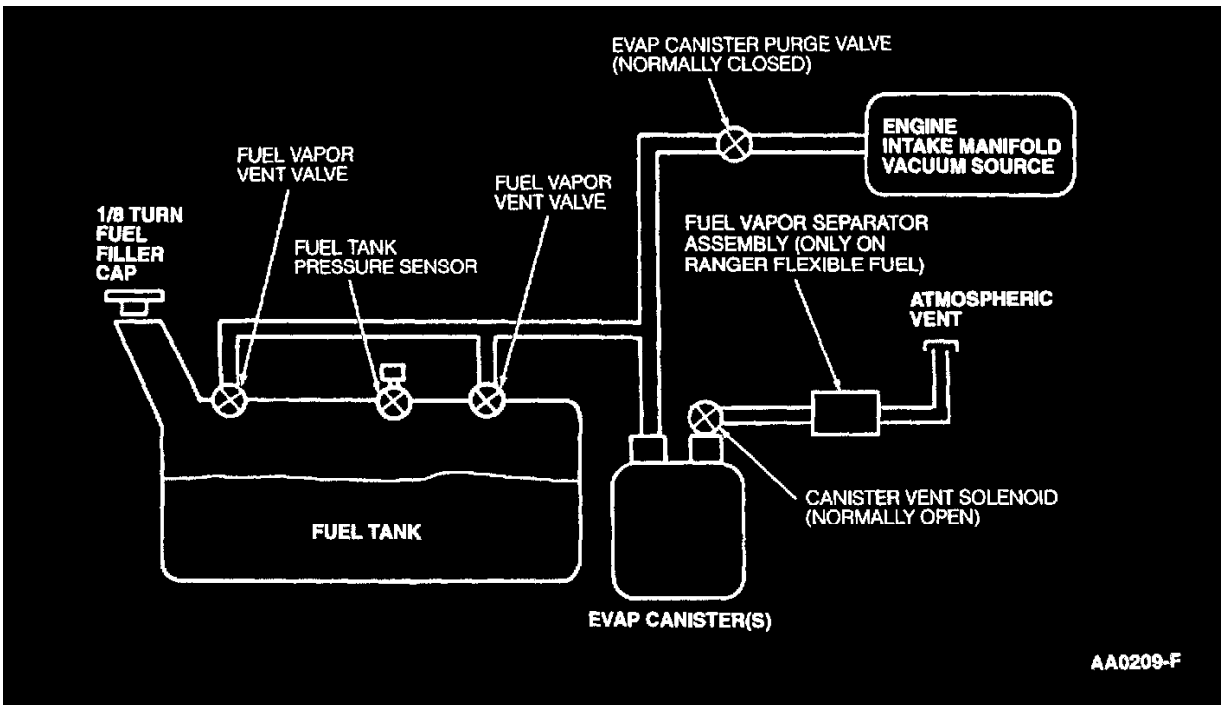
The use of a soap solution, such as SNOOP, around the fuel filler cap or the use of the hydrocarbon emission analyzer to determine an evaporative emission system leak is not recommended. The mandatory Rotunda Evaporative Emission System Leak Tester for OBD II (including the ultra-sonic tester) is the only device to be used at this time for evaporative emission system leak detection.

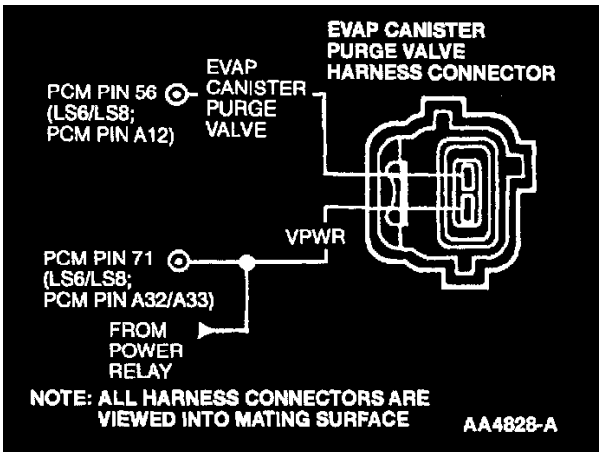
This Pinpoint Test is intended to diagnose the following:

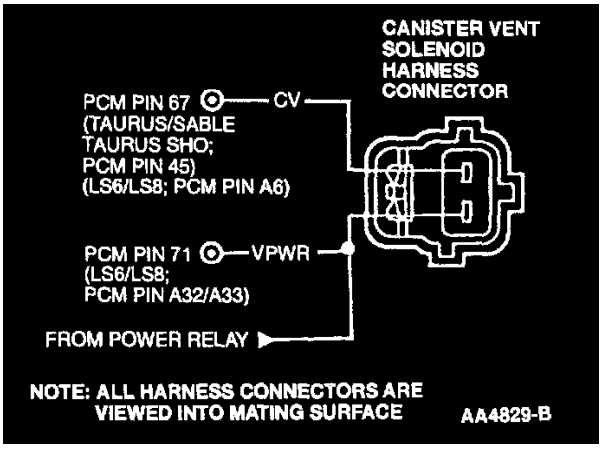
- Canister Vent **(CV)** solenoid (electrical concern only)
- Fuel filler cap
- Fuel Tank Pressure **(FTP)** sensor
- In-line fuel tank pressure sensor
- EVAP canister tube (fuel tank to EVAP canister)
- Front fuel vapor hose assembly (fuel tank to EVAP canister)
- Fuel canister purge outlet tube (EVAP canister to EVAP canister purge valve)
- EVAP return tube (EVAP canister purge valve to intake manifold)
- EVAP canister purge valve
- Vacuum source line (input port vacuum to intake manifold)
- Harness circuits: CV, FLI, FTP, EVAP Canister Purge Valve, SIG RTN, Vehicle Power **(VPWR)**, Reference Voltage **(VREF)** and Power Ground **(PWR GND)**
- Powertrain Control Module **(PCM)**

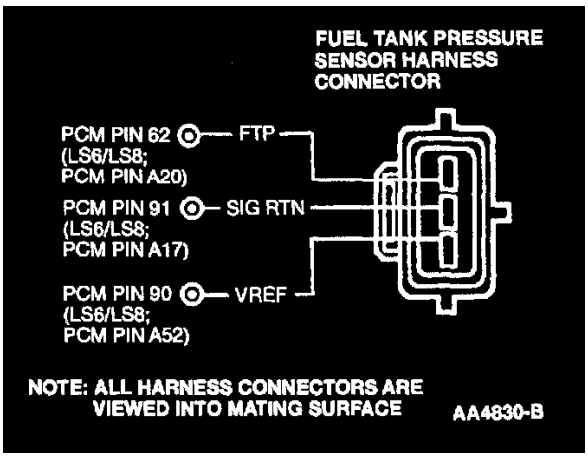
This Pinpoint Test is used as an assistance in diagnosing the following EVAP components:

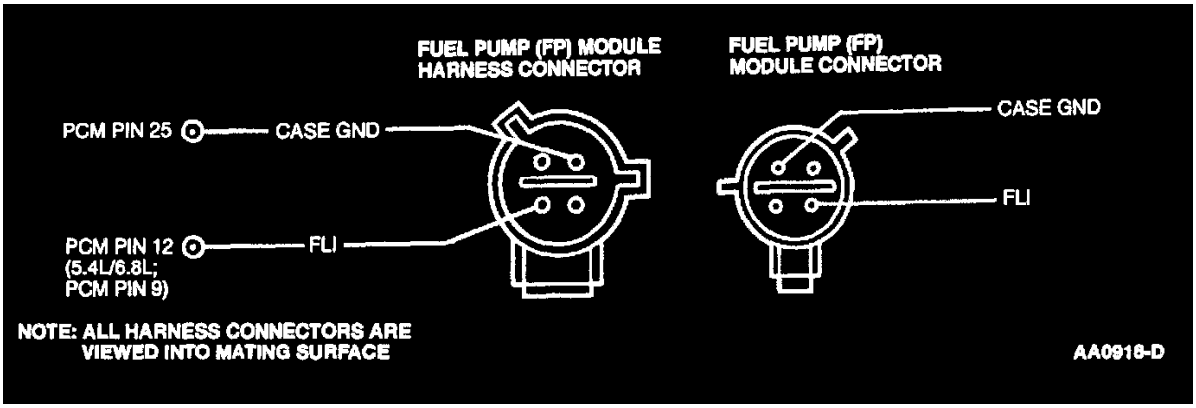
- EVAP canister and bracket assembly
  - EVAP canister sleeve assembly (fitting)
  - Canister vent solenoid hose assembly
  - EVAP canister
  - Canister vent solenoid-(mechanical concern only)
- Fill limit valve assembly
- Fuel filler pipe flapper valve
- Fuel filler pipe check valve, assembly
- Fuel tank filler pipe
- Fuel tank assembly (with fuel vapor vent valve)
- Fuel tank assembly (without fuel vapor vent valve)
- Fuel vapor control valve [can be referred to as a Grade Vent Valve **(GVV)**]
- Fuel vapor vent valve [can be referred to as a Fill limiting Vent Valve **(FVV)**]
- Fuel vapor separator assembly [can be referred to as a dust separator]
- Liquid/vapor fuel discriminator
- On-board Refueling Vapor Recovery **(ORVR)** T-connector assembly

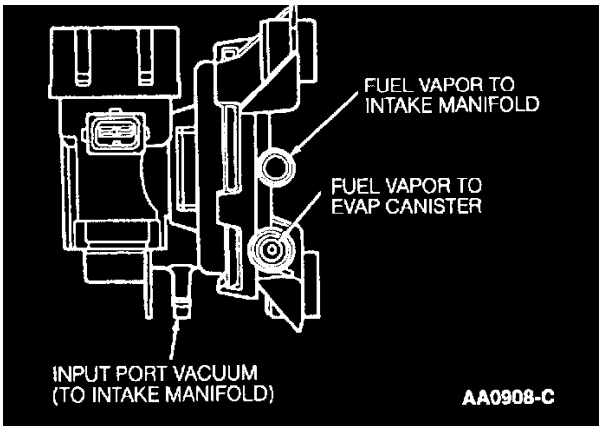

EVAP CANISTER PURGE VALVE (NORMALLY CLOSED)
ENGINE INTAKE MANIFOLD VACUUM SOURCE
FUEL VAPOR VENT VALVE
FUEL VAPOR VENT VALVE
1/8 TURN FUEL FILLER CAP
FUEL TANK PRESSURE SENSOR
FUEL VAPOR SEPARATOR ASSEMBLY (ONLY ON RANGER FLEXIBLE FUEL)
ATMOSPHERIC VENT
CANISTER VENT SOLENOID (NORMALLY OPEN)
FUEL TANK
EVAP CANISTER(S)
AA0209-F


