

**FORD:**  
2003-2005 Excursion

2003-2007 F-Super Duty  
2004-2009 E-Series

This article supersedes TSB **08-11-3** to update the Service Procedure, which includes the release of a new Oil Cooler Service Kit. The Oil Cooler Service Kit includes a serviceable heat exchanger, which is to be used to service a restricted oil cooler. Replacement of the entire Oil Cooler assembly due to flow restriction is no longer necessary.

### **ISSUE**

Some 2003-2007 F-Super Duty, 2003-2005 Excursion and 2004-2009 E-Series vehicles, all equipped with a 6.0L engine, may exhibit:

- Coolant venting from the degas bottle cap
- Internal engine coolant leak (possibly resulting in a hydro-locked engine)
- White smoke from tail pipe
- Coolant loss
- Lacks power due to overheating
- No cabin heat

The conditions typically occur when operating the vehicle under a load such as trailer towing, uphill driving, or both.

### **ACTION**

Follow the Service Procedure steps to correct the condition.

### **SERVICE PROCEDURE**

Following the Service Procedure steps will aid in isolating the source of the coolant leak condition by testing and repairing as necessary the following: degas bottle and pressure cap integrity, exhaust gas recirculation (EGR) cooler for internal leaks and the oil cooler for coolant flow restrictions. All vehicles will be required to have the cooling system flushed with Motorcraft® Engine Cooling System Iron Cleaner. For vehicles that are diagnosed to have leaking head gaskets, you will be required to test the turbocharger for causing an over-boost condition, which may be the cause of the head gasket failure.

### **NOTE**

PLEASE REFER TO THE WARRANTY AND POLICY MANUAL, SECTION 3, FOR WARRANTY IMPLICATIONS OF REPAIRS RELATED TO VEHICLE MODIFICATIONS.

### **NOTE**

A NEW OIL COOLER SERVICE KIT, WHICH INCLUDES A SERVICEABLE HEAT EXCHANGER, IS TO BE USED TO SERVICE A RESTRICTED OIL COOLER. REPLACEMENT OF THE ENTIRE OIL COOLER ASSEMBLY DUE TO FLOW RESTRICTION IS NO LONGER NECESSARY.

Prior to making any repairs, verify the coolant level is not overfull. The correct cold coolant fill level is at the MIN line of the degas bottle cold. Overfilled coolant levels will cause coolant to vent from the degas bottle cap.

### **Complete All Steps In Order As Outlined (Steps 1-4 Must Be Performed On A Cold Engine)**

1. Inspect the cooling system as per the Workshop Manual (WSM), Section 303-03 for external leaks, oil or fuel contamination, and/or diagnostic trouble codes (DTCs). If external coolant leaks, oil or fuel contamination of coolant, and/or DTC(s) P0480 / P0528 are found, do not continue with this procedure. Refer to WSM, Section 303-03, Powertrain Controls/Emissions Diagnosis (PC/ED) or any other applicable articles as needed.
2. Test the degas bottle and pressure cap for proper operation of the pressure cap and its seal to the degas bottle:
  - a. Do not remove the pressure cap.
  - b. Install a pressure tester in-line with the degas bottle hose using Rotunda 014-R1068 adapter. (Figure 1)

