

**FORD:**  
2003-2005 Excursion

2003-2007 F-Super Duty  
2004-2008 E-350, E-450

This article supersedes TSB **07-22-5** to update the Service Procedure.

### **ISSUE**

Some vehicles equipped with a 6.0L diesel engine may exhibit white smoke, black smoke, lack of power, exhaust odor, surges, or no start as a result of excessive coking deposits (un-combusted or incompletely combusted hydrocarbons). The root cause of the coking must be corrected or the coking may reoccur.

### **ACTION**

This TSB is to be used only if one or more of the components listed below in the Service Procedure have already been identified as having an excessive coking condition. After following normal Powertrain Controls/Emissions Diagnosis (PC/ED) diagnostics, use this TSB to identify the root cause of the excessive coking condition. Just replacing the component with coking deposits will not correct the root cause, and coking will reoccur.

### **SERVICE TIPS**

Coking deposits are generally un-combusted or incompletely combusted hydrocarbons and can form on system components such as the EGR valve, EGR cooler, EBP Sensor, EBP tube, intake manifold, turbo charger, catalytic converter and EGR throttle plate. Deposit sample analysis from warranty return parts confirms the source as engine oil or diesel fuel. Visual inspection CAN NOT link the sources of coking deposits as either from engine oil or diesel fuel. Coking deposits can be identified as shiny black grease like sludge, hard flat black solid mass, or thin light brown sticky layer.

Un-combusted deposits can be linked to delayed combustion events. Delayed combustion events can be a function of hard to ignite elements (poor quality fuel, excessive fuel, engine oil or excessive exhaust gas recirculation) in the combustion chamber or a delayed injection event (calibration, wire chafe, injector mechanical issue). Un-combusted fuel is usually evident as fuel scented white exhaust smoke. Un-combusted fuel may create coking which impairs system functionality eventually leading to black exhaust smoke/poorly combusted fuel.

### **SERVICE PROCEDURE**

#### **NOTE**

VEHICLE PERFORMANCE ISSUES RELATED TO FUEL QUALITY, MAINTENANCE AND AFTERMARKET MODIFICATIONS ARE NOT COVERED BY FORD MOTOR COMPANY WARRANTY.

Complete all of the following steps. Devices such as the Catalyst, MAP sensor and EBP sensor that fail the PC/ED pinpoint tests, must be replaced and not cleaned. Clean turbocharger using other applicable TSB, intake manifold and EBP tube. EGR valves that fail the IDS-EGR systems test should be replaced.

1. Follow PC/ED led diagnostics for any specific drivability issues and DTCs.
2. Check OASIS for open FSAs and complete before continuing with this TSB.
3. Validate clean good fuel.
  - a. Use PC/ED, Section 4: Diagnostic Subroutines Performance Diagnostic Procedures/Sufficient Clean Fuel.

**NOTE:** The information in Technical Service Bulletins is intended for use by trained, professional technicians with the knowledge, tools, and equipment to do the job properly and safely. It informs these technicians of conditions that may occur on some vehicles, or provides information that could assist in proper vehicle service. The procedures should not be performed by "do-it-yourselfers". Do not assume that a condition described affects your car or truck. Contact a Ford, Lincoln, or Mercury dealership to determine whether the Bulletin applies to your vehicle. Warranty Policy and Extended Service Plan documentation determine Warranty and/or Extended Service Plan coverage unless stated otherwise in the TSB article. The information in this Technical Service Bulletin (TSB) was current at the time of printing. Ford Motor Company reserves the right to supersede this information with updates. The most recent information is available through Ford Motor Company's on-line technical resources.