EVAP CANISTER PURGE VALVE HARNESS CONNECTOR
EVAP CANISTER PURGE VALVE
PCM PIN 56 (LS6/LS8; PCM PIN A12)
VPWR
PCM PIN 71 (LS6/LS8; PCM PIN A32/A33)
FROM POWER RELAY
NOTE: ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE
AA4828-A


CANISTER VENT SOLENOID HARNESS CONNECTOR
PCM PIN 67 (TAURUS/SABLE TAURUS SHO; PCM PIN 45) (LS6/LS8; PCM PIN A6)
CV
PCM PIN 71 (LS6/LS8; PCM PIN A32/A33)
VPWR
FROM POWER RELAY
NOTE: ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE
AA4829-B


FUEL TANK PRESSURE SENSOR HARNESS CONNECTOR
PCM PIN 62
(LS6/LS8; PCM PIN A20)
FTP
PCM PIN 91
(LS6/LS8; PCM PIN A17)
SIG RTN
PCM PIN 90
(LS6/LS8; PCM PIN A52)
VREF
NOTE: ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE
AA4830-B


FUEL PUMP (FP) MODULE HARNESS CONNECTOR
FUEL PUMP (FP) MODULE CONNECTOR
PCM PIN 25
CASE GND
PCM PIN 12
(5.4L/6.8L; PCM PIN 9)
FLI
CASE GND
FLI
NOTE: ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE
AA0918-D


FUEL VAPOR TO INTAKE MANIFOLD
FUEL VAPOR TO EVAP CANISTER
INPUT PORT VACUUM (TO INTAKE MANIFOLD)
AA0908-C

Test Step		Result ▶	Action to Take
HX1	DTC P0442: VISUAL INSPECTION FOR SMALL EVAPORATIVE EMISSION SYSTEM LEAKS		
	• Check for presence of fuel filler cap. (Continue with Pinpoint Test Step HX2 before tightening a loose cap or checking for a cross threaded cap). • Verify that the CV solenoid is properly seated on the EVAP canister (if possible). • Visually inspect for cut or loose connections to fuel vapor hoses / tubes in following locations: — EVAP canister to EVAP canister purge valve. — EVAP canister to fuel vapor vent valve assembly. — fuel vapor control valve tube assembly to fuel tank (if applicable). • Check for fuel filler pipe damage. • **Is a fault indicated?**	Yes ▶ No ▶	CONNECT or REPLACE fuel vapor hoses / tubes as required. REPLACE damaged fuel vapor vent valve assembly, fuel vapor control valve tube assembly, EVAP canister purge valve and FTP sensor as necessary. GO to HX2. GO to HX2.
HX2	CHECK FOR SMALL EVAPORATIVE EMISSION SYSTEM LEAKS FROM THE EVAPORATIVE TEST PORT		
	NOTE: When checking for leaks or blockages in the EVAP system, energize (close) the canister vent (CV) solenoid through the scan tool for a maximum of nine minutes per pinpoint test step. Then de-energize the CV solenoid prior to performing the subsequent pinpoint test step. This is done to assure proper closing of the solenoid. • Disconnect and plug the EVAP return tube (EVAP canister purge valve to intake manifold) at the intake manifold vacuum source. • Key on, engine off. • Access VPWR PID. If the voltage is not 12 volts or greater, GO to HX61. • Locate evaporative test port [marked EVAPORATIVE SERVICE PORT DO NOT USE UNREGULATED PRESSURE ABOVE 6.89 kPa (1 PSI)] near EVAP canister purge valve or EVAP canister. • If vehicle is not equipped with the evaporative test port, GO to HX3. • Install the Rotunda Evaporative Emission System Leak Tester 310-F007 (134-00056) or equivalent at the evaporative test port. • Close CV solenoid by accessing Output Test Mode on the scan tool. • Select ALL OFF mode and push START button. • Regulate the nitrogen or argon gas pressure on the tester to 3.48 kPa (14 in-H_2O). • Follow the instructions that come with the EVAP System Leak Tester and pressurize the EVAP system. • Complete the EVAP system leak test. • **Does the pressure on the EVAP system stay above 1.99 kPa (8 in-H_2O) and pass the leak test?**	Yes ▶ No ▶	CHECK for visible damage to fuel filler cap. REMOVE the EVAP system Leak Tester from the evaporative test port. GO to HX3. REMOVE the EVAP system Leak Tester from the evaporative test port. GO to HX3.

Test Step		Result ▶	Action to Take
HX3	CHECK FOR SMALL LEAKS AT FUEL FILLER CAP AND EVAPORATIVE TEST PORT		
	• Install the EVAP System Leak Tester at the fuel filler pipe. • Follow the instructions that come with the EVAP System Leak Tester kit, titled TESTING AT FILLER NECK. • Access the ultra-sonic detector from the test kit. • Key on, engine off. • Close CV solenoid by accessing Output Test Mode. • Pressurize the EVAP system to 3.48 kPa (14 in-H_2O). • Complete the EVAP system leak test. • Slowly pass the detector probe around the fuel filler cap and the evaporative test port. • **Is an audible change around the fuel filler cap (or evaporative test port) and an EVAP system leak test failure indicated?**	Yes ▶	REPLACE fuel filler cap or evaporative test. When test port of EVAP canister purge valve, REPLACE valve. REPEAT Pinpoint Test Step HX3. **For EVAP system passing the leak test:** REMOVE EVAP System Leak Tester from fuel filler pipe. RECONNECT and TIGHTEN fuel filler cap only one eighth turn, so that cap initially clicks by sound or touch. FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle. **For EVAP system not passing the leak test:** REMOVE EVAP System Leak Tester from fuel filler pipe. RECONNECT and TIGHTEN fuel filler cap only one eighth turn, so that cap initially clicks by sound or touch. GO to HX4.
		No ▶	REMOVE EVAP System Leak Tester from fuel filler pipe. RECONNECT and TIGHTEN fuel filler cap only one eighth turn, so that cap initially clicks by sound or touch. FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle.

	Test Step	Result ▶	Action to Take
HX4	SMALL LEAK CHECK FOR EVAP SYSTEM WITH LEAK TESTER SET AT FILL POSITION		
	• Install EVAP System Leak Tester at evaporative test port. • Close canister vent (CV) solenoid by accessing Output Test Mode. • Select ALL OFF mode and push START button. • Regulate the nitrogen or argon gas pressure on the tester to 3.48 kPa (14 in-H_2O). • Follow the instructions that come with the EVAP System Leak Tester. • Turn selector on the Leak Tester to FILL POSITION. • Pressurize the EVAP system to 3.48 kPa (14 in-H_2O). • **Does the pressure on the EVAP system hold between 3.43 and 3.53 kPa (13.80 and 14.20 In-H_2O)?**	Yes ▶ No ▶	GO to HX5. DISCONTINUE pressurizing the EVAP system. GO to HX6.
HX5	CHECK FOR SMALL LEAK IN THE ENTIRE EVAP SYSTEM WITH ULTRA-SONIC DETECTOR		
	NOTE: If the EVAP canister-CV solenoid and fuel tank assemblies are not accessible during this pinpoint test step, remove them. • Key on, engine off. • NOTE: To assure that the CV solenoid remains closed do not energize the solenoid with the scan tool for more than nine minutes. If necessary, de-energize the CV solenoid with some time passing between checks. Close the CV solenoid closed by accessing Output Test Mode. • Pressurize the EVAP system to 3.48 kPa (14 in-H_2O). • Access the ultra-sonic detector from the EVAP System Leak Tester kit. • Slowly pass the detector probe over the EVAP system at the following locations: — EVAP return tube to EVAP canister purge valve. — EVAP canister purge valve to EVAP canister-CV solenoid assembly. — EVAP canister-CV solenoid assembly to fuel tank. — Fuel filler cap and fuel filler pipe. • **Is a sudden audible change indicated?**	Yes ▶ No ▶	RECONNECT loose or REPLACE damaged fuel vapor hoses / tubes (EVAP return tube, EVAP canister purge outlet tube and EVAP canister tube). GO to HX6. DISCONTINUE pressurizing EVAP system. GO to HX6.

	Test Step	Result ▶	Action to Take
HX6	CHECK FOR SMALL EVAPORATIVE LEAK FROM EVAP RETURN TUBE TO THE EVAP CANISTER WITH ULTRA-SONIC DETECTOR		
	NOTE: Mustang, Town Car, Windstar and Ranger have a quick disconnect between the EVAP canister tube and front fuel vapor hose assembly (fuel tank to the EVAP canister). This disconnect is used as an alternative location to a fuel vapor tee or F-fitting on the EVAP canister for leak check purposes. • Disconnect the EVAP canister tube (from the fuel tank) at the fuel vapor tee between the EVAP canister purge valve and EVAP canister (or at the F-fitting on the EVAP canister). • Plug (cap) the fuel vapor tee open end of front fuel vapor hose at quick disconnect, or the F-fitting on the canister. • Close the CV solenoid by accessing Output Test Mode on the scan tool. • Pressurize the EVAP system to 3.48 kPa (14 in-H_2O) at the evaporative test port. • Access the ultra-sonic detector from the EVAP System Leak Tester kit. • Slowly pass the detector probe from the EVAP return tube (intake manifold to EVAP canister purge valve), EVAP canister purge outlet tube (EVAP canister purge valve to EVAP canister-CV solenoid assembly) and canister vent hose assembly. • **Is a sudden audible change indicated?**	Yes ▶	RECONNECT loose or REPLACE damaged EVAP return tube, EVAP canister purge outlet tube or canister vent hose assembly. REPEAT Pinpoint Test Step HX6 to VERIFY fuel vapor leak no longer exists. GO to HX7.
		No ▶	REMOVE plug from fuel vapor tee, front fuel vapor hose or F-fitting on the EVAP canister. GO to HX7.
HX7	CHECK FOR SMALL EVAPORATIVE LEAK BETWEEN EVAP CANISTER TUBE AND THE FUEL TANK AT THE FUEL FILLER PIPE		
	NOTE: If the fuel vapor vent valve and fuel vapor control valve tube assemblies are not accessible to perform the following step, remove them. • Remove the EVAP System Leak Tester equipment from the evaporative test port. • Remove fuel filler cap. • Install EVAP System Leak Tester at the fuel filler pipe. • Plug the open end of the EVAP canister tube (from the fuel tank) at either the fuel vapor tee, at the quick disconnect to front fuel vapor hose, or at the F-fitting on the EVAP canister. • Key on, engine off. • Pressurize the EVAP system at 6.47 to 6.97 kPa (26 to 28 in-H_2O) with selector on the Leak Tester at FILL POSITION. • Access the ultra-sonic detector from the EVAP System Tester kit. • Slowly pass the detector probe from the EVAP canister tube to the fuel tank, checking the FTP sensor, fuel vapor vent valve(s), fuel vapor control valve and fuel filler pipe. • **Is a sudden audible change indicated?**	Yes ▶	RECONNECT loose or REPLACE EVAP canister tube. REPEAT Pinpoint Test Step HX7 to VERIFY a leak no longer exists. GO to HX8.
		No ▶	GO to HX8.