**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 09-8-3 (Continued)

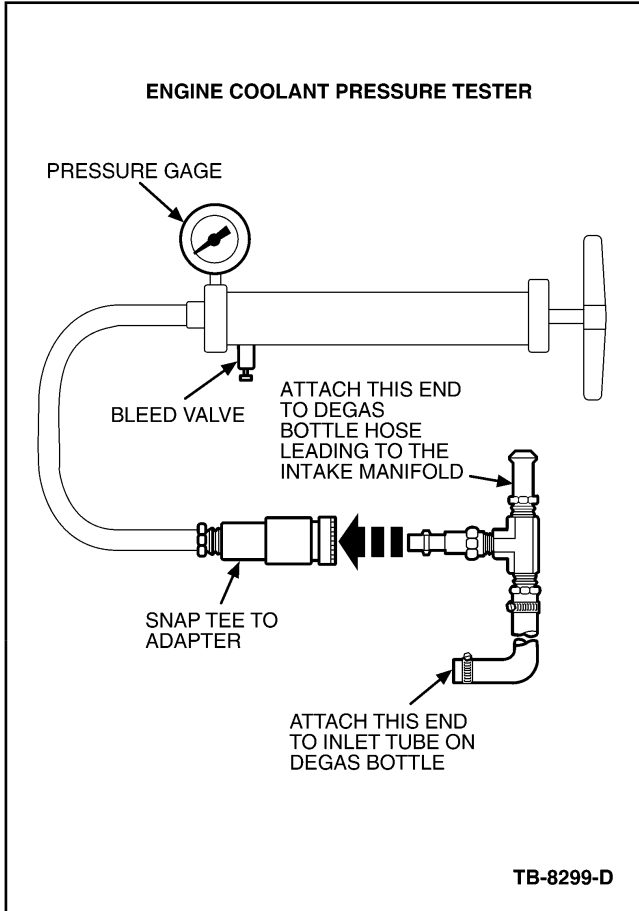


Figure 1 - Article 09-8-3

- c. Pressurize the cooling system by using slow and steady pump action on the tester pump handle. Quick or rapid pumps on the tester handle may cause false readings. Pressurize the system until the gauge pressure levels off, between 12-18 psi (83-124 kPa).
- d. The degas cap should release between 12-18 psi (83-124 kPa) allowing the pressure to level off.
  - (1) If the degas cap releases with less than 12 psi (83 kPa), replace the cap.
  - (2) If degas cap was replaced or held pressure, apply pressure to 12-18 psi (83-124kPa) and wait 30 seconds for pressure to stabilize. If pressure holds, go to Step 2e. If pressure drops, continue to next step.
  - (3) If the gauge pressure drops:
    - (a) Apply soapy water around the cap to find any leaks.

- (b) Check the degas bottle fill neck lip for nicks or cracks. Small nicks can be removed by light sanding with fine emery cloth. Repair or replace as necessary and re-pressure test.
- (c) Replace the pressure cap, if leaks are still present and pressure cap was not already replaced in a previous step.
- (d) Pressurize the system and test again, if leaks are still present replace the degas bottle, Refer to WSM, Section 303-03.
- e. Record the degas cap holding pressure for later reference, go to Step 3.

### **CAUTION**

**COOLANT ENTERING ANY COMBUSTION CHAMBER MAY CAUSE A HYDRO LOCK CONDITION. EVACUATE INTAKE PASSAGES AND COMBUSTION CHAMBERS OF ALL LIQUIDS USING A SUCTION DEVICE. REMOVE GLOW PLUGS (REFER TO WSM, SECTION 303-07B) TO ASSIST IN VENTING LIQUID FROM COMBUSTION CHAMBERS, BEFORE ENGINE IS STARTED.**

### 3. EGR Cooler Leak Test On Vehicle:

#### **NOTE**

NOTE: A LEAKING EGR COOLER CAN CAUSE EXCESSIVE WHITE SMOKE, INTERNAL COOLANT LOSS (WHICH MAY RESULT IN A HYDRO-LOCKED ENGINE), AND/OR PRESSURIZED EXHAUST GASES ENTERING THE COOLING SYSTEM. THIS MAY RESULT IN VENTING FROM THE DEGAS BOTTLE CAP, AND APPEAR SIMILAR TO A LEAKING HEAD GASKET.

- a. Install RADKITPLUSA 078-00592 on the degas tank.
- b. Regulate shop air to 100 psi (690 kPa) and apply vacuum to cooling system until gauge stops decreasing or 20 inches of vacuum is reached. Degas bottle coolant level must be set to MIN line with a cold engine to allow sufficient space for vacuum.
- c. Hold vacuum and allow vacuum to stabilize (allow 60 seconds for vacuum to stabilize).
  - (1) If vacuum holds steady over 15 minutes go to Step 5.

