**WARNING**
To avoid serious personal injury, possible death or damage to the engine or vehicle, read all safety instructions in the "Safety Information" section of Engine Diagnostics Manual EGES-270 before doing procedures on this form.

1. See "Hard Start and No Start Diagnostics", Section 5 in EGES-270. Use figures and additional information to do each test or procedure on this form. Record results on this form.
2. For starting concerns with ECT temperatures below 38°C (100°F), do Test 15 (Inlet Air Heater System) and service as required. If a problem was found and corrected, it is not necessary to complete the rest of the form unless a starting concern remains.
3. Do all checks in sequence unless otherwise stated. Doing a check or test out of sequence could cause incorrect results. If a problem was found and corrected, it is not necessary to complete the rest of the form unless a starting concern remains.
4. Minimum cranking speed and duration specifications are based on typical service bay ambient temperature. For colder temperatures, see Engine Diagnostics Manual EGES-270 for specifications.
5. See Appendix A or B in EGES-270 for engine specifications.
6. See Appendix C in EGES-270 or Form CGE 310-1 for Diagnostic Trouble Codes (DTCs).

### 1. Initial Ignition Switch On (Do not start)
- Listen for injector precycle. (Duration is temp. dependent.)
- Check for turbocharger pre-cycle.
- Check Water In Fuel (WIF) lamp.
- Listen for injector precycle.
- Listen for turbocharger pre-cycle.
- Check for fault codes.

### 2. Engine Cranking
- Does engine crank?
  - Thick smoke.
  - Check for fault codes.
- Check oil pressure.
- Check for fault codes.
- Check oil temperature.
- Check oil level.
- Check oil pressure.
- Check smoke color.
- Check oil pressure.
- Check smoke color.

### 3. Diagnostic Trouble Codes
- Install Electronic Service Tool (EST).
- Use EST to check DTCs.
- Use EST to check KOEO values for temperature and pressure sensors.
- Active DTCs
  - Active DTCs
  - Abnormal sensor values
  - Suspect sensor value
  - Correct problem causing active DTCs before continuing.
  - To access DTCs without EST, see "Diagnostic Software Operation" in Section 3 of EGES-270.

### 4. KOEO Standard Test
- Use EST to run KOEO Standard Test.
- Active DTCs
  - Correct problem causing active DTCs before continuing.
- To do KOEO Standard Test without EST, see "Diagnostic Software Operation" in Section 3 of EGES-270.

### 5. KOEO Injector Test
- Use EST to run KOEO Injector Test.
- Active DTCs
  - Correct problem causing active DTCs before continuing.

### 6. EST Data List
- Enter data in the Cranking Spec column.
- Monitor KOEO values and enter in KOEO column.
- Crank engine and monitor DATA for 20 seconds. (See note 4.)
- Enter data in the Cranking Actual column.

### 7. Fuel
- Fuel level in tank
- Free of water, ice, and clouding
- Free of contaminants
- Correct fuel grade
- Check water in fuel tank
- Note: If unit was run out of fuel, see "Priming the Fuel System" in Section 4.

### 8. Engine Systems
- Leaks
- Loose connections
  - Fuel
  - Oil
  - Coolant
  - Electrical
  - Air
  - Correct for aerated fuel before continuing.

### 9. Engine Oil
- Leaks
- Contaminated oil (fuel or coolant)
- Oil grade, viscosity, and level
- Miles/hours on oil
- Correct for aerated fuel before continuing.

### 10. Intake and Exhaust Restriction
- Hose and piping
- Filter minder
- Intake and exhaust restriction

### 11. Main Power Relay Voltage to ECM
- Connect breakout harness between ECM main power relay and power distribution center.
- Crank engine and use DMM to measure voltage to ECM. (Min. 130 rpm for 20 seconds. See note 4.)
- Check voltage between connector Pin 87 and ground.

### 12. Main Power Relay Voltage to IDM
- Connect 12-pin Breakout Harness between engine and chassis harness.
- Crank engine and use DMM to measure voltage to IDM. (Min. 130 rpm for 20 seconds. See note 4.)
- Check voltage between connector Pin 12 and Pin 1.

