

Engine Cooling System Draining, Vacuum Filling and Bleeding
Special Tool(s) / General Equipment

 <p>ST1720-A</p>	<p>ROB75240 Coolant/Battery Refractometer (Fahrenheit)</p>
Fluid Container	
Cooling System Vacuum Tester and Refiller	

Draining

NOTICE: The coolant must be recovered in a suitable, clean container for reuse. If the coolant is contaminated, it must be recycled or disposed of correctly. Using contaminated coolant may result in damage to the engine or cooling system components.

NOTICE: Use the correct coolant. Do not mix coolant types. Mixing coolant types may degrade the coolant corrosion protection and may damage the engine or cooling system. For the correct coolant specified for this vehicle, refer to Specifications.

NOTICE: Always fill the cooling system with the manufacturer's specified coolant. Chemically flush the cooling system if a non-specified coolant has been used. Refer to Cooling System Flushing. Failure to follow these instructions may damage the engine or cooling system.

NOTE: During normal vehicle operation, coolant can change color. As long as the engine coolant is clear and uncontaminated, this color change does not indicate the engine coolant has degraded nor does it require the engine coolant to be drained, the system to be flushed, or the engine coolant to be replaced.

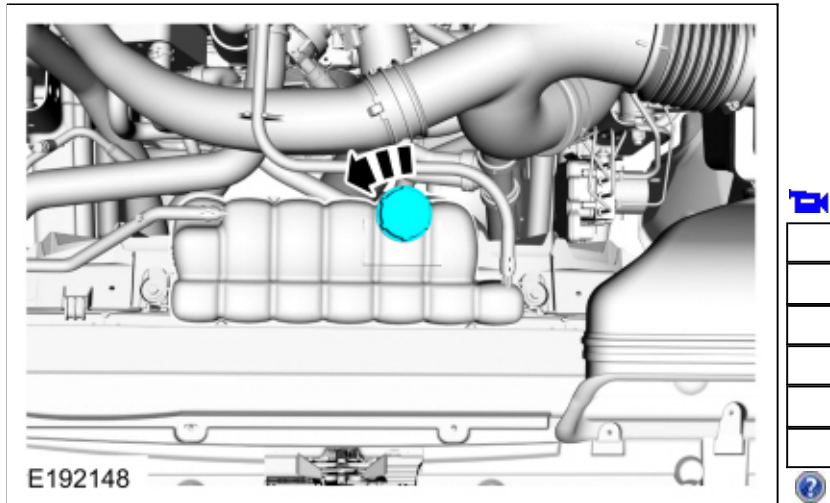
NOTE: Less than 80% of coolant capacity can be recovered with the engine in the vehicle. Dirty, rusty or contaminated coolant requires replacement.

1.



WARNING: When releasing the cooling system pressure, cover the coolant expansion tank cap a thick cloth.

Remove the pressure relief cap.



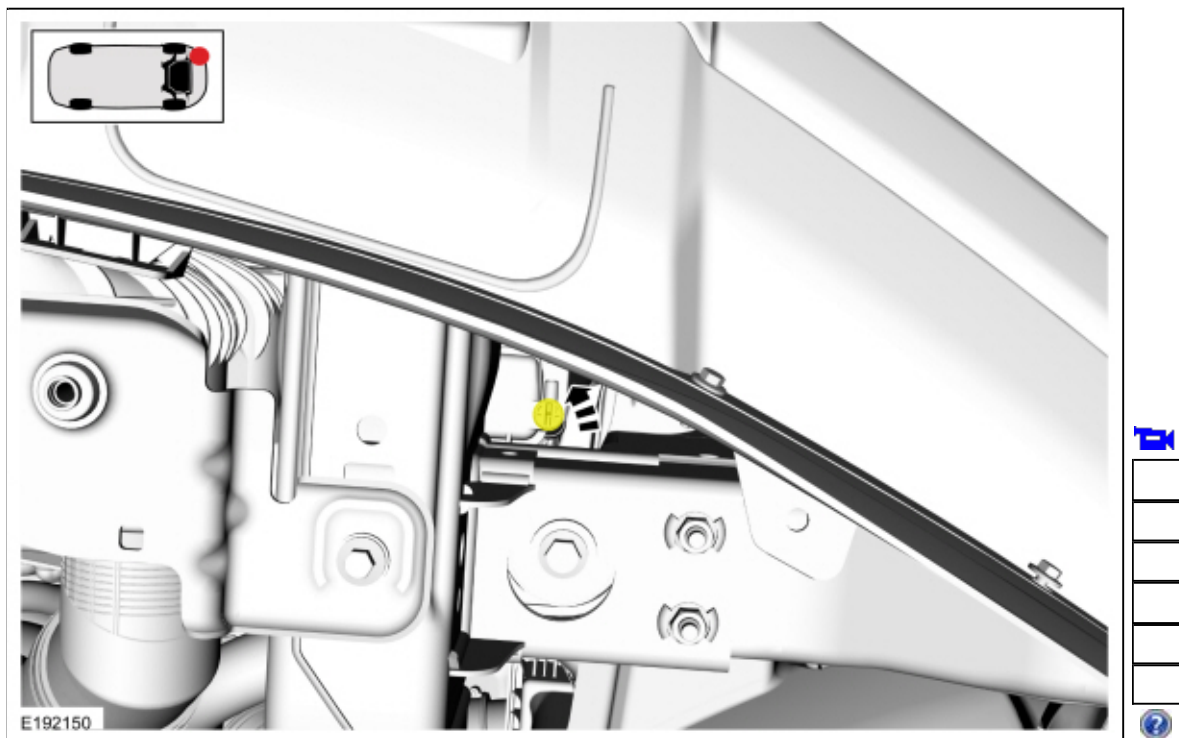
2. Refer to: [Jacking and Lifting - Overview](#) (100-02 Jacking and Lifting, Description and Operation).



