



Evans Cooling Systems, Inc.
1 Mountain Rd.
Suffield, CT 06078

INSTALLATION PROCEDURE – 2011 Navistar MaxxForce 13L

CAUTIONARY NOTE: DO NOT FLUSH COOLING SYSTEM WITH WATER!

1. Supplies, information, and special tools needed:

- 1) Is the engine equipped with a coolant filter? If the engine is equipped with a coolant filter, replace with a non-chemical coolant filter element. A Fleetguard WF2077 fits.
 - 2) **Two new thermostats P/N: 3006444C3.** (This procedure requires that the thermostats be removed for blowing out old coolant. Putting in new thermostats assures that the sealing rings won't leak. The thermostats are only about \$18 each.)
 - 3) Evans waterless Heavy Duty Coolant (16 gallons is needed for a day cab without an APU unit and without fuel tank heaters.
 - 4) Two gallons of Evans Prep Fluid.
 - 5) Evans-provided labels to warn against the addition of water.
 - 6) Refractometer for measuring small amounts of water content – Evans P/N E2190.
 - d. A high-volume air source (rather than high pressure) such as Makita blower Model UB 1101, widely available from the internet.
 - e. An angled pick for difficult hoses.
 - f. Small picks and screwdrivers for opening the 96-pin ECM plug.
 - g. Funnels.
 - h. A 4" piece of 3/8" id hose and a 3/8" dia. bolt to close one end of it.
2. **Beginning the procedure** - If the engine is hot, wait for it to cool to a safe temperature. Never open a cooling system pressure cap if the engine is hot.
3. Place containers to catch coolant at draining locations.
4. Remove the pressure cap.
5. There are two radiators to be drained (see diagram, page 6). The container for the primary radiator should be large enough to contain at least 17 gallons. The container for the "Low Temperature" radiator only needs to collect 2 gallons or so but should be wide enough to collect drips over a 2 square ft. area.
- a. Primary radiator: Drain from the petcock on the right side.
 - b. Low Temp radiator: This radiator is in front of the primary radiator. Find its petcock on the left side.
 - c. Apply air to the expansion tank, either from the Makita blower or from the cooling system pressure tester to speed the draining.
 - d. Once the draining from the primary radiator slows, **pull off the bottom radiator hose and leave it to drain.** Leave the radiator petcocks open.
6. The following devices have "source" connections and "return" connections:
- Cab heater
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- Sleeper heater
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- Fuel heater (at fuel filter)
- APU units
- This engine has no DEF tank or DEF tank heater.

The returns all connect to the inlet side of the pump. In general, when air is blown into the source side of each device, old coolant is pushed out of the device, through its return line, and out the bottom radiator hose. **Evans Prep Fluid is then introduced into each source side and blown through to chase residual coolant from each device.**

7. Special device information:

- a. Cab and sleeper heaters, in order to be drained properly, require that the temperature controls for these units be turned to MAX, the blowers turned ON, and the key ON.
- b. The coolant to fuel tank heaters generally passes through a thermostatically controlled valve (sometimes labeled “Arctic”) that is probably closed. The connections must be opened downstream of the valve to blow out the coolant in the fuel tank heaters.
- c. An APU unit may hold significant amounts of old coolant. In general, the air is blown into the outlet of the APU back through the unit and out the inlet side. There may be a thermostat in the APU that requires removal in order to blow coolant out of the unit.
- d. The transmission oil cooler may be in the bottom of the primary radiator but look for the possibility of a transmission cooler that uses engine coolant that would need to be drained.

9. Turn off the key (if it is still on).

10. Remove the coolant filter, leaving the inlet and outlet valves open.

11. Disconnect hose to the low temp radiator at the CMV.

- a. Blow air through the low temp radiator and chase with coolant.
- b. Blow air downward through the CMV.
- c. Re-attach hose at the CMV.

12. Disconnect hose to LPCAC. Blow air and chase with coolant. Re-attach hose.

13. **Blowing air through the thermostat holes.**

- a. Disconnect top radiator hose from primary radiator. Blow air into radiator. Chase with waterless coolant or Prep Fluid. Leave top radiator hose disconnected.
- b. Remove the bracket that attaches to the fan shroud (3-13mm hex bolts).
- c. Remove the thermostat cover (3-13mm hex bolts) and the upper radiator hose. Remove the two thermostats, including the sealing rings and discard. **(You have the 2 new thermostats, don't you?)**
- d. Block the two by-pass holes (they are at the center of each thermostat hole), using a small rag (about 7" x 9") for each. Push against the rags to assure that they won't be going anywhere when air is applied.
- e. Using a blower, blow air into one of the thermostat holes

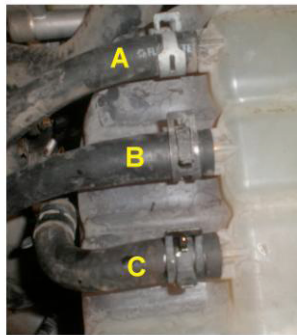
while at the same time using a rag or tennis ball to block the second thermostat hole. Keep blowing air until coolant stops running out the bottom radiator hose.