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- (2) If vacuum does not hold steady over 15 minutes go to Step 4.
4. EGR Cooler Leak Test Off Vehicle:
  - a. Remove the EGR cooler from the engine following Workshop Manual (WSM), Section 303-08.
  - b. Install cooler block-off tools and pressurize the EGR cooler to 30 psi (207 kPa). Fasten the inlet and outlet port block-off plates using standard bolts, nuts and washers. (Figure 2)

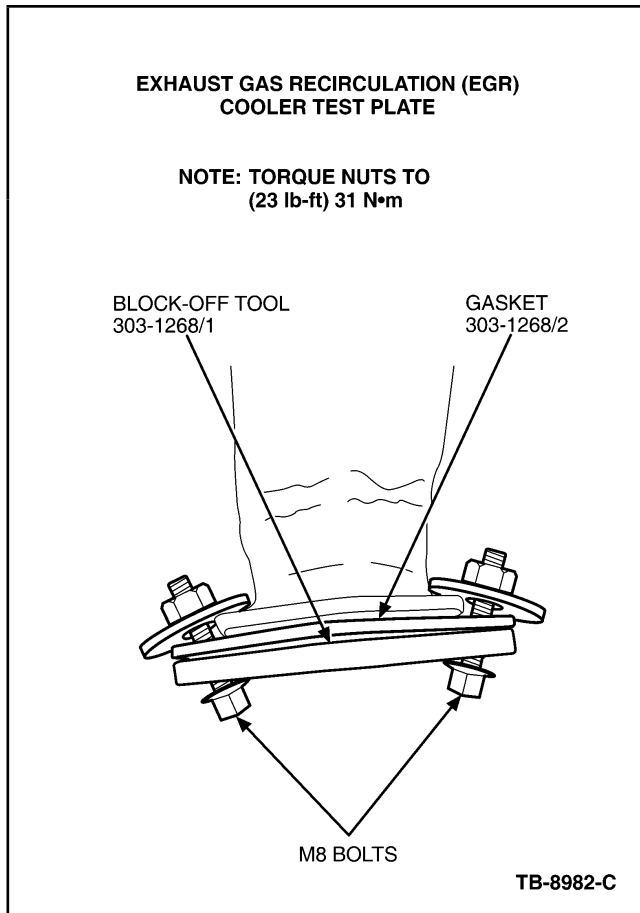


Figure 2 - Article 09-8-3

### NOTE

FOR VERY SMALL LEAKS, IT MAY BE REQUIRED THAT EGR COOLER REMAIN SUBMERGED FOR UP TO 15 MINUTES TO AID IN LEAK IDENTIFICATION. THIS TIME IS NEEDED TO ALLOW SMALL LEAKS TO DISPLACE ENOUGH WATER FROM THE COOLANT PASSAGES TO BECOME EVIDENT.

- c. Submerge the EGR cooler horizontally in the water, with the coolant ports pointing upward. Manipulate the cooler under water to purge all trapped air from the internal coolant passages. (Figure 3)

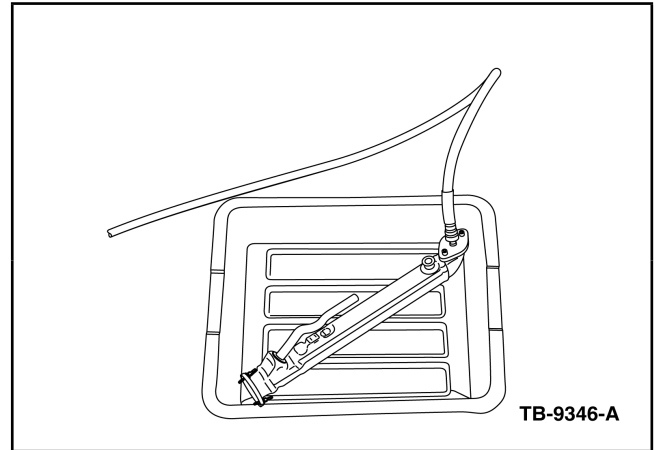


Figure 3 - Article 09-8-3

- d. Inspect for continuous bubbles escaping from the coolant ports.
  - (1) If continuous bubbles identify a leak, replace the EGR cooler and service the oil cooler with an Oil Cooler Kit. Refer to the WSM, Sections 303-01C and 303-08 for additional information and go to Step 7.
  - (2) If bubbles do not identify a leak, an external leak was missed in Step 1. Install the original EGR cooler and exit this procedure. This procedure should not be performed until all external cooling system leaks have been repaired.
5. Road Test For Restricted Oil Cooler - Setup and Observations:
  - a. Install integrated diagnostic system (IDS), select engine coolant temperature (ECT) and engine oil temperature (EOT) PID's on IDS Datalogger.
  - b. Carefully drive the vehicle at wide open throttle (WOT) / high load to achieve maximum boost.