⚠ WARNING: Be prepared to collect escaping fluid.

Connect a hose to drain the coolant. Open the radiator drain valve and drain the engine coolant in a suitable, clean container.

Use the General Equipment: Fluid Container



Filling

Filling and Bleeding with a Vacuum Cooling System Filler

1.

- **NOTICE:** Use the correct coolant. Do not mix coolant types. Mixing coolant types may degrade the coolant corrosion protection and may damage the engine or cooling system. For the correct coolant specified for this vehicle, refer to Specifications.

NOTICE: Engine coolant provides boil protection, corrosion protection, freeze protection, and cooling efficiency to the engine and cooling components. In order to obtain these protections, maintain the engine coolant at the correct concentration and fluid level in the degas bottle.

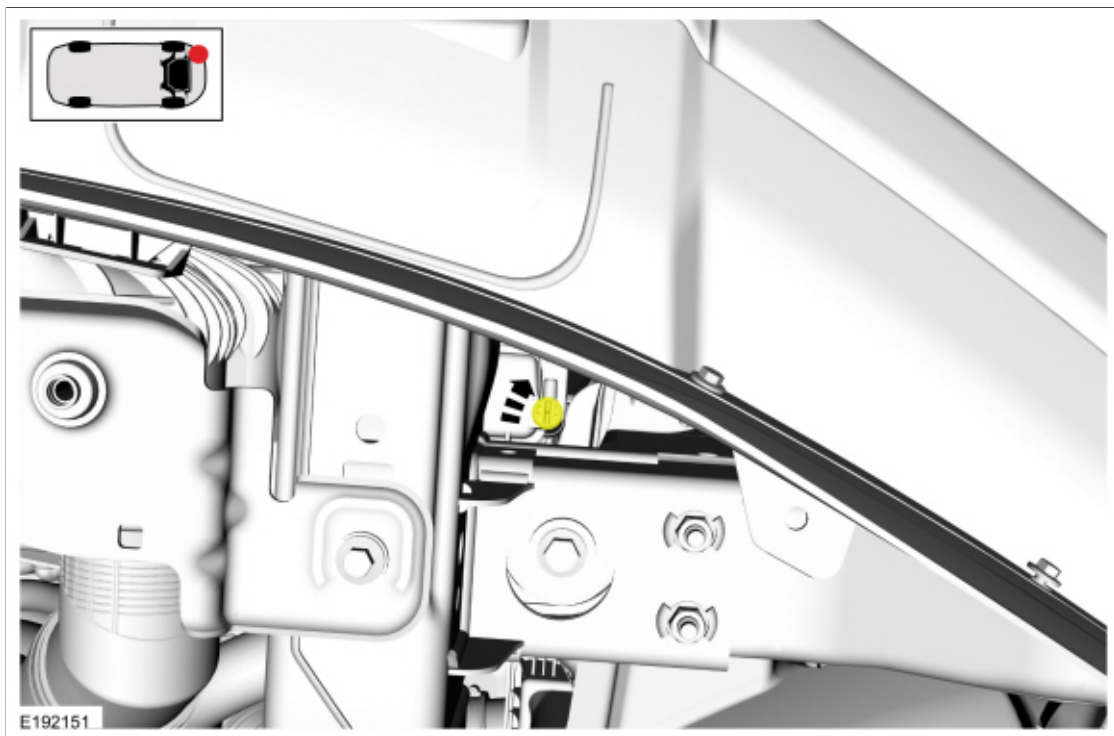
NOTICE: Do not add alcohol, methanol, or brine, or any engine coolants mixed with alcohol or methanol antifreeze. These can cause engine damage from overheating or freezing.

NOTE: Ford Motor Company does NOT recommend the use of recycled engine coolant since a Ford-approved recycling process is not yet available.

When adding or topping off the engine coolant:


- Measure the coolant concentration in the vehicle.
Use Special Service Tool: [ROB75240 Coolant/Battery Refractometer \(Fahrenheit\)](#).
- Determine the concentration desired based on the vehicle duty cycle of extreme hot or cold operating conditions.
- Add, top-off or adjust the coolant to the correct concentration.
Refer to: [Specifications](#) (303-03B Engine Cooling - 3.3L Duratec-V6, Specifications).