- f. **Pull out both rags** and blow air into each side.
 - g. Install the **new** thermostats and the cover.
 - h. Re-attach the top radiator hose.
 - i. Re-install the bracket that attaches to the fan shroud.
14. Install the new non-chemical coolant filter. (Fill it and lubricate the gasket with the waterless coolant.)
15. Re-connect all open hoses. Police all hose connections to assure that they are tight. Close the two radiator petcocks.

16. Installing the coolant:

IMPORTANT! Do not install the coolant using the OEM recommended vacuum filling process. The vacuum filling process will not eliminate air pockets. Here is how you fill the system and end up with no air pockets:

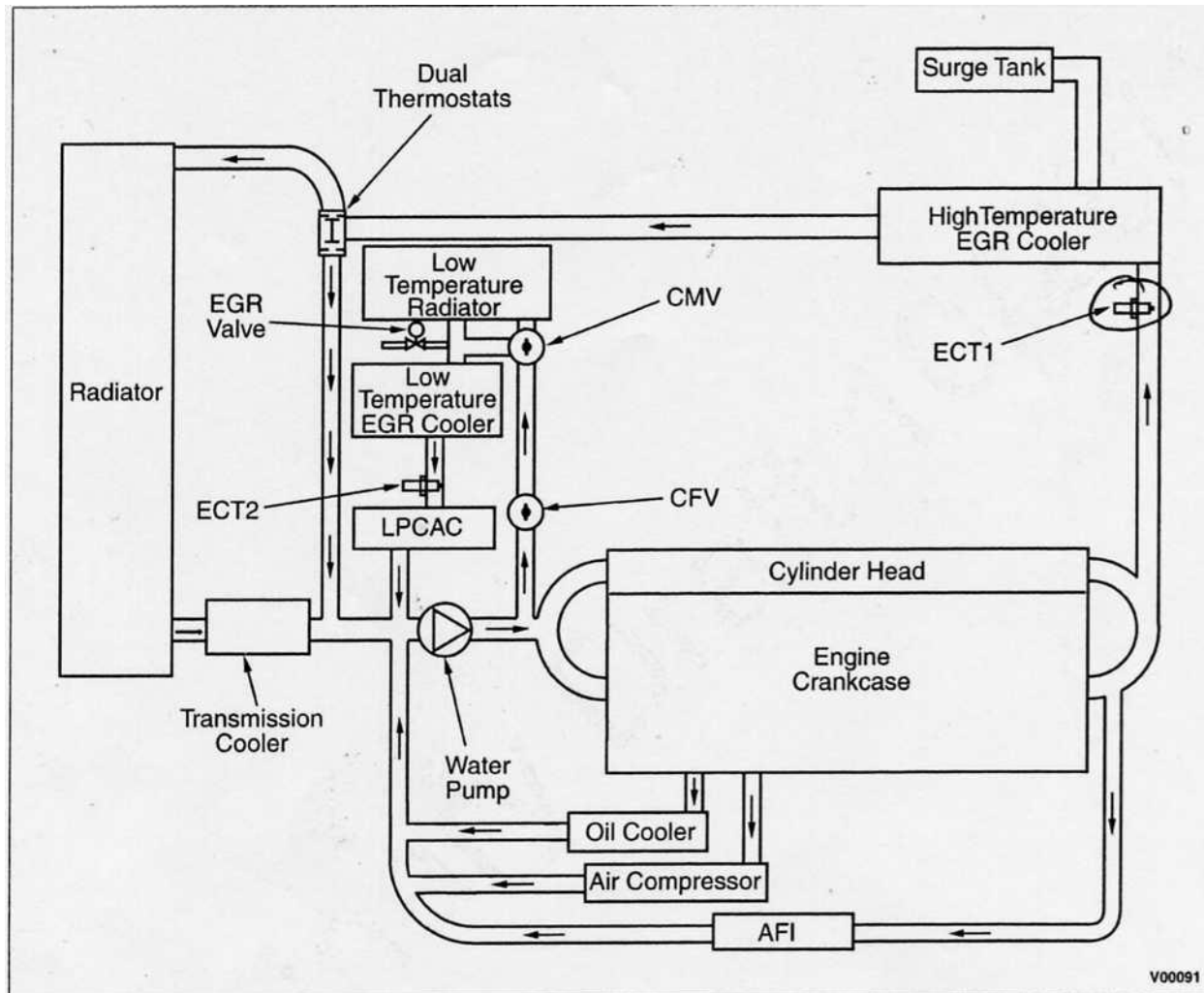
- a. Open the in-hose vent petcock.
- b. Pour Evans waterless coolant into the expansion tank to a level above the vent petcock.
- c. Apply air to the expansion tank, either by gentle use of the blower or by use of a cooling system pressure tester.
- d. Hold a small catch can under the vent petcock to catch spurts of coolant.
- e. Add coolant from time to time to keep the level above the petcock.
- f. Keep the petcock open until the emerging coolant is a steady flow; then close it.
- g. Fill the expansion tank with coolant.
- h. Look at the vent lines that enter the expansion tank:



VENT LINES ENTERING THE EXPANSION TANK

- i. Pull off vent line A.
- j. Attach the closed 4" hose to the hose nipple for vent line A.
- k. Blow air into the expansion tank until coolant emerges from vent line A.
- l. Re-attach vent line A.
- m. Top up the coolant in the expansion tank.
- n. Repeat the sequence with vent hose C.
- o. Leave vent hose B alone.
- p. Top up the coolant

17. Operate the engine to assure the opening of the thermostats and thorough circulation of the coolant. Add coolant as required to maintain the “hot” level. The system should take 15.75 to 16 gallons (Expect that after operating and cool-down cycles additional topping may be required. Make sure that the truck is stocked with an extra gallon and that the driver is advised.). Any remaining Prep Fluid is compatible with Evans HD Coolant.
18. Apply labels warning against the addition of water or water-based coolant to the cooling system in the vicinity of the expansion tank and on the dashboard..
19. This procedure is designed for the installed coolant to have 3.0 percent or less water content. Test the water content of the coolant with the Evans refractometer after several operation and cool-down cycles of the engine according to the procedure in the Appendix.



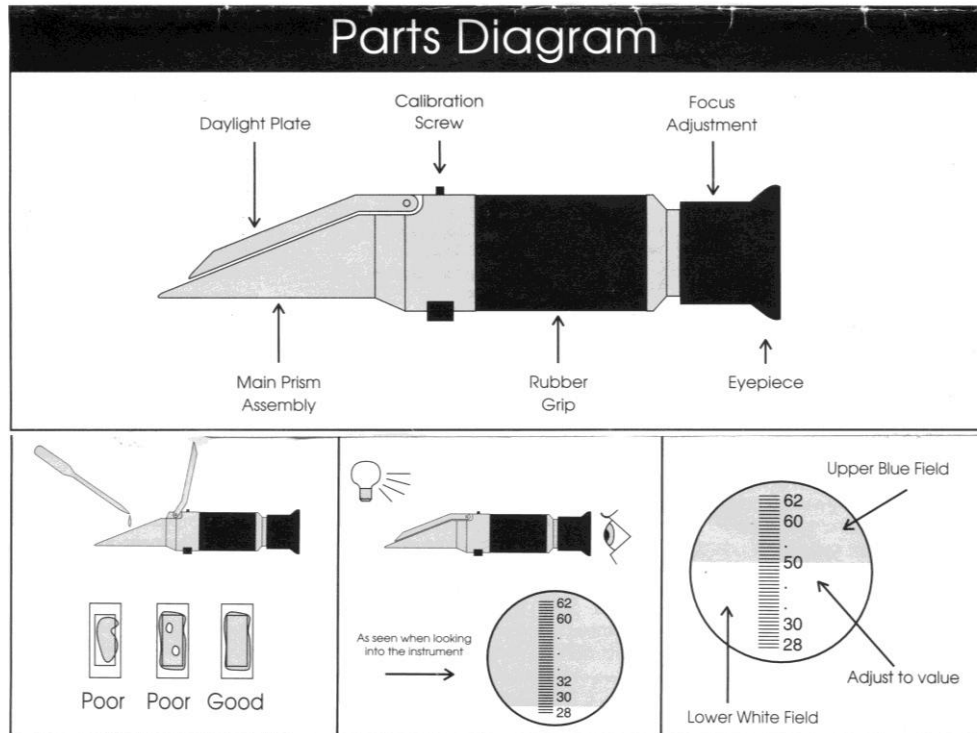
Coolant Flow Diagram for the
2011 Navistar MaxxForce 13L Engine

Evans Refractometer Part# E2190 for Reading Water Content of Waterless Coolant

VER 10Aug11

Hand Held Brix Refractometer

Range: 28-62°
Minimum Division: 0.2°
Dimensions: 27 x 40 160mm
Weight: 176 grams



Readings are temperature sensitive, so calibrate before use:

Calibrate the refractometer by placing a drop of **new** Evans Waterless Heavy Duty Coolant on the refractometer glass. Use the small screwdriver supplied with the instrument and set the reading to 57.0. Always clean the glass and the daylight plate with a clean, soft cloth between readings.

Place a small amount of coolant, obtained from a location in the cooling system where the coolant is well-mixed, on the glass and close the daylight plate.

°Brix	% water
57.0	0.0
56.5	1.0
56.1	2.0
55.7	3.0
55.2	4.0
54.8	5.0
54.3	6.0
53.9	7.0