Test Step		Result ▶	Action to Take
HX8	VERIFICATION LEAK CHECK ON THE EVAP SYSTEM AT THE FUEL FILLER PIPE		
	• Reconnect the EVAP canister tube to either the fuel vapor tee, the front fuel vapor hose to EVAP canister or the F-fitting on the EVAP canister). • Key on, engine off. • Close the CV solenoid by accessing Output Test Mode. • Regulate the nitrogen or argon gas pressure on the tester to 3.48 kPa (14 in-H_2O). • Pressurize the EVAP system to 3.48 kPa (14 in-H_2O) at the fuel filler pipe. • Follow the instructions that come with the EVAP System Leak Tester. • Complete the EVAP system leak test. • **Does the EVAP system pass the leak test?**	Yes ▶	REMOVE the EVAP System Leak Tester from the fuel filler pipe. RECONNECT and TIGHTEN the fuel filler cap only one eighth turn so that the cap initially clicks by sound or touch. RECONNECT the EVAP return tube to the intake manifold vacuum. FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle.
		No ▶	Begin at Pinpoint Test Step HX4 and locate a small leak that still exists. Proceed to Pinpoint Test Step HX8 afterwards to VERIFY repair. REMOVE the EVAP System Leak Tester. RECONNECT and TIGHTEN the fuel filler cap only one eighth turn so that the cap initially clicks by sound or touch. RECONNECT the EVAP return tube to the intake manifold. FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle.
HX10	DTC P0443: INSPECT EVAP CANISTER PURGE VALVE CIRCUIT FOR INTERMITTENT FAILURE		
	• Rerun KOEO, KOER Self-Tests and retrieve Continuous Memory DTCs. • **Is DTC P0443 present in Continuous Memory Self-Test only?**	Yes ▶	The fault that produced Continuous Memory DTC P0443 can be intermittent. GO to Pinpoint Test Step Z1. If OK REPLACE PCM.
		No ▶	GO to HX11.

	Test Step	Result ▶	Action to Take
HX11	DTC P0443: CHECK VPWR VOLTAGE TO EVAP CANISTER PURGE VALVE		
	• Key off. • Disconnect EVAP canister purge valve. • Key on, engine off. • Measure voltage between VPWR circuit at the EVAP canister purge valve harness connector and battery negative post. • **Is voltage greater than 10.5 volts?**	Yes ▶ No ▶	KEY OFF. GO to HX12. REPAIR open circuit.
HX12	CHECK EVAP CANISTER PURGE VALVE RESISTANCE		
	NOTE: EVAP canister purge valve resistance reading must be taken with engine cooled down. • Disconnect EVAP canister purge valve. • Measure EVAP canister purge valve resistance. • **Is resistance between 30 and 38 ohms?**	Yes ▶ No ▶	GO to HX13. REPLACE damaged EVAP canister purge valve. COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle.
HX13	CHECK EVAP CANISTER PURGE VALVE CIRCUIT FOR OPEN IN HARNESS		
	NOTE: Refer to the PCM connector pin numbers in the beginning of this pinpoint test. • Disconnect PCM. • Measure resistance of EVAP canister purge valve circuit between PCM harness connector pin and EVAP canister purge valve harness connector. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to HX14. REPAIR open circuit.
HX14	CHECK EVAP CANISTER PURGE VALVE CIRCUIT FOR SHORT TO PWR GND IN HARNESS		
	• Disconnect scan tool from DLC. • Measure resistance between EVAP canister purge valve circuit at the EVAP canister purge valve harness connector and battery negative post • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	GO to HX15. REPAIR short circuit.
HX15	CHECK EVAP CANISTER PURGE VALVE CIRCUIT FOR SHORT TO VPWR IN HARNESS		
	• Key on, engine off. • Measure voltage between EVAP canister purge valve circuit at the EVAP canister purge valve harness connector and battery negative post. • **Is voltage greater than 10.5 volts?**	Yes ▶ No ▶	REPAIR short circuit. REPLACE PCM.

Test Step		Result ▶	Action to Take
HX18	DTC P1450: CHECK FOR VISUAL CAUSES OF EXCESSIVE FUEL TANK VACUUM		
	NOTE: If the EVAP canister-CV solenoid and fuel tank assemblies are not accessible during this pinpoint test step, REMOVE them. • Check for kinks or bends in the fuel vapor hoses/tubes (EVAP canister purge outlet tube and EVAP canister tube). • Visually inspect EVAP canister inlet port, CV solenoid filter and canister vent hose assembly for contamination or debris. • Check CV solenoid filter for blockage or contamination. • **Is a fault indicated?**	Yes ▶ No ▶	REMOVE any contamination or debris around fuel vapor hoses/tubes and EVAP canister- CV solenoid assembly. REMOVE kinks or bends in EVAP canister purge outlet tube, EVAP canister tube and canister vent hose assembly. GO to HX19. GO to HX19.
HX19	CHECK FOR BLOCKAGE BETWEEN THE EVAPORATIVE TEST PORT AND EVAP CANISTER-CV SOLENOID ASSEMBLY		
	• Disconnect and plug the EVAP return tube (EVAP canister purge valve to intake manifold) at the intake manifold vacuum source. • Plug (tape) the CV solenoid (or filter) or plug the canister vent hose assembly. • Locate evaporative test port [marked EVAPORATIVE SERVICE PORT DO NOT USE UNREGULATED PRESSURE ABOVE 6.89 kPa (1 PSI)] near EVAP canister purge valve or EVAP canister. • Install Rotunda Evaporative Emission System Leak Tester 310-F007 (134-00056) or equivalent at the test port. • Regulate the nitrogen or argon gas pressure on the tester to 3.48 kPa (14 in-H_2O). • Pressurize the EVAP system to 3.48 kPa (14 in-H_2O). • Remove the plug (tape) from the CV solenoid or the plug from the canister vent hose assembly. • **Does the EVAP system pressure drop rapidly (quickly)?**	Yes ▶ No ▶	REMOVE EVAP System Leak Tester from evaporative test port. GO to HX20. GO to Evaporative Emissions diagnostic symptom condition listed as Hiss When Opening Fuel Cap. REPEAT Pinpoint Test Step HX19 to VERIFY blockage no longer exists. GO to HX22.

Test Step	Result ▶	Action to Take
HX20 PRESSURE CHECK THE FUEL FILLER CAP		
NOTE: When checking for leaks or blockages in the EVAP system, energize (close) the canister vent (CV) solenoid through the scan tool for a maximum of nine minutes per pinpoint test step. Then de-energize the CV solenoid prior to performing the subsequent pinpoint test step. This is done to assure proper closing of the solenoid. • Install the EVAP System Leak Tester at the fuel filler pipe. • Follow the instructions that come with the EVAP System Leak Tester kit to perform TESTING AT FILLER NECK. • Key on, engine off. • Close CV solenoid by accessing Output Test Mode on the scan tool. • Pressurize the EVAP system to 3.48 kPa (14 in-H_2O) at the evaporative test port. • NOTE: The Rotunda Engine EAR Amplifier (107-R2100) is an optional tool to be used if noise level hinders the effectiveness of the ultra-sonic detector. Access the ultra-sonic detector from the EVAP System Leak Tester kit. • Slowly pass the detector probe around the fuel filler cap and the evaporative test port. • **Is an audible change around the fuel filler cap indicated?**	Yes ▶ No ▶	REPLACE fuel filler cap. REPEAT HX20 to VERIFY repair. GO to HX21. GO to HX21.
HX21 CHECK FOR BLOCKAGE BETWEEN THE EVAPORATIVE TEST PORT TANK WITH FUEL FILLER CAP REMOVED		
• Key on, engine off. • Close CV solenoid by accessing Output Test Mode. • Pressurize the EVAP system to 3.48 kPa (14 in-H_2O). • REMOVE fuel filler cap. • **Does the pressure drop rapidly (quickly)?**	Yes ▶ No ▶	REMOVE the EVAP System Leak Tester from the fuel filler pipe. GO to HX22. GO to Evaporative Emissions diagnostic symptom condition listed as Hiss When Opening Fuel Cap. REPEAT Pinpoint Test Step HX21 to VERIFY a blockage no longer exists. Then, GO to HX22.

Test Step		Result ▶	Action to Take
HX22	CHECK FUEL TANK PRESSURE SENSOR PIDS WITH FUEL FILLER CAP REMOVED		
	NOTE: FTP sensor input for KOEO, KOER with no pressure or no vacuum on the fuel tank (fuel filler cap on or off) is 2.40 to 2.80 volts. • Remove fuel filler cap. • Key on, engine off. • Access the FTP [FTP V] PIDs. • Record the reading. • **Is FTP [FTP V] PID reading between -0.37 and 0.37 kPa (-1.50 and 1.50 in-H_2O) [2.40 and 2.80 volts] with the fuel filler cap off?**	Yes ▶ No ▶	INSTALL the fuel filler cap only one eighth turn so that the cap initially clicks by sound or touch. GO to HX23. GO to HX24.
HX23	CHECK FOR STUCK OPEN EVAP CANISTER PURGE VALVE CONDITION AT IDLE		
	NOTE: When the EVAPPDC PID reads zero the FTP [FTP V] PID must read +/-0.37 kPa (+/-1.50 in-H_2O) [2.40 to 2.60 volts]. • Open the CV solenoid to atmosphere by removing the plug from the canister vent hose assembly or the tape from the the CV solenoid filter cap. • Remove plug and reconnect the EVAP return tube (EVAP canister purge valve to intake manifold) at the intake manifold vacuum source. • Verify fuel filler cap is installed. • Key on, engine off. • Access the FTP, FTP V and EVAPPDC PIDs. • Start engine. • **When EVAPPDC PID is zero, is the FTP [FTP V] PID reading below -0.37 kPa (-1.50 in-H_2O) 2.40 volts?**	Yes ▶ No ▶	The EVAP canister purge valve is stuck open. REPLACE EVAP canister purge valve. INSTALL the EVAP System Leak Tester or equivalent to the evaporative test port. COMPLETE an EVAP system leak test to VERIFY a leak did not occur during component replacement. FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle. If FTP (FTP V) PID is within the range specified in Pinpoint Test Step HX22, COMPLETE an EVAP system leak test to VERIFY no leak exists. FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle GO to HX19 to find additional blockages.

