

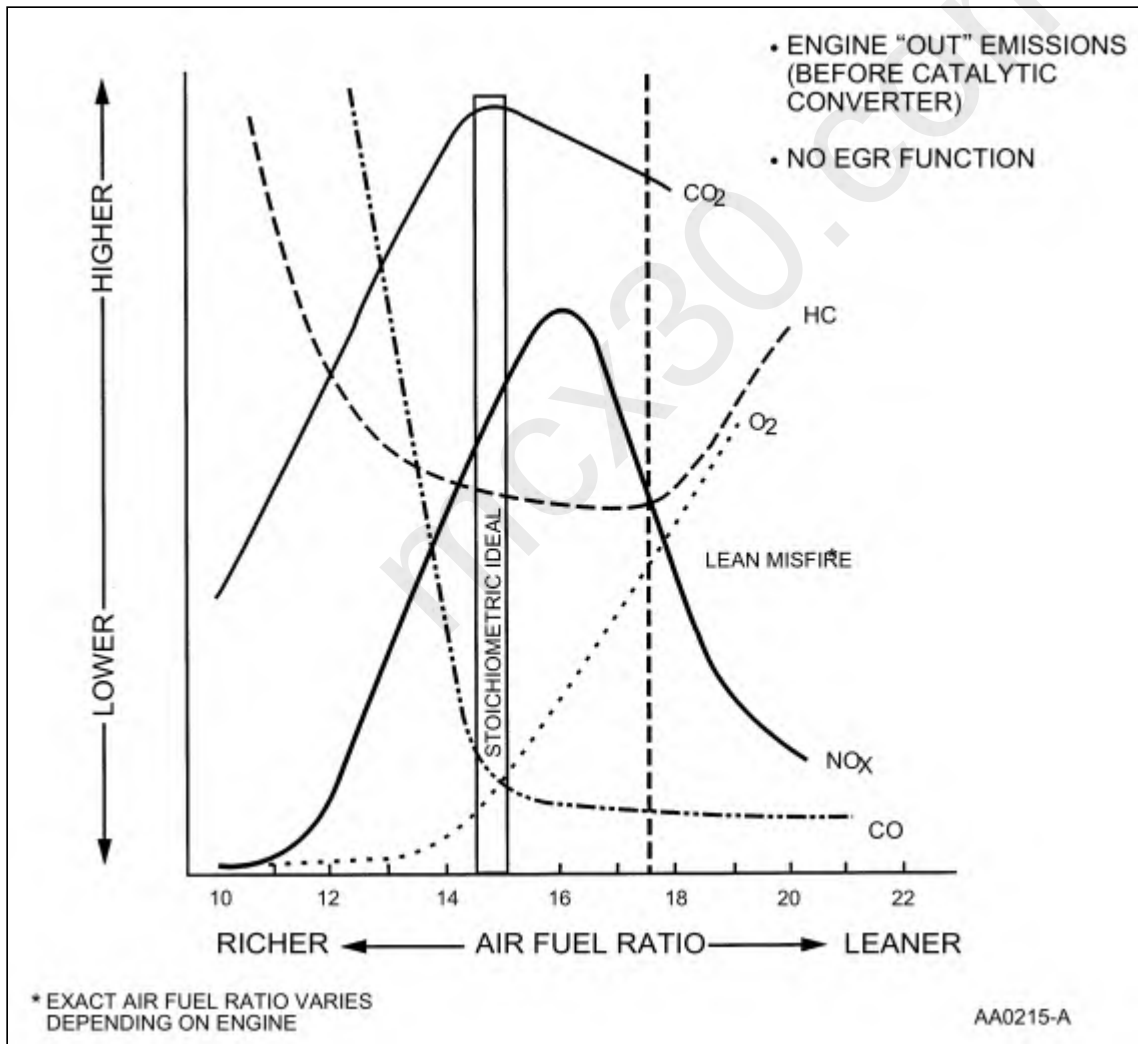
EM: Emission Compliance

Note: Canada and some states or metropolitan areas in the United States require periodic emission, or inspection/maintenance (I/M) tests. All Ford products are designed to pass these tests. If a Ford product fails an I/M test the most likely causes are:

- the engine or catalyst temperature was not warm and stabilized before the test.
- the vehicle idled excessively before the test.

If any new emission components are installed, carry out the following steps before repeating the I/M test procedure:

- Reset the keep alive memory (KAM). Refer to Section 2, [Resetting The Keep Alive Memory \(KAM\)](#).
- To relearn some basic adaptive learning (trim) values, run the engine at 2,500 RPM for 1 minute and idle the engine for 2 minutes.