### NOTE

FOR ACCURATE TEST RESULTS, ECT TEMPERATURE MUST BE GREATER THAN 190 °F (88 °C) WHEN MEASURING THE ECT AND EOT MAXIMUM TEMPERATURE DIFFERENTIAL.

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### NOTE

PERFORMING THIS TEST STEP OUT OF SEQUENCE CAN RESULT IN INACCURATE TEST RESULTS. THIS CAN BE CAUSED BY A LEAKING EGR COOLER ALLOWING (HOT) COMBUSTION GASES TO ENTER THE ENGINE COOLANT AND ARTIFICIALLY RAISING ECT READINGS.

- c. Observe ECT and EOT PID's on IDS Datalogger. EOT maximum temperature differential might occur at throttle tip-out.
  - (1) If EOT is within 15 °F (8.4 °C) degrees of the ECT, go to Step 7.
  - (2) If EOT exceeds ECT by 15 °F (8.4 °C) or more at any time during the test, go to Step 6.
6. Service Oil Cooler and Pressure Test EGR Cooler Off Vehicle:
  - a. Service oil cooler with an Oil Cooler Kit per WSM, Sections 303-01C and 303-08.
  - b. EGR cooler leak test - off vehicle:
    - (1) Remove the EGR cooler from the engine following Workshop Manual (WSM), Section 303-08.
    - (2) Install cooler block-off tools and pressurize the EGR cooler to 30 psi (207 kPa). Fasten the inlet and outlet port block-off plates using standard bolts, nuts and washers. (Figure 2)

### NOTE

FOR VERY SMALL LEAKS, IT MAY BE REQUIRED THAT EGR COOLER REMAIN SUBMERGED FOR UP TO 15 MINUTES TO AID IN LEAK IDENTIFICATION. THIS TIME IS NEEDED TO ALLOW SMALL LEAKS TO DISPLACE ENOUGH WATER FROM THE COOLANT PASSAGES TO BECOME EVIDENT.

- (3) Submerge the EGR cooler horizontally in the water, with the coolant ports pointing upward. Manipulate the cooler under water to purge all trapped air from the internal coolant passages. Inspect for continuous bubbles escaping from the coolant ports. (Figure 3)

- (a) If continuous bubbles identify a leak, replace the EGR cooler. Refer to the WSM, Sections 303-01C and 303-08 for additional information and go to Step 7.
- (b) If bubbles do not identify a leak, install the original EGR cooler and go to Step 7.

7. Road Test For Leaking Head Gaskets - Setup And Observations:
  - a. Install the vehicle measurement module (VMM) pressure vacuum transducer (PVT), or Rotunda Pressure Adapter Kit 014-00761, or equivalent. (Figure 4)

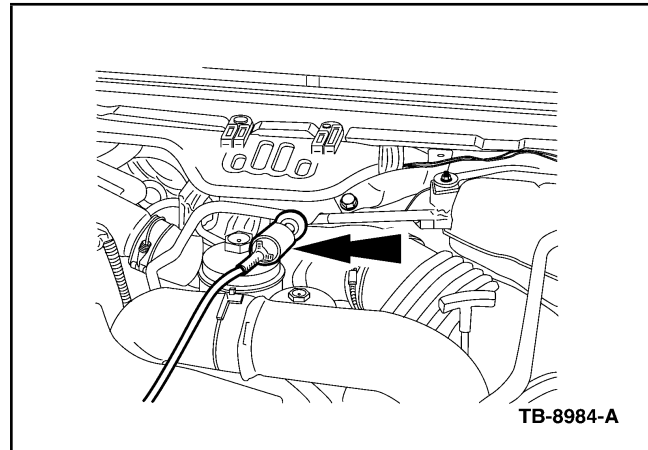


Figure 4 - Article 09-8-3

### CAUTION

**CAREFULLY RELEASE THE COOLING SYSTEM PRESSURE WHILE REMOVING DEGAS CAP.**

- b. Carefully release the cooling system pressure, leaving the tester in place.
- c. Seal pressure bleed.
- d. Drive the vehicle at wide open throttle (WOT) / high load / to achieve maximum boost.
- e. Observe whether the cooling system pressure exceeds the holding pressure noted in Step 2e.
- f. Check for coolant venting through the degas bottle cap by listening for a hissing noise.
  - (1) If the cooling system pressure is less than the holding pressure noted in Step 2, go to Step 10.