Test Step	Result ▶	Action to Take
HX24 CHECK VREF FROM PCM TO FTP SENSOR		
• Disconnect FTP sensor. • Key on, engine off. • Measure voltage between VREF and SIG RTN circuits at the FTP sensor harness connector. • **Is voltage between 4.0 and 6.0 volts?**	Yes ▶	KEY OFF. REPLACE damaged FTP sensor. After replacing FTP sensor, COMPLETE an EVAP System leak test at the evaporative test port to repair. Then, GO to HX22 to VERIFY the repair.
	No ▶	KEY OFF. GO to HX25.
HX25 CHECK FOR OPEN VREF CIRCUIT BETWEEN PCM AND FTP SENSOR		
NOTE: Refer to the PCM connector pin numbers in the beginning of this pinpoint test. • Disconnect PCM. • Measure resistance of VREF circuit between PCM harness connector pin and FTP sensor harness connector. • **Is resistance less than 5.0 ohms?**	Yes ▶	REPLACE PCM. Then, GO to HX22 to VERIFY the repair.
	No ▶	REPAIR open circuit. Then, GO to HX22 to VERIFY the repair.
HX26 DTC P0452: CHECK FOR FTP SENSOR CONNECTOR CONTAMINATION		
• Key off. • Visually check for liquid fuel contamination of the FTP sensor electrical connector. • Check for completely submerged FTP sensor (tank mounted type only) in liquid fuel (can affect correct FTP voltage reading). • **Does FTP sensor and its electrical connector show signs of fuel contamination?**	Yes ▶	REPAIR FTP sensor electrical connector as necessary. ADJUST fuel tank overfill.
	No ▶	GO to HX27.
HX27 CHECK FOR LOW FTP SENSOR VOLTAGE		
• NOTE: FTP sensor input with no pressure / vacuum on the fuel tank (filler cap open or not open to atmosphere) is between 2.37 and 2.97 volts. • Connect scan tool. • Key on, engine off. • Access FTP V PID. • If FTP V PID is not present on the scan tool, measure voltage between FTP and SIG RTN circuits at the PCM harness connector with PCM connected. • **Is measured voltage or FTP V PID reading less than 0.22 volt?**	Yes ▶	KEY OFF. GO to HX28.
	No ▶	The fault that produced the DTC P0452 is intermittent. GO to Pinpoint Test Step Z1.

Test Step	Result ▶	Action to Take
HX28 CHECK OPPOSITE INDUCED HIGH FTP SIGNAL		
• Disconnect FTP sensor. • Connect a jumper wire between VREF circuit and FTP circuits at the FTP sensor harness connector. • Key on, engine off. • If a scan tool communication concern exists, remove jumper immediately and go directly to HX29. • Access FTP V PID. • If FTP V PID is not present on the scan tool, measure voltage between FTP and SIG RTN circuits at the PCM harness connector with PCM connected. • **Is measured voltage or FTP V PID reading between 4.0 and 6.0 volts?**	Yes ▶ No ▶	REPLACE FTP sensor. RESTORE vehicle. FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle. REMOVE jumper. GO to HX29.
HX29 CHECK VOLTAGE BETWEEN VREF AND SIG RTN CIRCUITS AT FTP SENSOR		
• Key on, engine off. • Measure voltage between VREF and SIG RTN circuits at the FTP sensor harness connector. • **Is voltage between 4.0 and 6.0 volts?**	Yes ▶ No ▶	KEY OFF. GO to HX30. VREF voltage is out of range. GO to Pinpoint Test Step C1.
HX30 CHECK FTP CIRCUIT FOR SHORT TO SIG RTN OR PWR GND IN HARNESS		
NOTE: Refer to the PCM connector pin numbers in the beginning of this pinpoint test. • Disconnect PCM. • Disconnect scan tool from DLC. • Measure resistance between FTP and SIG RTN circuits at the PCM harness connector. • Measure resistance between FTP circuit at the PCM harness connector and battery negative post. • **Is each resistance greater than 10,000 ohms?**	Yes ▶ No ▶	REPLACE PCM. REPAIR short circuit.
HX33 DTC P0453: CHECK FOR HIGH FTP SENSOR VOLTAGE		
NOTE: FTP sensor input with no pressure / vacuum on the fuel tank (fuel filler cap open or not open to atmosphere) is 2.37 to 2.97 volts. • Connect scan tool. • Key on, engine off. • Access FTP V PID. • If FTP V PID is not present on the scan tool, measure voltage between FTP and SIG RTN circuits at the PCM harness connector with PCM connected. • **Is measured voltage or FTP V PID reading greater than 4.50 volts?**	Yes ▶ No ▶	KEY OFF. GO to HX34. The fault that produced DTC P0453 is intermittent. GO to Pinpoint Test Step Z1.

Test Step	Result ▶	Action to Take
HX34 CHECK FTP CIRCUIT FOR SHORT TO POWER • Disconnect FTP sensor. • Key on, engine off. • Measure voltage between FTP circuit at the FTP sensor harness connector and battery negative post. • **Is the voltage greater than 10.5 volts?**	Yes ▶ No ▶	KEY OFF. The FTP is indicating a short to VPWR. GO to **HX35**. KEY OFF. GO to **HX36**.
HX35 CHECK FTP CIRCUIT FOR SHORT TO VPWR IN HARNESS NOTE: Refer to the PCM connector pin numbers in the beginning of this pinpoint test. • Disconnect PCM. • Key on, engine off. • Measure the voltage between FTP circuit at the PCM harness connector and battery negative post. • **Is voltage greater than 10.5 volts?**	Yes ▶ No ▶	REPAIR short circuit. REPLACE PCM.
HX36 CHECK OPPOSITE INDUCED LOW FTP SIGNAL • Connect a jumper wire between SIG RTN and FTP circuits at the FTP sensor harness connector. • Key on, engine off. • If a scan tool communication concern exists, turn the key off, remove jumper immediately and go directly to **HX41**. • Access FTP V PID. • If FTP V PID is not present on the scan tool, measure voltage between FTP and SIG RTN circuits at the PCM harness connector with PCM connected. • **Is measured voltage or FTP V PID reading less than 0.10 volt?**	Yes ▶ No ▶	REMOVE jumper. GO to **HX37**. Unable to induce opposite signal. KEY OFF. GO to **HX39**.
HX37 CHECK FOR IN RANGE VOLTAGE BETWEEN VREF AND SIG RTN CIRCUITS AT FTP SENSOR • Key on, engine off. • Measure voltage between VREF and SIG RTN circuits at the FTP sensor vehicle harness connector. • **Is voltage between 4.0 and 6.0 volts?**	Yes ▶ No ▶	KEY OFF. GO to **HX38**. VREF voltage is out of range. GO to Pinpoint Test Step **C1**.

Test Step		Result ▶	Action to Take
HX38	CHECK FTP CIRCUIT FOR SHORT TO VREF IN SENSOR OR HARNESS		
	NOTE: Refer to the PCM connector pin numbers in the beginning of this pinpoint test. • Disconnect PCM. • Measure resistance between FTP and VREF circuits at the PCM harness connector. (For LS6/LS8 measure to both VREF pins.) • **Is the resistance greater than 10,000 ohms?**	Yes ▶	REPLACE FTP sensor. RESTORE vehicle. FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle.
		No ▶	REPAIR short circuit.
HX39	CHECK FTP CIRCUIT FOR OPEN IN HARNESS		
	NOTE: Refer to the PCM connector pin numbers in the beginning of this pinpoint test. • Disconnect PCM. • Measure resistance of FTP circuit between PCM harness connector pin and FTP sensor harness connector. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to HX40. REPAIR open circuit.
HX40	CHECK FOR OPEN SIG RTN CIRCUIT BETWEEN PCM AND FTP SENSOR		
	• Measure resistance of SIG RTN circuit between PCM harness connector pin and FTP sensor harness connector. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to HX41. REPAIR open circuit.
HX41	CHECK FTP CIRCUIT FOR SHORT TO VREF IN PCM		
	• PCM disconnected. • Measure resistance between FTP and VREF circuits at the PCM harness connector. (For LS6/LS8 measure to both VREF pins.) • **Is the resistance greater than 10,000?**	Yes ▶ No ▶	REPLACE PCM. REPAIR short circuit.
HX44	DTC P0455: VISUAL INSPECTION FOR SUBSTANTIAL EVAPORATIVE EMISSION SYSTEM LEAKS		
	• Check for missing fuel filler cap. If the cap is loose DO NOT DISTURB EVAP system. • Verify that both the input port vacuum hose and EVAP return tube are attached to the EVAP canister purge valve. • NOTE: If the EVAP canister-CV solenoid assembly is not accessible during this pinpoint test step, remove. Verify that the CV solenoid is properly seated on the EVAP canister (if possible). • Visually inspect for disconnected or cracked fuel vapor hoses/tubes between the intake manifold, the EVAP canister purge valve, the EVAP canister, the fuel vapor vent valve assembly and if applicable the fuel vapor control valve tube assembly. • Check for damage to the fuel filler pipe and the fuel tank. • **Is a fault indicated?**	Yes ▶ No ▶	CONNECT or REPLACE fuel vapor hoses/tubes as required. REPLACE damaged EVAP system components (fuel filler pipe, fuel vapor vent valve assembly, fuel vapor control valve tube assembly, EVAP canister purge valve, FTP sensor and EVAP canister-CV solenoid assembly) as necessary. GO to HX45. GO to HX45.

Test Step		Result ▶	Action to Take
HX45	CHECK FOR EVAPORATIVE EMISSION SYSTEM LEAKS		
	NOTE: When checking for leaks or blockages in the EVAP system, energize (close) the canister vent (CV) solenoid through the scan tool for a maximum of nine minutes per pinpoint test step. Then de-energize the CV solenoid prior to performing the subsequent pinpoint test step. This is done to assure proper closing of the solenoid. • Disconnect and plug the EVAP return tube (EVAP canister purge valve to intake manifold) at the intake manifold vacuum source. • Connect scan tool. • Key on, engine off. • Access VPWR PID. If the voltage is not 12 volts or greater, GO to HX61. • Locate evaporative test port [marked EVAPORATIVE SERVICE PORT DO NOT USE UNREGULATED PRESSURE ABOVE 6.89 kPa (1 PSI)] near EVAP canister purge valve or EVAP canister. • If vehicle is not equipped with the evaporative test port, GO to HX50. • Install the Rotunda Evaporative Emission System Leak Tester 310-F007 (134-00056) or equivalent at the evaporative test port. • Close CV solenoid by accessing Output Test Mode on the scan tool. • Select ALL OFF mode and push START button. • Regulate the nitrogen or argon gas pressure on the tester to 3.48 kPa (14 in-H_2O). • Follow the instructions that come with the EVAP System Leak Tester and pressurize the EVAP system. • Perform the EVAP system leak test. • **Does the pressure on the EVAP system stay above 1.99 kPa (8 in-H_2O) and pass the leak test?**	Yes ▶ No ▶	GO to HX46. REMOVE the EVAP System Leak Tester from the evaporative test port and REINSTALL the test port cap. GO to HX50.
HX46	BLOCKAGE CHECK FOR EVAP CANISTER-CV SOLENOID ASSEMBLY		
	• Key on, engine off. • Close CV solenoid by accessing Output Test Mode. • Pressurize the EVAP system to 3.48 kPa (14 in-H_2O). • De-energize the CV solenoid using scan tool. • **Does the pressure on the EVAP system drop rapidly (quickly) to zero?**	Yes ▶ No ▶	GO to HX48. GO to HX47.