Exhaust Gas Analysis Chart

Verifying an excessive grams per mile (gpm) indication using a parts per million (ppm) reading.

For excessive vehicle gas readings, compare the actual gpm reading to the gas cutpoint level needed to pass testing. This gives an indication of how much the ppm reading has to be reduced (if the actual reading is twice the cutpoint, the baseline reading has to be cut in half or more).

Example:

- The actual hydrocarbon (HC) produced by a vehicle is 1.6 gpm. The cutpoint for HC in this example is 0.8 gpm. The actual reading is twice the cutpoint.
- The HC reading obtained for the same vehicle during the baseline drive averages 440 ppm. In order for this vehicle to pass the I/M test, the HC reading from the verification trip must be at least half of the baseline reading, or an average of 220 ppm or less.
- This method only gives a general idea of how much the ppm reading needs to be reduced in order for the vehicle to pass an I/M test that calculates gpm. This test is not exact. Experience still has to be used to determine if the emission readings are reduced enough for the vehicle to pass the I/M test.

EM1 ANALYZE THE I/M TEST REPORT

- Analyze the I/M test report for data entry errors.
 - model
 - model year
 - correct calibration, if included on the report
 - correct test weight, if included on the report (this number is less than the vehicle's GVW)
- Analyze the I/M test report results.
 - identify high and low gas readings.
 - for reports that include a drive cycle, identify during which mode the gases failed. Be aware that if all gases were high early then decreased, the catalyst may have been cool when testing began.

Has the I/M test report been analyzed?

Yes	GO to EM2 .
No	REPEAT the test step.

EM2 EVAP SYSTEM LEAK OR PURGE FLOW TEST (IF THESE TESTS WERE CARRIED OUT)

Does the vehicle fail only an EVAP system leak or purge flow test (if these tests are carried out)?

Yes	This is an EVAP concern only. GO to EM22 .
No	GO to EM3 .

EM3 BASELINE THE VEHICLE

Note: *Baselining the vehicle exhaust gas readings is important so the baseline readings can be used for comparison after any repair is made.*

- Baseline the vehicle using an exhaust gas analyzer. If the vehicle must be driven, be certain any baseline drive used is repeatable. The same drive cycle will be used to verify any repair.
- During the baseline, check for any related symptoms that may be present, such as driveability, transmission shifting or exhaust smoke concerns.

Has the vehicle been baselined?

Yes	GO to EM4 .
No	REPEAT the test step.

EM4 SYMPTOM CHECKS

- Check if any of the following symptoms are present:
 - transmission concerns
 - idle concerns
 - driveability concerns
 - exhaust smoke
 - cooling system concerns

Are any of the symptoms present?

Yes	CARRY OUT the PCM Quick Test. RETURN to Section 3, Symptom Charts for further direction. REFER to the Exhaust Gas Analysis Chart at the beginning of this pinpoint test. After any repair, GO to EM26 .
No	GO to EM5 .

EM5 PRELIMINARY CHECKS

- Carry out the following checks:
 - vacuum lines for leaks and restrictions
 - electrical connections
 - correct scheduled maintenance
 - Ford authorized emission controls and components installed on the vehicle
 - intake air tube and air cleaner concerns such as obstructions, leaks, or a dirty air cleaner element

Is a concern present?

Yes	REPAIR as necessary. After any repair, GO to EM26 .
No	GO to EM6 .

EM6 CARRY OUT THE PCM QUICK TEST

- Carry out the PCM Quick Test to access any PCM DTCs. For the procedure information, refer to Section 3, Symptom Charts.

Is a concern present?

Yes	FOLLOW the Section 3 Quick Test direction. After any repair, GO to EM26 .
No	GO to EM7 .

EM7 CHECK FOR EXCESSIVE CARBON MONOXIDE (CO) LEVELS**Does the vehicle have excessive CO levels?**

Yes	Excessive CO levels indicate the engine is running rich. GO to EM10 .
No	GO to EM8 .

EM8 CHECK FOR EXCESSIVE HYDROCARBON (HC) LEVELS**Does the vehicle have excessive HC levels?**

Yes	Excessive HC levels with low to normal CO levels indicate the engine is running lean. GO to EM16 .
No	GO to EM9 .

EM9 CHECK FOR EXCESSIVE OXIDES OF NITROGEN (NOX) LEVELS

Does the vehicle have excessive NOx levels?