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- (2) If the cooling system pressure exceeds the holding pressure noted in Step 2, and/or the degas bottle cap continuously vents with loaded engine, go to Step 8.

### 8. Turbocharger Over-boost Tests

#### **NOTE**

OVER-BOOST CONDITIONS WILL RESULT IN EXCESSIVE CYLINDER PRESSURES, AND MAY BE CAUSED BY IRREGULAR RESPONSE IN VARIABLE GEOMETRY TURBOCHARGER (VGT), OR BY A BIASED EXHAUST BACK PRESSURE (EBP) SENSOR SIGNAL. EXCESSIVE CYLINDER PRESSURES MAY LEAD TO HEAD GASKET FAILURE.

- a. Remove the EBP sensor wire seal connector and inspect the weather seal. If the seal is missing, replace the connector and EBP sensor.
- b. Perform both turbocharger tests in IDS by going to the tests as follows and performing the on-screen prompts:
  - (1) Tool Box > Powertrain > Air Management > Turbo Test > Turbo Boost Test
  - (2) Tool Box > Powertrain > Air Management > Turbo Test > VVT Test

#### **NOTE**

FOR 2003 AND EARLY 2004 MODEL YEAR VEHICLES, PERFORM PC/ED PPT STEPS KA9 AND KA10 FOR VVT TEST TO DETERMINE VGT VANE OPERATION.

- (a) If either test indicates turbocharger repair or replacement is required, refer to the WSM, Section 303-01D General Procedures for Turbocharger Reconditioning procedures. Turbocharger service must be performed while the turbocharger is off the vehicle for head gasket service in Step 9.

- (b) If both tests indicate the turbocharger is operating properly, go to Step 9.

### 9. Head Gasket Replacement:

- a. Replace the head gaskets. Refer to WSM, Section 303-01C for head removal, installation, cleaning and flatness measurement procedures. Refer to Cylinder Head Gasket Identification Chart located at the end of this procedure. (Figure 5)
- b. Use other applicable TSB for proper cylinder head identification.

### 10. Vehicle Assembly:

#### **NOTE**

FAILURE TO PROPERLY FLUSH THE COOLING SYSTEM WITH MOTORCRAFT® ENGINE COOLING SYSTEM IRON CLEANER (VC-9) FOLLOWING WSM PROCEDURES MAY RESULT IN REPEAT EGR COOLER AND OIL COOLER FAILURES.

- a. Flush the cooling and heater system together using the WSM, Section 303-03 Cooling System Flushing - Diesel Engine procedure. Engine coolant quality can be affected by combustion gases, operation at low system pressure or exposure to excessive system temperatures. Engine coolant degradation characteristics include silicate drop out (clouding) and reduced corrosion protection. Rust flakes and silicate that combine in the system might collect in the oil cooler and be mistaken as casting sand.
- b. Change engine oil and oil filter.