Test Step		Result ▶	Action to Take
HX47	CHECK FOR BLOCKAGE BETWEEN EVAP CANISTER PURGE VALVE AND EVAP CANISTER		
	NOTE: If the EVAP canister-CV solenoid assembly is not accessible during this pinpoint test step, remove it. • Disconnect and plug the EVAP canister purge outlet tube (between EVAP canister purge valve and EVAP canister) at the EVAP canister. • Re-pressurize the EVAP system to 3.48 kPa (14 in-H_2O). • Remove the plug from the EVAP canister purge outlet tube. • **Does the pressure on the EVAP system drop rapidly (quickly) to zero?**	Yes ▶	GO to Evaporative Emissions diagnostic symptom condition listed as Pressure Released When Opening Fuel Cap. Then, REPEAT Pinpoint Test Step HX46 to VERIFY a blockage no longer exists. Afterwards, GO to HX48.
		No ▶	REMOVE blockage or contamination from the EVAP canister purge outlet tube. If necessary, REPLACE the tube. GO to HX46.
HX48	CHECK FOR BLOCKAGE BETWEEN THE EVAP TEST PORT AND THE FUEL TANK		
	• Key on, engine off. • Close canister vent (CV) solenoid by accessing Output Test Mode. • Re-pressurize the EVAP system to 3.48 kPa (14 in-H_2O) at evaporative test port. • Remove the fuel filler cap. • **Does the pressure on the EVAP system drop to zero?**	Yes ▶	LEAVE fuel filler cap off. GO to HX56.
		No ▶	REMOVE EVAP System Leak Tester equipment from evaporative test port. REINSTALL test port cap. GO to HX49.
HX49	CHECK FOR BLOCKAGE BETWEEN FUEL TANK AND EVAP CANISTER TUBE		
	NOTE: If the EVAP canister-CV solenoid assembly is not accessible during this pinpoint test step, remove it. • Key on, engine off. • Install the EVAP System Leak Tester at the fuel filler pipe. • NOTE: Mustang, Town Car, Windstar and Ranger have a quick disconnect between the EVAP canister tube and front fuel vapor hose assembly (fuel tank to EVAP canister). This disconnect is used as an alternative location to the fuel vapor tee or F-fitting on the EVAP canister for leak check purposes. Remove and plug the EVAP canister tube (from the fuel tank) at the tee fitting between the EVAP canister purge valve and EVAP canister (or the F-fitting on the EVAP canister). • Re-pressurize the EVAP system to 3.48 kPa (14 in-H_2O) at fuel filler pipe. • Remove the plug from the EVAP canister tube at either the tee fitting, the front fuel vapor hose or the F-fitting on the EVAP canister. • **Does the pressure on the EVAP system drop?**	Yes ▶	REMOVE fuel filler cap. REINSTALL EVAP canister tube. GO to HX56.
		No ▶	GO to Evaporative Emissions diagnostic symptom condition listed as Pressure Released When Opening Fuel Cap. Then, REPEAT Pinpoint Test Step HX48 to VERIFY a blockage no longer exists. LEAVE fuel filler cap off. GO to HX56.

Test Step	Result ▶	Action to Take
HX50 CHECK FOR LARGE LEAKS AT FUEL FILLER CAP		
• Install the EVAP System Leak Tester at the fuel filler pipe. • Follow the instructions that come with the EVAP System Leak Tester kit, titled TESTING AT FILLER NECK. • Access the ultra-sonic detector from the test kit. • Key on, engine off. • Close canister vent (CV) solenoid by accessing Output Test Mode on the scan tool. • Pressurize the EVAP system to 3.48 kPa (14 in-H_2O). • Complete the EVAP system leak test. • Slowly pass the detector probe around the fuel filler cap. • **Is an audible change around the fuel filler cap indicated?**	Yes ▶	REPLACE fuel filler cap REPEAT Pinpoint Test Step HX50 to VERIFY repair. **For EVAP system passing the leak test:** REMOVE EVAP System Leak Tester from fuel filler pipe. RECONNECT and TIGHTEN the fuel filler cap only one eighth turn so that the cap initially clicks by sound or touch. FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle. **For EVAP system not passing the leak test:** REMOVE EVAP System Leak Tester from fuel filler pipe. RECONNECT and TIGHTEN the fuel filler cap only one eighth turn so that the cap initially clicks by sound or touch. GO to HX51.
	No ▶	REMOVE EVAP System Leak Tester from the fuel filler pipe. RECONNECT and TIGHTEN the fuel filler cap only one eighth turn so that the cap initially clicks by sound or touch. GO to HX51.

Test Step	Result ▶	Action to Take
HX51 CHECK FOR FUEL VAPOR LEAK IN THE EVAP CANISTER-CV SOLENOID ASSEMBLY		
NOTE: If the EVAP canister-CV solenoid assembly is not accessible during this pinpoint test step, • Plug the canister vent hose assembly or close (tape CV filter shut) the CV solenoid to atmosphere. • Pressurize the EVAP system to 3.48 kPa (14 in-H_2O) at evaporative service port. • Slowly pass the detector probe around the EVAP canister-CV solenoid assembly. • **Is an audible change around the EVAP canister-CV solenoid assembly indicated?**	Yes ▶	LEAK test the EVAP canister-CV solenoid assembly. REPLACE damaged component. COMPLETE leak test on EVAP canister-CV solenoid assembly prior to installation in vehicle. Then, REPEAT Pinpoint Test Step HX45 to VERIFY fuel vapor leak no longer exists, disregarding the Action To Take direction in that step. **For EVAP system passing the leak test:** FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle. **For EVAP system not passing the leak test:** GO to HX52.
	No ▶	GO to HX52.
HX52 CHECK FOR EVAP SYSTEM LEAK FROM EVAP TEST PORT TO EVAP CANISTER ASSEMBLY		
• Disconnect the EVAP canister tube (from the fuel tank) at the fuel vapor tee between the EVAP canister purge valve and EVAP canister (or at the F-fitting on the EVAP canister). • Plug (cap) the fuel vapor tee (or F-fitting on the EVAP canister). • Close the CV solenoid closed by accessing Output Test Mode on the scan tool. • Re-pressurize the EVAP system to 3.48 kPa (14 in-H_2O) at the evaporative service port. • NOTE: The Rotunda Engine EAR Amplifier (107-R2100) is an optional tool to be used if noise level hinders the effectiveness of the ultra-sonic detector. Access the ultra-sonic detector from the EVAP System Leak Tester kit. • Slowly pass the detector probe from the EVAP return tube (intake manifold to EVAP canister purge valve) to the EVAP canister assembly. • **Is a sudden audible change indicated?**	Yes ▶	REPLACE fuel vapor hoses / tubes or damaged components as necessary. REMOVE plug tee or F-fitting. RECONNECT the EVAP canister tube. GO to HX53.
	No ▶	GO to HX54.
HX53 VERIFICATION OF REPAIR BETWEEN EVAP TEST PORT TO EVAP CANISTER ASSEMBLY		
• Complete the leak test outlined in Pinpoint Test Step HX45, disregarding the Action To Take direction in that step. • **Does the pressure on the EVAP system stay above 1.99 kPa (8 in-H_2O) and pass the leak test?**	Yes ▶	REMOVE EVAP System Leak Tester equipment from evaporative test port. LEAVE fuel filler cap off. GO to HX56.
	No ▶	REMOVE EVAP System Leak Tester equipment from evaporative test port. GO to HX54.

	Test Step	Result ▶	Action to Take
HX54	CHECK FOR EVAP SYSTEM LEAK FROM FUEL TANK TO EVAP CANISTER TUBE		
	NOTE: Mustang, Town Car, Windstar and Ranger have a quick disconnect between the EVAP canister tube and front fuel vapor hose assembly (fuel tank to the EVAP canister). This disconnect is used as an alternative location to a fuel vapor tee or F-fitting on the EVAP canister for leak check purposes. • Disconnect the EVAP canister tube (from the fuel tank) at either the fuel vapor tee at the front fuel vapor hose or at the F-fitting on the EVAP canister between the EVAP canister purge valve and EVAP canister. • Plug the open end of the EVAP canister tube. • Install the EVAP System Leak Tester at the fuel filler pipe. • Pressurize the EVAP system from 6.47 to 6.97 kPa (26 to 28 in-H_2O). • NOTE: The Rotunda Engine EAR Amplifier (107-R2100) is an optional tool to be used if noise level hinders the effectiveness of the ultra-sonic detector. Access the ultra-sonic detector from the EVAP System Leak Tester kit. • Slowly pass the detector probe over the fuel filler pipe, fuel tank, fuel vapor vent valve assembly, fuel vapor control valve tube assembly, FTP sensor and the EVAP canister tube (fuel vapor tube from fuel vapor control valve to EVAP canister). • **Is a sudden audible change indicated?**	Yes ▶	LEAVE EVAP System Leak Tester equipment connected at the fuel filler pipe. REPLACE damaged fuel vapor hoses / tubes. After repair, GO to HX55.
		No ▶	REMOVE plug from EVAP canister tube. RECONNECT EVAP canister tube and fuel filler cap. TRANSFER EVAP System Leak Tester equipment from the fuel filler pipe to the evaporative test port. RERUN the EVAP system leak test outlined in Pinpoint Test Step HX45 to VERIFY a leak no longer exists. REMOVE fuel filler cap. GO to HX56.