### 13. Fuel Pressure and Aerated Fuel
- Measure pressure at fuel rail (intake manifold).
- Minimum cranking speed 130 rpm for 20 seconds. (See note 4.)
- Check for Aerated fuel.

### 14. Low ICP System Pressure
- Do only the low ICP tests below, if ICP was not to spec during Test 6.
- Start and continue Test 14.1 System Function. If fuel pressure is not a concern and terminals on IPR valve and engine harness are not damaged or corroded.
- If test result is yes for 14.1 System Function, do tests 14.2 through 14.5 for low ICP.

### 15. Inlet Air Heater System
- Install Amp Clamp around one of the two fuel wires and do the Output State Test. After 2 seconds, measure ampereage for each air heater wire.
- If ampereage reading is not to spec for Test 15.1, do tests 15.2, 15.3, 15.4, and 15.5 for that circuit.

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**DT 466, DT 570, and HT 570 Diagnostic Form EGED-290-1 INTERNATIONAL TRUCK AND ENGINE CORPORATION 2004**
### 5. Fuel
- Fuel level in tank
- Free of water, icing, and clouding
- Correct fuel grade
- Check water in fuel tank

**Comments**

### 6. Fuel Pressure and Aerated Fuel
- Measure pressure at fuel rail (intake manifold).
- Measure pressure at low and high idle.
- Measure pressure under load (automobile only – torque converter stall)
- Check for aerated fuel.

#### Instrument

<table>
<thead>
<tr>
<th>Spec Actual</th>
<th>Condition</th>
<th>Actual</th>
<th>Spec Actual</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-100 psi</td>
<td>Low idle</td>
<td>Low idle</td>
<td>High idle</td>
<td>Auto only</td>
</tr>
<tr>
<td>Aerated oil</td>
<td>Yes</td>
<td>No</td>
<td>Aerated oil</td>
<td>After 2 min.</td>
</tr>
</tbody>
</table>

#### Note:
- If fuel pressure is below spec, replace fuel filter, clean strainer, and relay.
- If aerated fuel is present, check for fuel pressure sensors.

### 7. Intake Restriction
- Measure restriction at high idle, no load.

#### Instrument

<table>
<thead>
<tr>
<th>Spec Actual</th>
<th>Magnetic gauge 12.5 in H2O</th>
</tr>
</thead>
</table>

#### Condition

- Correct problem caused by aerated fuel.

### 8. Exhaust Restriction

#### Instrument

<table>
<thead>
<tr>
<th>Spec Actual</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>EST</td>
<td>Base Line</td>
</tr>
<tr>
<td>DMM</td>
<td>Base Line</td>
</tr>
</tbody>
</table>

#### Note:
- If pressure is above spec, remove turbo outlet exhaust pipe and retest.
- If pressure is good with pipe removed, correct problem from turbocharger to tail pipe.
- If EBP is still high with turbo outlet exhaust pipe removed, plug EGR back in, do key switch cycle, clear DTCs, and do Tests 13 and 14.

### 9. KOEO Standard Test
- Use EST to run KOEO Standard Test.

#### Note:
- Engine coolant temperature must be above 70 °C (158 °F).
- Turn ignition switch to ON.
- Use EST to monitor ICP and engine speed.
- ICP should be zero, when engine brake is inactive.
- If ICP is high or unstable, hold at high idle for 2 minutes.
- If ICP is still high or unstable, replace IPR and retest.

#### Cylinder Pressure Test

<table>
<thead>
<tr>
<th>Cylinder 1 Relative Compression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder 2 Relative Compression</td>
<td></td>
</tr>
<tr>
<td>Cylinder 3 Relative Compression</td>
<td></td>
</tr>
<tr>
<td>Cylinder 4 Relative Compression</td>
<td></td>
</tr>
</tbody>
</table>

#### Condition

- Correct problem causing active DTCs before continuing.