## TSB 09-8-3 (Continued)

PART NUMBER	PART NAME
3C3Z-9P456-AE	EGR Cooler (Built Before 9/29/2003)
4C3Z-9P456-AF	EGR Cooler (Built 9/29/2003 And After)
3C3Z-6A642-CA	Oil Cooler Kit
6C3Z- 8A080-B	Degas Bottle (F-Series)
4C2Z-8A080-AA	Degas Bottle (E-Series)
9C3Z-8101-A	Cap - Degas Bottle
3C3Z-9E933-BA	Gasket Front EGR Cooler
3C3Z-9E933-AA	Gasket Rear EGR Cooler
3C3Z-6A831-AA	O-Ring Oil Filter Housing
3C3Z-9A375-AA	Washer Fuel Banjo
3C3Z-9229-AA	O-Ring Kit Injector
3C3Z-6051-CB	Head Gasket Kit Built Before 10/2003 (Figure 5 For Application)
6C3Z-6051-A	Head Gasket Kit 20 mm Align Dowels (Figure 5 For Application)
4C3Z-6051-EB	Head Gasket Kit 18 mm Align Dowels (Figure 5 For Application)
4C3Z-6051-DA	Head Gasket Kit Over Size (Figure 5 For Application)
ZC-31-A	Motorcraft® Metal Surface Prep
VC-9	Motorcraft® Engine Cooling System Iron Cleaner
3C3Z-9J469-AA	O-Ring Heater Tube Front
4C3Z-9J460-A	Straight (Pipe) Thread Fitting (2003-05 F-Series built thru approximately 11/3/2004, and 2003-2005 Excursion built thru approximately 1/9/2005)
5C3Z-9J460-A	Tapered/Flared Thread (all E-Series, 2005-07 F-Series built after approximately 11/3/2004, and 2005 Excursion built after approximately 1/9/2005)
5C3Z-12224-A	EBP Sensor Connector Kit

OPERATION	DESCRIPTION	TIME
090803A	2003-2007 Super Duty, 2003-2005 Excursion 6.0L, 2004-2009 Econoline 6.0L: Includes Time To: Pressure Test The Cooling System Several Times; Test The EGR Cooler On Vehicle, Replace The Degas Cap If Required, Sand Degas Bottle Fill Neck To Remove Small Nicks If Required, Install IDS/PVT, Road Test(s) And Check For DTCs (May Be Claimed With Operations B, C, D, E, F, G and H)	1.3 Hrs.
090803B	2004-2007 Super Duty, 2004-2005 Excursion 6.0L: Includes Time To: Remove And Leak Check EGR Cooler Off Engine, Replace EGR Cooler And Oil Cooler If Required (May Be Claimed With Operations A, C, D, E, F, G And H)	6.1 Hrs.
090803B	2004-2009 Econoline 6.0L: Includes Time To: Remove And Leak Check EGR Cooler Off Engine, Replace EGR Cooler And Oil Cooler If Required May Be Claimed With Operations A, C, D, E, F, G And H	7.8 Hrs.
090803B	2003 Super Duty, 2003 Excursion 6.0L: Includes Time To: Remove And Leak Check EGR Cooler Off Engine, Replace EGR Cooler And Oil Cooler If Required (May Be Claimed With Operations A, C, D, E, F, G And H)	5.5 Hrs.
090803C	2003-2007 Super Duty, 2003-2005 Excursion, 2004-2009 Econoline 6.0L: Replace The Degas Bottle, May Be Claimed With Operations A, B, D, E, F, G And H	0.5 Hr.

**OTHER APPLICABLE ARTICLES:** 07-10-4, 05-2-5  
**WARRANTY STATUS:** Eligible Under Provisions Of New Vehicle Limited Warranty Coverage  
**IMPORTANT:** Warranty coverage limits/policies are not altered by a TSB. Warranty coverage limits are determined by the identified causal part.