Test Step		Result ▶	Action to Take
HX55	VERIFICATION OF REPAIR BETWEEN FUEL TANK AND EVAP CANISTER		
	• Pressurize the EVAP system to 3.48 kPa (14 in-H_2O) and perform leak test. • **Does the pressure on the EVAP system stay above 1.99 kPa (8 in-H_2O) and pass the leak test?**	Yes ▶	REMOVE plug from EVAP canister tube. RECONNECT EVAP canister tube and fuel filler cap. TRANSFER EVAP System Leak Tester equipment from the fuel filler pipe to the evaporative test port. RERUN the EVAP system leak test outlined in Pinpoint Test Step HX45 to VERIFY a leak no longer exists. REMOVE fuel filler cap. GO to HX56.
		No ▶	REPEAT Pinpoint Test Step HX54 to isolate the additional source of the fuel vapor leak.
HX56	CHECK FOR FUEL TANK PRESSURE SENSOR FUNCTION WITH FUEL FILLER CAP REMOVED		
	• Key on, engine off. • Access the VPWR PID. • If VPWR PID is not greater than 10.5 volts less, refer to Pinpoint Test Step HX61 to charge the system. Then, return to this pinpoint test step. • Access the FTP (FTP V) PID. • **Is the FTP (FTP V) PID voltage between (-0.12 to +0.12 kPa [-0.5 to +0.5 in-H_2O]) (2.40 to 2.80 volts) with the fuel filler cap off?**	Yes ▶	GO to HX57.
		No ▶	REPLACE damaged FTP sensor. REPEAT this Pinpoint Test Step to VERIFY the repair. GO to HX57.
HX57	FUEL TANK PRESSURE SENSOR FUNCTIONAL CHECK WITH PRESSURE APPLIED TO EVAP SYSTEM		
	• Install the EVAP System Leak Tester equipment at the fuel filler pipe. • Plug the canister vent hose assembly or close (tape CV filter shut) the CV solenoid to atmosphere. • Key on, engine off • Access the FTP (FTP V) PID. • Pressurize the EVAP system to 3.48 kPa (14 in-H_2O). • Key off. • **Was the FTP (FTP V) PID reading (3.11 to 3.86 kPa [12.5 to 15.5 in-H_2O]) (4.22 to 4.90 volts) with pressure applied to EVAP system?**	Yes ▶	REMOVE the EVAP System Leak Tester equipment from fuel filler pipe. RECONNECT fuel filler cap. REMOVE the plug from the canister vent hose assembly or tape from the CV solenoid. GO to HX58.
		No ▶	DISCONTINUE pressurizing the EVAP system. REPLACE damaged FTP sensor. REPEAT Pinpoint Test Step HX56 to VERIFY a -0.5 to +0.5 in-H_2O (2.40 to 2.80 voltage) reading with fuel filler cap removed.

Test Step		Result ▶	Action to Take
HX58	CHECK FOR EVAP CANISTER PURGE VALVE OPERATION WITH ENGINE AT IDLE		
	• Remove plug and connect EVAP return tube at the intake manifold vacuum source. • Key on, engine off. • Access EVAPPDC PID and FTP (FTP V) PID. • Start engine. Observe the EVAPPDC PID and FTP (FTP V) PID. • Idle engine until EVAPPDC PID reaches a minimum of 40% duty cycle. • **Does the FTP V PID read less than 0.0 in-H_2O (2.60 volts)?**	Yes ▶	FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle.
		No ▶	GO to HX59.
HX59	CHECK FOR INTAKE MANIFOLD VACUUM TO EVAP CANISTER PURGE VALVE		
	NOTE: At high elevations (altitude) the intake manifold vacuum source readings at both the input port vacuum hose and EVAP return tube must be at least 33.77 kPa (10 in-Hg). • Disconnect the input port vacuum hose and EVAP return tube at the EVAP canister purge valve. • Install a vacuum gauge in kPa (in-Hg) to the open end of the input port vacuum hose and plug the open end of the EVAP return tube. • Start engine. • Observe vacuum gauge for manifold vacuum and record reading. • Key on, engine off. • Install the vacuum gauge to the EVAP return tube and plug the open end of the input port vacuum hose. • Again, start engine. • Again, observe the vacuum gauge for manifold vacuum. • **Are both vacuum gauge readings between 47.28 and 67.54 kPa (14 and 20 in-Hg)?**	Yes ▶	REMOVE vacuum gauge. REPLACE damaged EVAP canister purge valve. RECONNECT input port vacuum hose and EVAP return tube to the EVAP canister purge valve. COMPLETE an EVAP system leak test at evaporative test port to VERIFY the repair. FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle.
		No ▶	CHECK for blockage in the input port vacuum hose or EVAP return tube. CHECK intake manifold tree or port for debris or obstructions. REPLACE or REPAIR as necessary. If fuel vapor hoses / tube are replaced, COMPLETE an EVAP System leak test at evaporative test port to VERIFY the repair. REPEAT Pinpoint Test Step HX58 to VERIFY blockage repair.

Test Step		Result ▶	Action to Take
HX61	REGULATE THE VPWR TO THE CANISTER VENT (CV) SOLENOID		
	• Key off. • Measure the voltage across the battery terminals. • **Is the voltage 12 volts or greater?**	Yes ▶	COMPLETE an EVAP system leak test in the Pinpoint Test Step that directed you here.
		No ▶	RECHARGE the battery until the VPWR PID on the scan tool reads in excess of 11.0 volts in KOEO. An optional procedure is to apply voltage between 12.0 and 13.5 volts from voltage source to the VPWR input at the CV solenoid. RETURN to the Pinpoint Test Step that directed you here to complete an EVAP system leak test.
HX65	DTC P1451: CHECK VPWR VOLTAGE TO CV SOLENOID		
	• Key off. • Disconnect canister vent (CV) solenoid. • Connect a non-powered test lamp between CV and VPWR circuits at the CV solenoid harness connector. • Key on, engine off. • Attempt to close and open CV solenoid driver in PCM by accessing Output Test Mode. • Select ALL OFF mode. • Cycle START button ON and OFF, and observe the test lamp. • **Does the test lamp cycle on and off (light up and turn off)?**	Yes ▶	KEY OFF. GO to HX66.
		No ▶	**For test lamp always off:** GO to HX67. **For test lamp always on:** KEY OFF. GO to HX70.
HX66	CHECK CV SOLENOID RESISTANCE		
	• Measure CV solenoid resistance. • **Is resistance between 48 and 65 ohms?**	Yes ▶	Unable to identify fault at this time. GO to Pinpoint Test Step Z1.
		No ▶	REPLACE damaged CV solenoid. COMPLETE an EVAP system leak test at the evaporative test port to VERIFY that a leak did not occur during component replacement. FOLLOW the Vehicle Preparation for Monitor Repair Verification Drive Cycle and COMPLETE an Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle.

Test Step		Result ▶	Action to Take
HX67	CHECK FOR OPEN VPWR CIRCUIT BETWEEN CV SOLENOID AND POWER RELAY		
	• Measure voltage between VPWR circuit at the CV solenoid harness connector and battery negative post. • **Is voltage greater than 10.5 volts?**	Yes ▶ No ▶	KEY OFF. GO to HX68. KEY OFF. REPAIR open circuit.
HX68	CHECK VPWR CIRCUIT FOR OPEN IN HARNESS		
	NOTE: Refer to the PCM connector pin numbers in the beginning of this pinpoint test. • Disconnect PCM. • Measure resistance of VPWR circuit between PCM harness connector pin (or on LS6/LS8 the VPWR fuse to the power relay) and CV solenoid harness connector. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to HX69. REPAIR open circuit.
HX69	CHECK CV CIRCUIT FOR OPEN IN HARNESS		
	• Measure resistance of CV circuit between PCM harness connector pin and CV solenoid harness connector. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	REPLACE PCM. REPAIR open circuit.
HX70	CHECK CV CIRCUIT FOR SHORT TO PWR GND IN HARNESS		
	NOTE: Refer to the PCM connector pin numbers in the beginning of this pinpoint test. • Disconnect PCM. • Disconnect scan tool from DLC. • Measure resistance between CV circuit at the CV solenoid harness connector and battery negative post. • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	RECONNECT scan tool. GO to HX71. REPAIR short circuit.
HX71	CHECK CV CIRCUIT FOR SHORT TO PWR OR CHASSIS GND IN HARNESS		
	• Key on, engine off. • Measure voltage between CV circuit at the PCM harness connector and chassis ground. • **Is voltage less than 1.0 volt?**	Yes ▶ No ▶	KEY OFF. REPLACE PCM. KEY OFF. REPAIR short circuit to VPWR, VREF or chassis ground.

Test Step	Result ▶	Action to Take
HX76 DTC P0460: CHECK FUEL TANK LEVEL		
NOTE: For Mustang, LS6/LS8, Town Car, Windstar, F-150, 5.4L Lightning and Expedition/Navigator applications, go to Instrument Cluster diagnosis. • Key on, engine off. • Observe and record fuel gauge reading. • Access fuel level input (FLI) PID. • **Are both the fuel gauge and the FLI PID indicating between slightly above one quarter (30% on FLI PID) and three quarters (70% on the FLI PID) filled?**	Yes ▶ No ▶	GO to HX78. KEY OFF. INSPECT fuel tank for leaks. REPAIR fuel tank if necessary. CHECK for a damaged fuse for the fuel pump (FP) to fuel gauge circuit. **For a damaged fuse without a DTC P0460:** CHECK for CASE GND short to VPWR circuit. GO to Pinpoint Test Step B1 or X1 (CCRM applications). **For fuel gauge inoperative without a DTC P0460:** GO to Instrument Cluster diagnosis. **For DTC P0460:** GO to HX77.
HX77 CHECK FOR INADEQUATE FUEL LEVEL		
• Key on, engine off. • While observing both the fuel gauge and FLI PID, add fuel (7.57 to 11.36 liters [2 to 3 gallons]) to the fuel tank. • **Did either the fuel gauge or FLI PID indicate a movement upward as the fuel is added?**	Yes ▶ No ▶	DRAIN or FILL the fuel tank from above the one quarter (at 30% fill) to under the three quarter (at 70% fill) level. DRIVE vehicle and RERUN Quick Test for DTCs. If DTC P0460 is still present, GO to HX78. KEY OFF. GO to HX79.
HX78 CHECK FLI CIRCUIT VOLTAGE		
NOTE: The FLI V PID must not be used for diagnosis on the 2.5L Contour/Mystique and 2.5L Cougar in this Pinpoint Test Step, but only applications without returnless fuel systems. **For 2.5L Contour/Mystique and 2.5L Cougar (without returnless fuel systems only):** • Key on, engine running. • Measure voltage between the FLI and SIG RTN circuits at the PCM harness connector. **For All Others:** • Key on, engine running. • Access FLI V PID. • **Is voltage or FLI V PID reading between 1.23 and 2.25 volts (6.14 and 4.39 volts on 2.0L/2.5L Contour/Mystique/Cougar without returnless fuel system)?**	Yes ▶ No ▶	KEY OFF. **For Continental:** GO to HX87. **For All others:** GO to HX86. KEY OFF. GO to HX79.