### 10. Injection Control Pressure
- Use EST to monitor ICP and engine speed.
- BCP should be zero, when engine brake is inactive.

#### Note:
- If BCP is above zero, when engine brake is inactive, diagnose BCP sensor, circuit, and engine brake parts.
- If ICP is high or unstable, hold at high idle for 2 minutes.
- Return to low idle, take oil sample, check for foam, and correct condition if oil is aerated.
- If oil is not aerated, disconnect ICP sensor and check for engine stability.
- If problem is corrected, see Operational Voltage checks for "ICP Sensor" in Section 7 of EGES-270.
- If ICP is still high or unstable, replace IPR and retest.

### 11. Injector Disable
- Use EST to run injector diagnostic test to identify suspect cylinders.

#### Instrument

<table>
<thead>
<tr>
<th>Spec Actual</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>EST</td>
<td>Base Line</td>
</tr>
<tr>
<td>DMM</td>
<td>Base Line</td>
</tr>
</tbody>
</table>

#### Note:
- If minimum RPM is reached within specified time, for a launch concern do not continue with performance diagnostics.
- If RPM is low, or was not reached within specified time, continue with performance diagnostics.

### 12. Relative Compression
- Turn ignition switch to ON.
- Use EST to run Relative Compression Test.
- Crank engine following EST instructions.

#### Cylinder Compression Test

<table>
<thead>
<tr>
<th>Cylinder 1 Relative Compression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder 2 Relative Compression</td>
<td></td>
</tr>
<tr>
<td>Cylinder 3 Relative Compression</td>
<td></td>
</tr>
<tr>
<td>Cylinder 4 Relative Compression</td>
<td></td>
</tr>
</tbody>
</table>

#### Condition

- Correct problem causing active DTCs before continuing.

### 13. Air Management
- Use EST to monitor data while running Air Management Test.

#### Condition Spec Spec Actual

<table>
<thead>
<tr>
<th>Condition</th>
<th>Spec</th>
<th>Spec Actual</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low to medium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium to high</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High to low</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Note:
- If fuel pressure is low, replace fuel filter, clean fuel strainer, and relay.
- If pressure is still low, use fuel pressure restrictor at full load, rated speed.
- Use EST to monitor ICP and engine speed.
- BCP should be zero, when engine brake is inactive.

### 14. VGT Test
- Use EST to toggle turbocharger operation and monitor EBP and MAP.

#### Duty Cycle

<table>
<thead>
<tr>
<th>Spec Actual</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>EST</td>
<td>Base Line</td>
</tr>
</tbody>
</table>

#### Condition

- Did EBP and MAP change for each transition?
- If turbocharger is suspected cause of low pressure, see "Low Power (Turbocharger Assembly and Actuator)" in Section 4 of EGES-270.

### 15. Torque Converter Stall (Automatic only)
- Set parking brake and apply service brake.
- Push accelerator to the floor, begin timing and monitor tachometer until tachometer stops moving.
- Record RPM and time.

#### Condition Spec Actual

<table>
<thead>
<tr>
<th>Condition</th>
<th>Spec</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stall RPM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Note:
- If RPM is low, or was not reached within specified time, continue with performance diagnostics.

### 16. Crankcase Pressure
- Measure at road draft tube with crankcase pressure test adapter.

#### Condition Spec Spec Actual

<table>
<thead>
<tr>
<th>Condition</th>
<th>Spec</th>
<th>Spec Actual</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak HP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Torque</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Note:
- If boost pressure is not to spec, continue performance diagnostics.
- BCP should be zero, when engine brake is inactive.

### 17. Test Drive (Full load, rated speed)
- Measure fuel pressure at full load, rated speed.

#### Instrument Spec Spec Actual

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Spec</th>
<th>Spec Actual</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 100 psi gauge</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Note:
- If fuel pressure is low, replace fuel filter, clean fuel strainer, and relay.
- If pressure is still low, use fuel pressure restrictor at full load, rated speed.
- Use EST to monitor ICP and engine speed.
- BCP should be zero, when engine brake is inactive.