## TSB 08-2-7 (Continued)

- b. Use “Motorcraft® Cetane Booster and Performance Improver” PM-22-A (PM-22-B Canada), or “Motorcraft® Anti-Gel and Performance Improver” PM-23-A (PM-23-B Canada) to see if symptoms improve. Motorcraft® fuel conditioners will typically reduce white smoke related to fuel quality within 20 miles (32 km) of driving. Continued use of the available Motorcraft® fuel conditioners will aid in the removal of fuel quality related coking deposits.
  4. Review vehicle maintenance history/records. Refer to the Owner Guide for recommended service intervals and oil grade/viscosity based on vehicle use and ambient temperature. Calculate engine operating hours versus odometer accumulation when selecting appropriate maintenance schedule. (2005 MY and forward are equipped with an hour meter as part of the odometer.) Ensure the proper maintenance schedule and oil viscosity/grade is in use. Oil additives that thicken engine oil and poor maintenance can delay commanded injector response. Several oil changes with driving cycles may be required to “flush” the engine of residual additives and/or degraded oil.
  5. Check for excessive oil carryover to air inlet system.
    - a. Validate proper air intake flow. Check air filter minder by performing PC/ED Section 4: Diagnostic Subroutines / Performance Diagnostic Procedures / Intake Restriction. Excessive inlet restriction may cause oil carryover from crankcase vent.
    - b. Validate crankcase pressure by performing PC/ED Section 4: Diagnostic Subroutines / Performance Diagnostic Procedures / Crankcase Pressure Test. Repair base engine concern if pressures exceed spec.
    - c. Validate no internal turbo oil leak by referring to Workshop Manual, Section 303-04D.
  6. Validate fuel pressure is not less than 45 psi, and inlet restriction no more than 6 inches Hg when performing a 0-50 MPH (0-80 Km/h) wide open throttle (WOT) acceleration.
  7. Ensure proper operation of engine cooling system and visctronic fan clutch. Refer to Workshop Manual, Section 303-03 and Section 5, pinpoint test AH of the PC/ED. Repair as necessary if any concerns are found.
  8. Ensure IDS calibration level 36.10 or later is installed; these calibrations include the following improvements which will effect component coking:
    - Shut off EGR after 5 minutes of idling. Reduces the amount of hard to combust elements in the combustion chamber.
    - Injection timing improvements at 1100-1800 RPM (Typical range for PTO operation/Cold Ambient Protection Idle Kicker/Battery Charge Protect Idle Kicker).
    - Increased exhaust pressure / VGT Duty Cycle for APCM or PTO commanded engine speeds. Maintains heat in the combustion chamber.
    - Higher engine temperature required for cold ambient idle kicker to switch off. Idle will remain elevated until driver input is observed by powertrain control module (PCM). Maintains heat in the combustion chamber.
    - Improved EGR throttle plate self test. Better control of hard to combust elements.
  9. Validate individual cylinder performance / validate EGR and boost system performance.
- NOTE**  
COKING DEPOSITS ON THE EGR VALVE ALONE IS NOT REASON FOR REPLACEMENT OF THE PART.
- a. Perform IDS Power Balance Test after overnight cold soak.
    - (1) Verify engine coolant temperature (ECT) is no lower than 20° F (-7° C), or greater than 50° F (10° C). Accurate test readings can not be achieved when engine ECT is below 20° F (-7° C). The block heater may be used to increase coolant temperature if ECT is lower than 20° F (-7° C). ECT above 50° F (10° C) may limit concern severity and diagnosis time.
    - (2) Using IDS, KOEO, set up to start the Power Balance Test.
    - (3) Turn the key off (reset ignition switch to trigger glow plug cycle).
    - (4) Key On Engine Running (KOER) - Start the Power Balance Test (monitor only 5-8 seconds before proceeding to Step 5) and record low contributing cylinders (anything below -15).

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- (5) While still running the Power Balance Test with the idle compensation strategy disabled (# sign pressed), increase the engine speed to between 800-900 RPM (monitor only 5-8 seconds before proceeding to Step 6) record low contributing cylinders (below -15). Repair as necessary.
  - (6) Use the results from Steps 4 and 5 to repair the vehicle as necessary.
  - b. Perform PC/ED pinpoint test KA.
  - c. Perform IDS Power Balance Test at engine operating temperature repeating steps A4 through A6 above. Refer to PC/ED Section 3 for diagnostics related to failed IDS Power Balance Tests.
  - d. Review and perform PC/ED pinpoint test X.
10. Inspect for possible wire chafe(s) in the under hood sensor harness and Fuel Injector Control Module (FICM) harness. With the Key On Engine Running (KOER) - push wires towards ground and wiggle test connectors. Shifted signals and commands caused by wiring issues may cause increased exhaust pressure resulting in increased exhaust gas recirculation flow rate, which will affect combustion.

PART NUMBER	PART NAME
PM-22-A	Motorcraft® Cetane Booster And Performance Improver
PM-23-A	Motorcraft® Anti-Gel and Performance Improver

**OTHER APPLICABLE ARTICLES:** 07-16-1  
**WARRANTY STATUS:** Eligible Under Provisions Of New Vehicle Limited Warranty Coverage And Emissions Warranty Coverage  
**IMPORTANT:** Warranty coverage limits/policies are not altered by a TSB. Warranty coverage limits are determined by the identified causal part.

OPERATION	DESCRIPTION	TIME
MT080207	Use SLTS Operations If Available; Claim Additional Diagnosis Or Labor Performed As Actual Time	Actual Time

**DEALER CODING**

BASIC PART NO.  
9F452

CONDITION  
CODE  
49