Test Step	Result ▶	Action to Take
HX79 CHECK FUEL PUMP MODULE RESISTANCE • Disconnect fuel pump (FP) module (refer to FP module pigtail connector at the beginning of this pinpoint test). • Measure resistance between FLI and CASE GND pins on the FP module (at pigtail). • **Is resistance between 15 and 160 ohms?**	Yes ▶ No ▶	GO to **HX80**. CHECK for stuck fuel level float on fuel pump (FP) module. REPAIR as necessary. If free movement is present, REPLACE fuel pump module assembly.
HX80 CHECK FLI CIRCUIT VOLTAGE AT FP MODULE • Disconnect the instrument cluster connector to the fuel gauge. • Key on, engine running. • Measure voltage between FLI circuit at the FP module harness connector and battery negative post. • **Is voltage greater than 5 volts?**	Yes ▶ No ▶	KEY OFF. GO to **HX81**. KEY OFF. GO to **HX82**.
HX81 CHECK FLI CIRCUIT FOR SHORT TO VPWR IN HARNESS • Disconnect PCM. • Key on, engine off. • Measure voltage between FLI circuit at the FP module harness connector and battery negative post. • **Is voltage greater than 10.5 volts?**	Yes ▶ No ▶	REPAIR short circuit. REPLACE PCM.
HX82 CHECK FLI CIRCUIT FOR SHORT TO PWR GND IN HARNESS • Disconnect PCM. • Measure resistance between FLI circuit at the PCM harness connector and battery negative post. • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	**For Continental:** GO to **HX84**. **For All others:** GO to **HX83**. REPAIR short circuit.
HX83 CHECK FLI CIRCUIT FOR SHORT TO CASE GND IN HARNESS • Measure resistance between FLI and CASE GND circuits at the PCM harness connector. • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	GO to **HX85**. REPAIR short between FLI and CASE GND circuits.

Test Step	Result ▶	Action to Take
HX84 CHECK FLI CIRCUIT FOR SHORT TO CASE GND IN HARNESS ON CONTINENTAL		
• Measure resistance between fuel level input Pin 4 and fuel level return Pin 28 at the virtual image instrument cluster harness connector at the fuel gauge. • Measure resistance between fuel level input Pin 4 and fuel logic ground Pin 27 at the virtual image instrument cluster harness connector at the fuel gauge. • **Is each resistance greater than 10,000 ohms?**	Yes ▶ No ▶	GO to HX85. REPAIR short between FLI and fuel level return circuits or FLI and fuel logic ground circuits.
HX85 CHECK FLI CIRCUIT FOR OPEN IN HARNESS		
• Measure resistance of FLI circuit between PCM harness connector and fuel pump (FP) module (pigtail) harness connector. • Measure resistance of FLI circuit between PCM harness connector and the instrument cluster fuel gauge harness connector. • **Is each resistance less than 10.0 ohms?**	Yes ▶ No ▶	**For Continental:** GO to HX87. **For All others:** GO to HX86. REPAIR open circuit.
HX86 CHECK CASE GND CIRCUIT FOR OPEN IN HARNESS		
• Measure resistance of CASE GND circuit between PCM harness connector and FP module (pigtail) harness connector. • Measure resistance between the CASE GND circuit at the PCM harness connector and the fuel gauge ground at the instrument cluster fuel gauge harness connector. • **Is each resistance less than 10.0 ohms?**	Yes ▶ No ▶	DIAGNOSE fuel gauge. REPLACE fuel gauge or REPAIR as necessary. Then RERUN Quick Test. If DTC P0460 is still present, REPLACE PCM. REPAIR open circuit.
HX87 CHECK CASE GND CIRCUIT FOR OPEN IN HARNESS ON CONTINENTAL		
• Measure resistance of CASE GND circuit between PCM harness connector Pin 25 and virtual image instrument cluster harness connector Pin 27 at the fuel gauge. • Measure resistance between CASE GND pin at FP module (pigtail) harness connector and virtual image instrument cluster harness connector Pin 28 at the fuel gauge. • **Is each resistance less than 10,000 ohms?**	Yes ▶ No ▶	DIAGNOSE fuel gauge. REPLACE fuel gauge or REPAIR as necessary. Then RERUN Quick Test. If DTC P0460 is still present, REPLACE PCM. REPAIR open circuit.

	Test Step	Result ▶	Action to Take
HX91	DTC P1443: MONITOR IDLE AIR CONTROL DUTY CYCLE (IAC AT IDLE) - FLEXIBLE FUEL EVAP SYSTEM		
	If a Continuous Memory DTC P1507 is received with the DTC P1443 in Self-Test, GO directly to Pinpoint Test Step KE30. NOTE: The following overspeed check is to be performed on flexible fuel vehicles. • Key on, engine off. • Access IAC, TP, and RPM PIDs. • With engine at normal operating temperature, accessories off and at idle, the IAC duty cycle should be between 20% to 45%. • Observe the IAC and RPM PIDs for an indication of a fault while performing the following: — While at idle, wiggle the IAC valve connector and vehicle harness between the IAC valve and PCM. A fault is indicated by a sudden increase in rpm and decrease in duty cycle. — Rapidly (or quickly) press and release the throttle several times while looking for slow return to idle (observing the TP PID). This may indicate a sticking IAC valve. • **Is a fault indicated?**	Yes ▶ No ▶	ISOLATE fault and REPAIR as necessary. VERIFY a symptom no longer exists. RERUN Quick Test. GO to HX92.
HX92	VISUAL CHECK OF EVAPORATIVE EMISSION SYSTEM		
	NOTE: Fuel saturation of EVAP canister cannot be effectively checked by the canister weight or intensity of odor (smell). • Check for kinked or pinched fuel vapor tubes / hoses between EVAP canister, EVAP canister purge valve and engine intake manifold. • Check for cracked or smashed EVAP canister. • **Is a fault indicated?**	Yes ▶ No ▶	REPAIR fuel vapor tubes / hoses as necessary. If components are replaced, GO to HX101. GO to HX93.
HX93	CHECK FOR VPWR VOLTAGE TO EVAP CANISTER PURGE VALVE		
	• Disconnect EVAP canister purge valve harness connector. • Key on, engine off. • Measure VPWR circuit voltage between EVAP canister purge valve harness connector and battery negative post. • Key off. • **Was the voltage greater than 10.5 volts?**	Yes ▶ No ▶	GO to HX94. REPAIR open circuit.

Test Step	Result ▶	Action to Take
HX94 CHECK FOR INTAKE MANIFOLD VACUUM AT THE EVAP CANISTER WHILE ELECTRICALLY CYCLING THE EVAP CANISTER PURGE VALVE		
• Disconnect fuel vapor hose to EVAP canister purge valve at EVAP canister. • Install a vacuum gauge to open end of fuel vapor hose. • Start engine. • Idle engine for 5 minutes. • Observe the vacuum gauge. Reading must be near 0 kPa (0 in-Hg). • Access EVAPPDC PID. • Drive vehicle on highway between 72 and 96 km/h (45 and 60 mph). • At a speed over 80 km/h (50 mph) try to hold a steady throttle between 1 and 2 minutes while observing EVAPPDC PID. • When EVAPPDC PID reaches 75% to 85% duty cycle, observe the vacuum gauge. • **Does the vacuum reading change from near 0 kPa (0 in-Hg) initially to 33.77 kPa (10 in-Hg) or greater on highway with EVAPPDC over 75% duty cycle?**	Yes ▶ No ▶	REMOVE vacuum gauge. INSPECT the fuel vapor tubes/hoses between the EVAP canister and the EVAP canister purge valve and between the EVAP canister purge valve and the intake manifold for small cracks, splits or holes. REPAIR as necessary. GO to HX95. REMOVE vacuum gauge. LEAVE the fuel vapor hose from EVAP canister disconnected. **For vacuum readings within 20.26 kPa (6 in-Hg)-33.77 kPa (10 in-Hg):** GO to HX96. **For vacuum readings less than 20.26 kPa (6 in-Hg):** GO to HX97.
HX95 CHECK EVAP CANISTER		
• Disconnect fuel vapor hose to EVAP canister purge valve at EVAP canister. • Check for contamination or blockages at all ports on EVAP canister (to the fuel tank, to the EVAP canister purge valve and to the atmosphere). • **Is a fault indicated?**	Yes ▶ No ▶	REPAIR EVAP canister. If components are replaced, GO to HX101. GO to HX96.
HX96 CHECK FOR FUEL VAPOR HOSE LEAK BETWEEN EVAP CANISTER PURGE VALVE AND EVAP CANISTER		
• Disconnect other end of fuel vapor hose from EVAP canister at EVAP canister purge valve. • Plug open end of fuel vapor hose at EVAP canister. • Install a hand vacuum pump to open end of fuel vapor hose at EVAP canister purge valve. • Apply 53 kPa (16 in-Hg) of vacuum with vacuum pump. • **Does the vacuum pump hold the vacuum?**	Yes ▶ No ▶	REMOVE plug in hose. GO to HX97. REPLACE damaged fuel vapor hose. GO to HX101.

Test Step	Result ▶	Action to Take
HX97 CHECK FOR FUEL VAPOR HOSE BLOCKAGE BETWEEN EVAP CANISTER PURGE VALVE AND EVAP CANISTER		
• Disconnect other end of fuel vapor hose from EVAP canister at EVAP canister purge valve. • Install a hand vacuum pump to open end of fuel vapor hose at EVAP canister purge valve. • Apply 53 kPa (16 in-Hg) of vacuum with vacuum pump. • **Does the vacuum pump hold the vacuum?**	Yes ▶ No ▶	REMOVE vacuum pump. REPAIR or STRAIGHTEN fuel vapor hose as necessary. GO to HX101. REMOVE vacuum pump. RECONNECT fuel vapor hose between EVAP canister and EVAP canister purge valve. GO to HX98.
HX98 CHECK FOR FILTER CONTAMINATION OR DAMAGE TO THE EVAP CANISTER PURGE VALVE		
• Disconnect vacuum line from input vacuum port to intake manifold on EVAP canister purge valve. (Refer to EVAP canister purge valve vacuum schematic at the beginning of this pinpoint test.) • Install a hand vacuum pump to input vacuum port on EVAP canister purge valve. • Apply 48-52 kPa (10-15 in-Hg) of vacuum to EVAP canister purge valve. • **Does the EVAP canister purge valve hold vacuum or show a very slow release of vacuum to atmosphere?**	Yes ▶ No ▶	REPAIR EVAP canister purge valve filter blockage or REPLACE EVAP canister purge valve. GO to HX101. REMOVE vacuum pump. GO to HX99.
HX99 CHECK FOR INTAKE MANIFOLD VACUUM AT VMV: BOTH INPUT PORT VACUUM HOSE AND FUEL VAPOR HOSE		
• EVAP canister purge valve electrically connected. • Disconnect both input port vacuum and fuel vapor hoses from intake manifold vacuum source and fuel vapor ports at EVAP canister purge valve. (Refer to the EVAP canister purge valve vacuum schematic at the beginning of this pinpoint test.) • Install a vacuum gauge (two gauges or one gauge at a time) to open end of input port vacuum hose and open end of the fuel vapor hose at EVAP canister purge valve. • Start engine. • **Are both vacuum gauge readings greater than 33.77 kPa (10 in-Hg)?**	Yes ▶ No ▶	LEAVE input port vacuum and fuel vapor hoses to the intake manifold at EVAP canister purge valve disconnected. GO to HX100. ISOLATE causes of missing intake manifold vacuum. REPAIR partially unconnected hoses or kinked / blocked hoses to intake manifold. REMOVE vacuum gauge(s). INSPECT for base engine vacuum loss. GO to HX100.