## TSB 09-8-3 (Continued)

090803D	2003-2004 Super Duty, 2003 Excursion 6.0L: Includes Time To: Test And/Or Replace EBP Sensor And Connector If Required, Perform Turbo Boost Test, Replace Head Gaskets, May Be Claimed With Operations A, B, C, E, F, G And H	15.0 Hrs.	090803F	2003-2007 Super Duty, 2003-2005 Excursion 6.0L: Includes Time To: Flush And Fill Cooling System, Change Engine Oil And Filter (May Be Claimed With Operations A, B, C, D, E, G And H)	2.1 Hrs.
090803D	2004-2009 Econoline 6.0L: Includes Time To: Test And/Or Replacing EBP Sensor And Connector If Required, Perform Turbo Boost Test, Replace Head Gaskets (May Be Claimed With Operations A, B, C, E, F, G And H)	21.1 Hrs.	090803F	2004-2009 Econoline 6.0L: Includes Time To: Flush And Fill Cooling System, Change Engine Oil And Filter (May be Claimed With Operations A, B, C, D, E, G And H)	3.0 Hrs.
090803D	2005-2007 Super Duty, 2004-2005 Excursion 6.0L: Includes Time To: Test And/Or Replace EBP Sensor And Connector If Required, Perform Turbo Boost Test, Replace Head Gaskets (May Be Claimed With Operations A, B, C, E, F, G And H)	15.5 Hrs.	090803G	2003-2007 Super Duty, 2003-2005 Excursion, 2004-2009 Econoline 6.0L: Includes Time To: Re-condition Turbocharger (May Be Claimed With Operations A, B, C, D, E, F And H)	1.0 Hr.
090803E	2003-2007 Super Duty, 2003-2005 Excursion 6.0L: Remove Glow Plugs To Vent Liquid From Combustion Chambers, Should Only Be Claimed If Engine Is Found To Be Hydro-locked (May Be Claimed With Operations A, B, C, D, F, G And H)	1.5 Hrs.	090803H	2003-2007 Super Duty, 2003-2005 Excursion, 2004-2009 Econoline 6.0L: Includes Time To: Replace Turbocharger Center Housing Rotating Assembly (May Be Claimed With Operations A, B, C, D, E, F And G)	0.3 Hr.
090803E	2004-2009 Econoline 6.0L: Remove Glow Plugs To Vent Liquid From Combustion Chambers Should Only Be Claimed If Engine Is Found To Be Hydro-locked (May Be Claimed With Operations A, B, C, D, F, G And H)	2.4 Hrs.			

### DEALER CODING

BASIC PART NO.  
6A642

CONDITION  
CODE  
55

**VEHICLE APPLICATION AND PART NUMBER DETAIL - KIT, CYLINDER HEAD GASKET**

**E-SERIES**

2004-2007	E-Series	6.0L Diesel	4C3Z-6051-EA	Use on heads with 18mm locating dowel holes.
2004-2008	E-Series	6.0L Diesel	6C3Z-6051-A	Use on heads with 20mm locating dowel holes.

**F-250 / F-550**

2003-2004	F-250 / 550	6.0L Diesel built before <b>9-30-03</b>	3C3Z-6051-CA	Kit includes 2003 straight rail design stand pipes.
2004-2007	F-250 / 550	6.0L Diesel built after <b>9-30-03</b>	4C3Z-6051-EA	Use on heads with 18mm locating dowel holes.
2004-2007	F-250 / 550	6.0L Diesel	6C3Z-6051-A	Use on heads with 20mm locating dowel holes.
2003-2006	F-250 / 550	6.0L Diesel Remanufactured 0.030" oversized cylinder bore only	4C3Z-6051-DA*	Refer to note on how to identify 0.030" oversized condition. Kit contents only include gasket and head bolts. Only available for use on heads with 18mm dowel holes.

**EXCURSION**

2003-2004	Excursion	6.0L Diesel built before <b>1-24-04</b>	3C3Z-6051-CA	Kit includes 2003 straight rail design stand pipes.
2004-2005	Excursion	6.0L Diesel build after <b>1-24-04</b>	4C3Z-6051-EA	Use on heads with 18mm locating dowel holes.
2004-2005	Excursion	6.0L Diesel build after <b>1-24-04</b>	6C3Z-6051-A	Use on heads with 20mm locating dowel holes.

**Note:** Head bolts and stand pipes are included in all kits except 4C3Z-6051-DA.  
It is mandatory to replace Injector O-Ring kit 3C3Z-9229-AA with all head gasket kits.

\* Head Gasket kit does not include bolts or stand pipes.  
Oversized pistons can be identified by a stamped part number on top of the piston.  
1843283C1    2003 Engines (Straight HP Oil Rails)  
1845522C1    04, 05, 06 (Pre-Commonization) Engines

A stamp on the rear of the block, located at the top of the left bank, can also be used to identify an oversize condition on remanufactured cylinder blocks. This is the same location where the OEM Serial Number was stamped.

