Evans Cooling Systems, Inc.
1 Mountain Rd.
Suffield, CT 06078
888-990-2665

INSTALLATION PROCEDURE – CUMMINS ISX

CAUTIONARY NOTE: DO NOT FLUSH COOLING SYSTEM WITH WATER!

REGARDING OLDER ENGINES: Metal to metal connections may be corroded. Do not apply force that can damage such connections and cause leaks.

Supplies, information, and special tools needed:

1. **Obtain this information from the owner:**
   a) Is the engine equipped with a coolant filter?
   b) How many thermostats are there?

   Purchase these items from Cummins:
   a) The correct thermostat housing gasket.
   b) Fleetguard Part # WF2127 non-chemical coolant filter (if the engine is equipped with a coolant filter).

   The following items are sourced from Evans Cooling Systems, Inc.:
   a) At least 16 gallons of Evans waterless Heavy Duty coolant. If the truck is equipped with an APU, fuel tank heater, and/or a DEF tank heater, add the additional coolant requirements.
   b) Three gallons of Evans Prep Fluid.
   c) Do not add water warning labels.
   d) Refractometer for measuring water content – Evans P/N E2190.
   e) A high-volume air source (rather than high pressure) such as Makita blower Model UB 1101, widely available from the internet. A shop doing installations commercially should consider a Model MB 3CD Master Blaster. A powerful (and clean) shop vac, used in the blower mode, is also an acceptable high-volume air source.
   f. An angled pick for difficult hoses.
   e. Funnels.

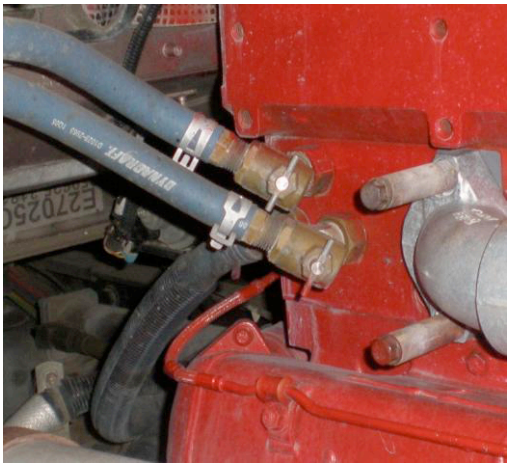
2. Place containers to catch drained coolant.

3. 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.

4. Remove the pressure cap and drain coolant from the bottom of the radiator. Sometimes there is a petcock in the bottom radiator hose.

5. While the coolant is draining, remove the air filter and ducting.

6. Pull off bottom radiator hose completely. Leave it to drain.



Heater hose and transmission cooler connections at cylinder head

7. Draining the heater circuits
   a. Close the manual valves shown on the heater hoses.
   b. Disconnect the heater hoses from the cylinder head end.
   c. Turn the cab heater "on" and set to max temperature.
   d. **If there is a second heater (e.g. for a sleeper cab), turn it on and set it to "max".**
   e. Turn the key "on".
   f. Blow air through both hoses until there is no further flow out the pump inlet.
   g. Insert about a half gallon of Evans Prep Fluid into the heater hose end(s) and blow air.
   h. Turn key off. Leave the manual valves closed for now.

8. If there is a transmission cooler and a coolant hose connection from the engine, open the hose and blow air toward the transmission cooler. Insert about a half gallon of Evans Prep Fluid into the hose end and blow more air. Re-connect the hose.

9. If there are other coolant circuits, such as for an APU, or a DEF tank heater, or for a fuel tank heater, carefully drain them, blow air through them and chase with Prep Fluid.

10. Open the thermostat housing and remove the existing thermostat(s).

11. If there are two thermostats, block the lower thermostat housing hole with a rag.

12. Blow high-volume air into the unblocked thermostat housing hole until coolant stops draining through the bottom hose.

13. Pour a gallon of Evans Prep Fluid into the unblocked thermostat housing hole and then blow high-volume air into the hole until coolant stops draining through the bottom hose.

14. <u>If the engine is equipped with a coolant filter</u>, remove it and blow air into the thermostat housing until no fluid emerges from the filter housing. Install a new non-chemical coolant filter.