	Test Step	Result ▶	Action to Take
HX100	CHECK FOR INPUT PORT VACUUM HOSE AND FUEL VAPOR HOSE RESTRICTIONS BETWEEN EVAP CANISTER PURGE VALVE AND INTAKE MANIFOLD		
	• Disconnect input port vacuum hose and fuel vapor hose from EVAP canister purge valve at intake manifold (other end of hoses are already disconnected). • Install a hand vacuum pump to one end of each completely disconnected hose from EVAP canister purge valve to intake manifold. • Apply 53 kPa (16 in-Hg) of vacuum with vacuum pump. • Observe the vacuum reading for 30 seconds. • **Does the vacuum bleed off immediately?**	Yes ▶ No ▶	REMOVE vacuum pump. CORRECT minor concerns with input vacuum hose and fuel vapor hose between EVAP canister purge valve and intake manifold. If hoses were OK, REPLACE damaged EVAP canister purge valve. GO to HX101. REMOVE vacuum pump. REMOVE blockages or minor kinks in input vacuum hose and fuel vapor hose between EVAP canister purge valve and intake manifold. GO to HX101.
HX101	CHECK EVAPORATIVE EMISSION SYSTEM LEAK THROUGH EVAPORATIVE EMISSION SERVICE PORT		
	Odors in the engine compartment or near the exhaust system and stalls can be associated to the evaporative emission system. Possible causes: — After-market parts and accessories not conforming to evaporative system specifications. — Leaks in the evaporative emission system. — Blockages in the evaporative emission system. • Remove atmospheric vent cap (blue or black) on EVAP canister(s) or canister vent line. • Plug (or tape) open vent on EVAP canister(s). • Disconnect and plug fuel vapor hose to EVAP canister purge valve from intake manifold at the intake manifold vacuum source. • Locate evaporative emission test port (marked EVAPORATIVE SERVICE PORT) between EVAP canister purge valve and EVAP canister. If vehicle does not have a test port, GO to Pinpoint Test step HX102. • Access the Rotunda Evaporative Emission System Tester 134-00056 or equivalent, including the compressed gas source (nitrogen or argon) and pressure regulator. • Perform a Tester Self-Test using the instructions provided with the Tester Kit. • Regulate the gas pressure on the Tester to 6.74 kPa (27 in-H_2O). • Install the Rotunda Evaporative Emission System Tester to the test port and follow the system leak test instructions provided with the Tester Kit. • If the pressure is not between 6.46 and 6.97 kPa (26 and 28 in-H_2O), use the ultra-sonic leak detector provided with the Tester Kit to check for leakage at the vehicle's fuel filler cap and filler pipe assembly. • **Is a leak indicated?**	Yes ▶ No ▶	REMOVE and VERIFY fuel filler cap according to original equipment specifications. REPLACE damaged fuel filler cap. REINSTALL fuel filler cap and TIGHTEN cap only one eighth turn so that cap initially clicks by sound or touch. REPEAT evaporative emission system leak test using Tester. If the leak is still present, REPAIR or REPLACE fuel tank, fuel filler pipe, fuel vapor valve or fuel vapor hose between fuel tank and EVAP canister as necessary. VERIFY a symptom no longer exists. GO to HX102.

Test Step		Result ▶	Action to Take
HX102	CHECK EVAPORATIVE EMISSION SYSTEM USING ROTUNDA EVAPORATIVE EMISSION SYSTEM TESTER		
	• Remove the fuel filler cap. Install the Rotunda Evaporative Emission System Tester 134-00056 or equivalent, including the compressed gas (nitrogen or argon) and pressure regulator. Tester kit contains all required adapters (Schrader valve and fuel filler cap per vehicle application). • Key on, engine off. • For Mustang only: cycle the valve open through output test mode with the scan tool (or disconnect valve harness connection and energize valve using a voltage source). • Pressurize the vehicle evaporative emission system at 6.74 kPa (27 in.-H_2O) using the Evaporative Emission System Tester and the instructions that come with the tester. • **Is a system leak indicated by the tester red light on?**	Yes ▶	ALLOW the two-position control on the tester to provide a continuing flow of the gas to the closed evaporative emission system. MAINTAIN 6.74 kPa (27 in.-H_2O) pressure on the system (monitor tester pressure gauges). GO to HX103.
		No ▶	REMOVE Evaporative Emission System Leak Tester. CLEAR DTCs. Access the EVAPPDC PID on the scan tool. DRIVE vehicle (including a steady accelerator speed over 80 km/h (50 mph) until the EVAPPDC PID shows 75 percent duty cycle). Then maintain approximate speed until duty cycle reaches zero percent. After additional two minute drive, bring vehicle to an idle. RETRIEVE Continuous Memory DTCs. VERIFY a symptom no longer exists.
HX103	CHECK FOR FUEL VAPOR HOSE RESTRICTIONS BETWEEN EVAP CANISTER PURGE VALVE, FUEL TANK AND EVAP CANISTER		
	• Key on, engine off. • Disconnect and plug the fuel vapor hose from the EVAP canister(s) at EVAP canister purge valve. • Reinitiate pressurizing of vehicle evaporative emission system using the Rotunda Evaporative Emission System Tester. Refer to Pinpoint Test Step HX102 for pressurizing instructions. • When pressure on the evaporative emission system is stabilized close to 6.74 kPa (27 in-H_2O), record the reading. • Remove the plug at the fuel vapor hose to EVAP canister at the EVAP canister purge valve. • Observe pressure gauges on tester. • **Does the pressure immediately drop?**	Yes ▶	REMOVE plugs. REINSTALL the dust cap (blue or black) on EVAP canister or canister vent line at canister. GO to HX104.
		No ▶	REMOVE blockages and STRAIGHTEN fuel vapor tubes/hoses between fuel tank, EVAP canister purge valve and EVAP canister(s). REMOVE plugs. REINSTALL the dust cap (blue or black) on EVAP canister. GO to HX104.

	Test Step	Result ▶	Action to Take
HX104	VERIFICATION OF EVAPORATIVE EMISSION SYSTEM REPAIR USING ROTUNDA EVAPORATIVE EMISSION SYSTEM LEAK TESTER		
	• Complete PCM Reset to clear DTCs. • Plug or tape atmospheric vent cap on EVAP canister (if applicable). • Remove fuel filler cap at fuel filler pipe. • Install Rotunda Evaporative Emission System Leak Tester 134-00056 or equivalent including the nitrogen or argon gas supply and pressure regulator. • Disconnect and plug fuel vapor hose to PF sensor (or EVAP canister purge valve on Ranger) from intake manifold at the intake manifold vacuum source. • Pressurize the EVAP system at 6.74 kPa (27 in-H_2O) with tester. • Observe tester installation leak self-test for two minutes and then the EVAP system leak test. • Listen for a vacuum leak noise and check for substantial fuel vapor odors at isolated areas in the EVAP system. • **Does the pressure applied to the EVAP system hold?**	Yes ▶	REMOVE plug and RECONNECT fuel vapor hose from PF sensor (or EVAP canister purge valve) at intake manifold vacuum source. REMOVE EVAP System Leak Tester. REINSTALL fuel filler cap. TIGHTEN cap only one eighth turn so that cap initially clicks by sound or touch. CLEAR DTCs. Access EVAPPDC PID on scan tool. DRIVE vehicle (including a steady accelerator speed over 80 km/h (50 mph) until EVAPPDC PID shows 75 percent duty cycle). Then maintain approximate speed until duty cycle reaches zero percent. After additional two minute drive, bring vehicle to an idle. RETRIEVE Continuous Memory DTCs. VERIFY a symptom no longer exists.
		No ▶	GO to HX105.

Test Step		Result ▶	Action to Take
HX105	CHECK LOCATION OF EVAPORATIVE EMISSION SYSTEM PRESSURE LEAK		
	• Systematically isolate area of potential pressure leak. • Close off pressure to EVAP system. • Disconnect and plug fuel vapor hose from fuel tank at EVAP canister. • Apply controlled pressure at 6.74 kPa (27 in-H_2O to the EVAP system with the leak tester. • If pressure now holds, DIAGNOSE the EVAP canister. • If system pressure cannot hold, close pressure supply to system. • Disconnect and plug fuel vapor hose from EVAP canister at EVAP canister purge valve. • Again, apply controlled pressure to the EVAP system. • **Does the pressure hold?**	Yes ▶	REMOVE plugs. RECONNECT fuel vapor hose at EVAP canister. RETURN to Pinpoint Test Step HX98 to check EVAP canister purge valve integrity. REMOVE EVAP System Leak Tester. REINSTALL fuel filler cap. CLEAR DTCs. Access EVAPPDC PID on scan tool. DRIVE vehicle (including a steady accelerator speed over 80 km/h (50 mph) until EVAPPDC PID shows 75 percent duty cycle). Then maintain approximate speed until duty cycle reaches zero percent. After additional two minute drive, bring vehicle to an idle. RETRIEVE Continuous Memory DTCs. VERIFY a symptom no longer exists.
		No ▶	REMOVE plugs. CHECK for fuel vapor hose cracks or fuel vapor valve damage. EXAMINE and SECURE fuel vapor hose connections to components. REPAIR or REPLACE as necessary. REMOVE EVAP System Leak Tester. REINSTALL fuel filler cap. CLEAR DTCs. Access EVAPPDC PID on scan tool. DRIVE vehicle (including a steady accelerator speed over 80 km/h (50 mph) until EVAPPDC PID shows 75 percent duty cycle). Then maintain approximate speed until duty cycle reaches zero percent. After additional two minute drive, bring vehicle to an idle. RETRIEVE Continuous Memory DTCs. VERIFY a symptom no longer exists.