Yes	GO to EM20 .
No	VERIFY the test step results.

EM10 HIGH CO LEVELS: CHECK THE HC LEVELS**Does the vehicle have excessive HC levels?**

Yes	CHECK for the engine running rich and incomplete combustion. GO to EM11 .
No	GO to EM12 .

EM11 CHECK THE SECONDARY IGNITION SYSTEM

- For ignition coil on plug (COP) diagnosis, GO to [JB3](#) and follow the pinpoint test direction.

Is a concern present?

Yes	FOLLOW the pinpoint test direction. After any repair, GO to EM26 .
No	GO to EM12 .

EM12 CHECK THE FUEL DELIVERY SYSTEM FOR CONCERNS SUCH AS HIGH FUEL PRESSURE AND THE ABILITY TO HOLD PRESSURE

- GO to Pinpoint Test [HC](#) and follow the pinpoint test direction.

Is a concern present?

Yes	FOLLOW the pinpoint test direction. After any repair, GO to EM26 .
No	GO to EM13 .

EM13 CHECK FOR VACUUM LEAKS OR OBSTRUCTIONS IN THE PCV SYSTEM (SUCH AS OIL CAP, PCV VALVE, HOSES, CUT GROMMETS, VALVE COVER BOLT TORQUE OR GASKET LEAK)

- GO to [HG2](#) and follow the pinpoint test direction.

Is a concern present?

Yes	FOLLOW the pinpoint test direction. After any repair, GO to EM26 .
No	GO to EM14 .

EM14 CHECK THE EXHAUST SYSTEM

- GO to [HF2](#) and follow the pinpoint test direction.

Is a concern present?

Yes	FOLLOW the pinpoint test direction.
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	After any repair, GO to EM26 .
No	GO to EM15 .

EM15 CHECK THE BASE ENGINE

- Check for base engine concerns. Refer to the Workshop Manual Section 303-00, Engine System.

Is a concern present?

Yes	REPAIR as necessary. After any repair, GO to EM26 .
No	GO to EM27 .

EM16 HIGH HC WITH A NORMAL TO LOW CO LEVEL

- Check the fuel delivery system for concerns. GO to Pinpoint Test [HC](#) and follow the pinpoint test direction.

Is a concern present?

Yes	FOLLOW the pinpoint test direction. After any repair, GO to EM26 .
No	GO to EM17 .

EM17 CHECK THE SECONDARY IGNITION

- For ignition coil on plug (COP) diagnosis, GO to [JB3](#) and follow the pinpoint test direction.

Is a concern present?

Yes	FOLLOW the pinpoint test direction. After any repair, GO to EM26 .
No	GO to EM18 .

EM18 CHECK FOR VACUUM LEAKS OR OBSTRUCTIONS IN THE PCV SYSTEM (SUCH AS OIL CAP, PCV VALVE, HOSES, CUT GROMMETS, VALVE COVER BOLT TORQUE OR GASKET LEAK)

- GO to [HG2](#) and follow the pinpoint test direction.

Is a concern present?

Yes	FOLLOW the pinpoint test direction. After any repair, GO to EM26 .
No	GO to EM19 .

EM19 CHECK THE BASE ENGINE

- Check for base engine concerns such as intake manifold leaks, incorrect compression, or valvetrain or camshaft damage. Refer to the Workshop Manual Section 303-00, Engine System to carry out the intake manifold vacuum test, compression test, and valve train analysis.

Is a concern present?

Yes	REPAIR as necessary. After any repair, GO to EM26 .
No	GO to EM27 .

EM20 HIGH NOX WITH NORMAL TO LOW HC AND CO LEVELS: CHECK THE BASE ENGINE

- Check for base engine concerns such as excessive carbon build up in the combustion chamber. Refer to the Workshop Manual Section 303-00, Engine System to diagnose the abnormal combustion.

Is a concern present?

Yes	REPAIR as necessary. After any repair, GO to EM26 .
No	GO to EM21 .

EM21 ADDITIONAL CHECKS

- Check the following:
 - transmission torque converter clutch operation
 - cooling system concerns such as an aftermarket front fascia covering the intake air or intake air system modifications
 - engine running lean concerns such as vacuum leaks or low fuel pressure

Is a concern present?

Yes	REPAIR as necessary. After any repair, GO to EM26 .
No	GO to EM27 .