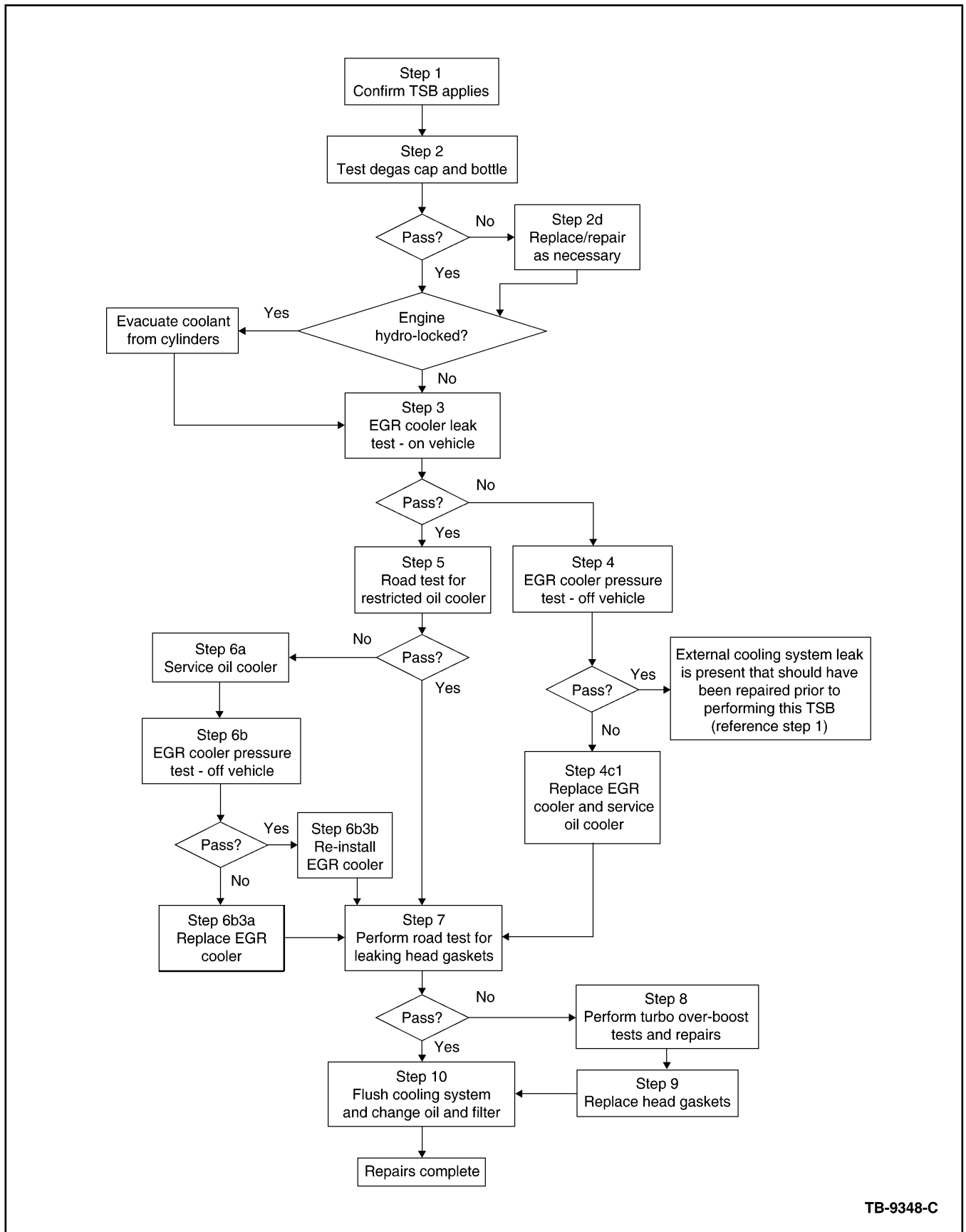
Stamp Information:  
6.0    MRB  
Serial Number  
Build Date

The number found in place of "B" above will identify the cylinder bore size.  
If 1    Cylinder bore is 0.010" oversized (stamped surface painted White)  
If 2    Cylinder bore is 0.020" oversized (stamped surface painted Red)  
If 3    Cylinder bore is 0.030" oversized (stamped surface painted Yellow)

**TB-9347-A**

Figure 5 - Article 09-8-3





TB-9348-C

Figure 6 - Article 09-8-3