F-Super Duty/Excursion 2004 - Early Build
6.0L Power Stroke Diesel Engine
Performance Diagnostic Guide

-NOTE-
IF CONCERN IS FOUND, SERVICE AS REQUIRED. IF THIS CORRECTS THE CONDITION, IT IS NOT NECESSARY TO COMPLETE THE REMAINDER OF THE DIAGNOSTIC PROCEDURE.

CUSTOMER NAME	DEALER NAME	P & A CODE	ODOMETER

MODEL YEAR	VEHICLE SERIAL N0.(VIN)	ENGINE SERIAL NUMBER	TRANSMISSION

CHASSIS STYLE	VEHICLE GVW	1863 CLAIM NUMBER	AMBIENT TEMP.	DATE

CUSTOMER CONCERNS (Please list in this box)

TYPE OF SERVICE PERSONAL ☐ COMMERCIAL ☐

1. Visual Engine/Chassis Inspection 6005F

- Verify that there are no fluid or pressure leaks.
- Inspect all wire connections for damage.
- Inspect MAP hose,intercooler hose,and manifolds for leaks.

Fuel Oil Coolant Electrical Hoses Leaks

Method	Check
Visual	

2. Sufficient Clean Fuel 6005F13

- Check if WATER IN FUEL indicator has been illuminated.
- Drain sample from fuel control module housing.
- Cetane rating between 40-50 is recommended for optimum performance

Method	Check
Visual	

3. Check Engine Oil Level 6005F

- Check for contaminants (fuel, coolant).
- Correct Grade/Viscosity.
- Miles/hours on oil, correct level.

Method	Check
Visual	

4. Perform KOEO On Demand Test 6005F1

- Use the scan tool.
- DTCs set during this test are current faults.

Diagnostic Trouble Codes	

5. Retrieve Continuous DTC's 6005F1

- Use the scan tool.
- DTCs retrieved during this test are historical faults.

Diagnostic Trouble Codes	

6. KOEO Injector Electrical Self-Test 6005F2

- Use the scan tool.
- All injectors will momentarily click, then individual injectors will click in sequence 1 though 8.

Injector Trouble Codes	

» **If self test codes are retrieved, go to appropriate PPT.**

7. Intake Restriction 6005F14

- Check filter minder switch/indicator.
- Measure vacuum on clean side of air inlet system at WOT with magnehelic gauge.

Instrument	Spec.	Check
Magnehelic/ Filter Minder	2"-25" H²0	

8. EGR Position 6005F20

- Perform with key on, engine off.
- Use scan tool to command Output State Control for EGR.
- Monitor EGR position sensor PID and calculate travel..

Instrument	Spec. Percent	Actual Percent
Scan tool	0% (0.6-1.2 V) Closed	_____ Closed
	90 % - 100% (4.0-4.52 V) Open	_____ Open
	90 % and 3.2 V Travel	_____ Travel

» ***Repair issue causing out of spec. values before continuing.***

9. Exhaust Restriction 6005F11

- Visually inspect exhaust system for damage
- Monitor EP with the scan tool with the engine temperature at 70° C (158° F)minimum at 3,800 RPM in park/neutral.

Parameter	Spec.	Measurement
EP	234 kPa (34 PSI) MAX '@ 3800 RPM	

10a. Electric Fuel Pump Pressure 6005F18

- Measure fuel pressure at engine filter housing test port.
- Road Test- engine at full load condition

Instrument	Spec.	Measurement
0-1.1 Mpa (0-160 PSI) Gauge	310-379 kPa (45-55 PSI) min.	

» ***If fuel pressure fails low, Go to step10b.***

» ***If pressure is above spec, check fuel return lines for restriction. If no restriction is present, replace fuel pressure regulator valve.***

10b. Elect. Fuel Pump Inlet Restriction 6005F19

- Measure restriction at fuel pump inlet.