EM22 EVAP SYSTEM CONCERN: PRELIMINARY CHECKS

- Analyze the I/M test report to determine when the concern is present. Attempt to verify the concern.
- Check the following:
 - fuel filler cap (if equipped)
 - capless fuel tank filler pipe (if equipped)
 - EVAP system lines and hoses for correct connections, restrictions or damage
 - fuel vapor storage canister damage

Is a concern present?

Yes	REPAIR as necessary. After any repair, GO to EM25 .
No	GO to EM23 .

EM23 CARRY OUT THE PCM QUICK TEST

- Carry out the PCM Quick Test to access any PCM DTCs. For the procedure information, refer to Section 3, Symptom Charts.

Is a concern present?

Yes	FOLLOW the Section 3 Quick Test direction. After any repair, GO to EM25 .
No	GO to EM24 .

EM24 EVAP SYSTEM CHECK

- Check the EVAP system for leaks. GO to Pinpoint Test [HX](#) and follow the pinpoint test direction.

Is a concern present?

Yes	REPAIR as necessary. After any repair, GO to EM25 .
No	VERIFY the test step results. If all the test steps are OK, GO to Pinpoint Test Z . For additional symptoms, RETURN to Section 3, Symptoms Charts for further direction. After any repair, GO to EM25 .

EM25 EVAP SYSTEM REPAIR VERIFICATION

- Confirm the vehicle repair.
- Reset the keep alive memory (KAM). Refer to Section 2, [Resetting The Keep Alive Memory \(KAM\)](#). This resets the on-board system readiness test.
- To relearn some basic adaptive learning (trim) values, run the engine at 2,500 RPM for 1 minute and idle the engine for 2 minutes.
- Carry out the PCM Quick Test to access any PCM DTCs. For the procedure information, refer to Section 3, Symptom Charts.
- Carry out the EVAP system leak test and flow check.

Does the vehicle pass the EVAP system leak test and flow check?

Yes	SAVE any repair documentation that may be required by local or federal laws. RETURN the vehicle to the customer.
No	The original concern was not repaired, or another concern exists. GO to EM1 .

EM26 REPAIR AND VERIFICATION

Note: If the vehicle needs to be driven for the baseline test, it may be necessary to drive the vehicle first up to 8 km (5 miles) to relearn some additional adaptive learning (trim) values. Also, during the baseline make sure to use the same drive mode that was used for the original baseline test.

- Confirm the vehicle repair.
- Reset the keep alive memory (KAM). Refer to Section 2, [Resetting The Keep Alive Memory \(KAM\)](#). This resets the on-board system readiness test.
- To relearn some basic adaptive learning (trim) values, run the engine at 2,500 RPM for 1 minute and idle the engine for 2 minutes.
- Carry out the PCM Quick Test to access any PCM DTCs. For the procedure information, refer to Section 3, Symptom Charts. Repair any other DTCs.
- Carry out the baseline test using the exhaust gas analyzer.
- For I/M 240 emission testing areas:
 - Refer to the beginning of this pinpoint test for information on verifying an excessive grams per mile indication using a parts per million (PPM) reading.
- All others (original gas concentrations reported in parts per million):

- Verify the gas levels are within the acceptable range

Are all gases within the acceptable range?

Yes	SAVE any repair documentation that may be required by local or federal laws. RETURN the vehicle to the customer.
No	The gas level is still high, or another gas level is above the acceptable range. GO to EM1 .

EM27 CATALYST DELTA TEMPERATURE TEST

- Complete all previous testing.
- Run the engine for 2 minutes at 2,500 RPM to heat the exhaust system.
- Ignition OFF.
- Disconnect and ground 1 spark plug wire from each cylinder bank (for coil on plug applications, disconnect the coil connector).
- Run the engine at approximately 1,000 RPM.
- Measure the surface temperature at both the inlet and outlet of each catalytic converter.
- Compare the difference in temperature between the inlet and outlet readings of each catalytic converter.

Does each catalytic converter have a difference of more than 28°C (50°F) between its inlet and outlet reading?

Yes	The catalytic converter is operating correctly. CONNECT the spark plug wires. CLEAR the DTCs. VERIFY the test step results. If all test steps are OK, GO to Pinpoint Test Z . For additional symptoms, RETURN to Section 3, Symptoms Charts for further direction. After any repair, GO to EM26 .
No	For catalytic converters that have less than 28°C (50°F) difference, testing indicates the catalytic converter is not working. REPEAT the test to verify the results. If the temperature difference is still less than required, INSTALL a new catalytic converter. After any repair, GO to EM26 .

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