15. Re-install the thermostat(s) and reassemble the thermostat housing, using the new thermostat housing gasket.

16. Reattach any hoses; close the bottom radiator hose drain; open the manual heater valves.

17. Police the hose connections to assure that they are tight.

18. Re-install the air filter and associated ducting.

19. Fill the cooling system with Evans Waterless Heavy Duty Coolant. Any remaining Prep Fluid is compatible with Evans HD Coolant.

20. 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.

21. The coolant in the expansion tank will get hot due to the coolant entering the expansion tank from the vent line attached to the thermostat housing. The high temperature assures that the coolant in the expansion tank is well-circulated. A refractometer reading may be taken at the expansion tank under the following conditions:
    - The thermostats are clearly open.
    - The coolant in the expansion tank is hot.
    - No coolant was recently added to the expansion tank.
    - Alternatively, take the reading after several days of operation.

22. Measuring the water content with the refractometer – see the last page.

23. Place the labels to warn against the addition of water or water-based coolant.

24. The equipment is ready for use. Upon cool-down and for a couple of days, small amounts of coolant may be necessary. Don't overfill the expansion tank – leave some room for fluid expansion.

25. Use the same radiator cap without modifications. Although it is possible to run an open-vented system, the pressure cap will give you a virtually "sealed system". Because there will be no vapor component, the pressure will remain quite low within the system (the only pressure will come from the expansion of the liquid against the air in the top of the expansion tank). It is unlikely that the pressure will ever breathe outward and that outside air will enter the system on a cool-down.

26. Bar's Leaks Liquid Aluminum Stop Leak is compatible with Evans waterless coolants and is effective in stopping small leaks.

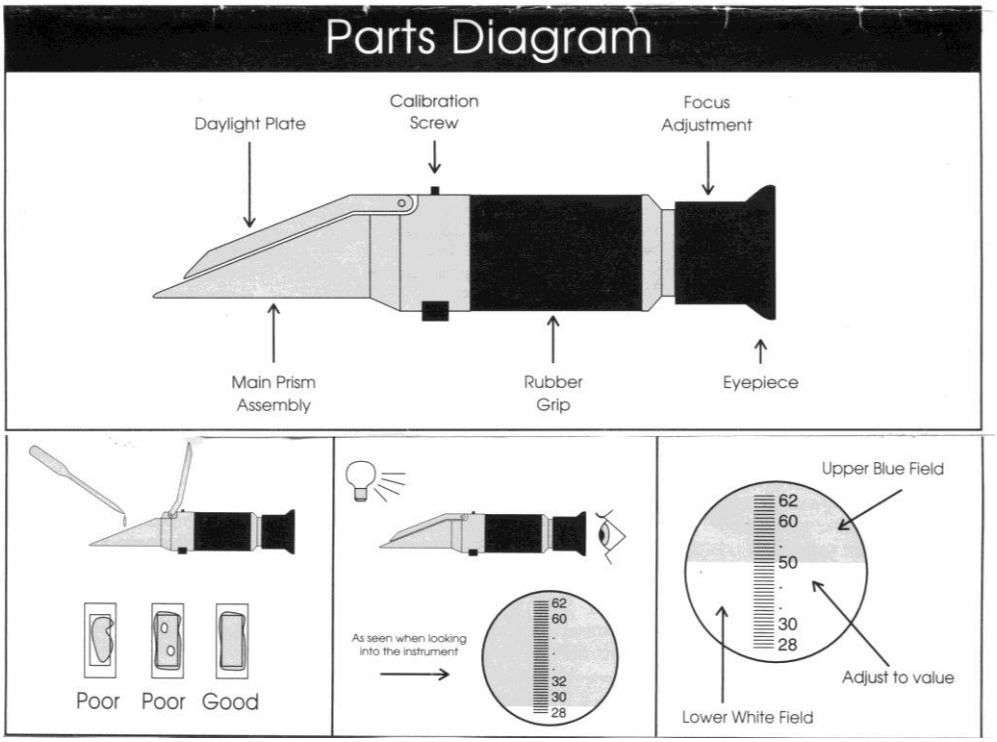
The procedures contained herein are subject to revision as techniques evolve that speed up the work and that conserve materials. The latest revision can be found on www.evanscooling.com.

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.

ºBrix	% 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