Instrument	Spec.	Measurement
0-30 " Hg vacuum	6" Hg MAX	

» ***If > 6" Hg restriction, check lines between pump and fuel tank.***

» ***If < 6" Hg, inspect both fuel filters. If filters are OK, check fuel regulator. If regulator and filters are OK, replace fuel pump.***

10c. Fuel Aeration Test 6005F21

- Install clear hose on fuel return line at fuel control module. **Refer to shop manual for approved procedure.**
- Run at WOT for 2 min. Return fuel should be free of bubbles.

Method	Check
Visual	

» ***If air is present in return fuel, inspect fuel system for leaks.***

11. Perform KOER On Demand Test 6005F6

- This will test the ICP, EGR and VGT performance.

KOER DTC	

12a. Low Idle Stability (ICP Pressure) 6005F8

- Check at low idle, EOT above 70° C (158° F)
- Monitor ICP and RPM with scan tool.

Parameter	Spec. @ 670 RPM	Measurement
ICP	4.5-5.5 Mpa ± .3MPa (650-800 PSI ± 45 PSI)	
Take reading before disconnecting ICP		

If engine RPM is unstable, disconnect ICP sensor (ICP will default).

» ***If RPM is still unstable, re-connect sensor and go to 12b.***

» ***If RPM smoothes out, the ICP sensor is at fault.***

12b. Injection Pressure Regulator Test 6005F22

- Check at low idle, EOT above 70° C (158° F)
- Monitor IPR with scan tool.

Parameter	Spec. @ 670 RPM	Measurement
IPR	30 % MAX	

» ***If duty cycle is below MAX spec go to next step.***

» ***If duty cycle is above MAX spec, check for system leak with procedure in Hard Start/No Start section. Test 10c.***

13. Boost Pressure Test 6005F12

- Carefully inspect intercooler tubes/connections, turbocharger connections, and MAP hose for signs of damage or leaks.
- Perform boost test at 3300 RPM.
- Monitor MGP and RPM with scan tool.
- Road Test - select appropriate gear to obtain desired engine speed and full load on engine climbing hill or loaded truck..

3300 RPM

Parameter	Spec. PSI G	Measurement
MGP	22 PSIG MIN	

» ***If test fails low, inspect turbo blades for damage.***

14. Crankcase Pressure Test 6005F9

- Measure at oil fill tube with 6.0L Crankcase Pressure Tester p/n 303-758, with engine at 70° C (158° F) minimum.
- Block breather tube on left valve cover.
- Measure at WOT with no load at 3,000 RPM.

Instrument	Spec.	Measurement
(0-60" H²0) Magnehelic	8" H²0 MAX	

If more than 8" H²0, refer to base engine in Shop Manual

15. Oil Aeration Test 6005F23

- Run engine at 3000 RPM for 1 minute.
- Take oil sample from the Oil Pressure Switch port at idle.
- Inspect sample for presence of air bubbles.

Method	Check
Visual	

» ***Excessive oil aeration can be caused by depleated oil additives, pick-up tube leak, front cover seal leak, or upper pan seal leak.***

Note: If performance concern still exists, refer to Enhanced Injector Diagnostics in the PCED.

See PC/ED manual, Section 4 for more detail on all of the above test steps.

When troubleshooting a Hard Start / No Start or Performance concern, this form must be filled out to the point of repair and returned, to receive warranty credit for diagnostic time for the parts listed below.

Fuel Injectors (9E527), regulator-injection control pressure (9C968), pump assembly-high pressure oil (9A543), turbo charger assembly (6K682), fuel control module (9G282), FICM (12B599), PCM (12A650), EGR valve (9P452), CKP sensor (6C315), CMP sensor (12K073), GPCM (12B533), and Glow Plugs (12A342).

Some labor operations are listed in more than one test step. Those operations include time for all occurrences and can be claimed only once.

What problems were found and what repairs were performed?

List Part Name, Number and Serial Number of parts replaced.