2. Close the radiator drain valve.




3. Install the vacuum cooling system filler and follow the manufacturer's instructions to fill and bleed the system.

Use the General Equipment: Cooling System Vacuum Tester and Refiller

4. Fill the degas bottle to the MAX FILL line.
5. Install the degas bottle cap until it contacts the hard stop.
6. Turn the climate control system off.
7. Start the engine and increase the engine speed to 3,500 rpm and hold for 30 seconds.
8. Turn the engine off and wait for 1 minute to purge any large air pockets from the cooling system.
9.  **WARNING: Always allow the engine to cool before opening the cooling system. Do not unscrew the coolant pressure relief cap when the engine is operating or the cooling system is hot. The cooling system is under pressure; steam and hot liquid can come out forcefully when the cap is loosened slightly. Failure to follow these instructions may result in serious personal injury.**

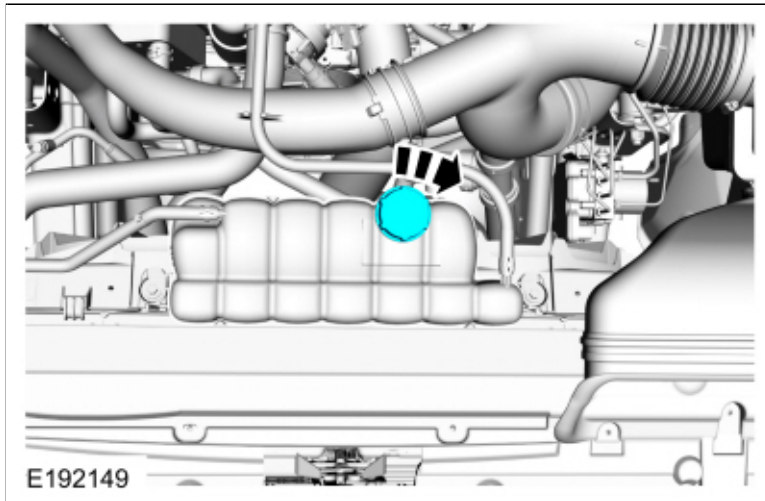
Check the engine coolant level in the degas bottle and if necessary fill to the top of the MAX FILL line on the degas bottle.

10. Start the engine and let it idle until the engine reaches normal operating temperature and the thermostat is fully open. A fully open thermostat is verified by the cooling fan cycling on at least once.
11. Increase the engine speed to 3,500 rpm and hold for 30 seconds.
12. Allow the engine to idle for 30 seconds.
13. Turn the engine off for 1 minute.
14. Repeat steps 11 through 13 a total of 10 times to remove any remaining air trapped in the system.
15.  **WARNING: Always allow the engine to cool before opening the cooling system. Do not unscrew the coolant pressure relief cap when the engine is operating or the cooling system is hot. The cooling system is under pressure; steam and hot liquid can come out forcefully when the cap is loosened slightly. Failure to follow these instructions may result in serious personal injury.**

Check the engine coolant level in the degas bottle and, if necessary, fill to the top of the MAX FILL line on the degas bottle.

16. Install the pressure relief cap until it contacts the hard stop.





Filling and Bleeding without a Vacuum Cooling System Filler

17.

- **NOTICE:** Use the correct coolant. Do not mix coolant types. Mixing coolant types may degrade the coolant corrosion protection and may damage the engine or cooling system. For the correct coolant specified for this vehicle, refer to Specifications.

NOTICE: Engine coolant provides boil protection, corrosion protection, freeze protection, and cooling efficiency to the engine and cooling components. In order to obtain these protections, maintain the engine coolant at the correct concentration and fluid level in the degas bottle.

NOTICE: Do not add alcohol, methanol, or brine, or any engine coolants mixed with alcohol or methanol antifreeze. These can cause engine damage from overheating or freezing.

NOTE: Ford Motor Company does NOT recommend the use of recycled engine coolant since a Ford-approved recycling process is not yet available.

When adding or topping off the engine coolant:

- Measure the coolant concentration in the vehicle.
Use Special Service Tool: [ROB75240 Coolant/Battery Refractometer \(Fahrenheit\)](#).
- Determine the concentration desired based on the vehicle duty cycle of extreme hot or cold operating conditions.
- Add, top-off or adjust the coolant to the correct concentration.
Refer to: [Specifications](#) (303-03B Engine Cooling - 3.3L Duratec-V6, Specifications).

18. Close the radiator drain valve.



19. Fill the degas bottle to the MAX FILL line.
20. Install the degas bottle cap until it contacts the hard stop.
21. Turn the climate control system off.
22. Start the engine and increase the engine speed to 3,500 rpm and hold for 30 seconds.
23. Turn the engine off and wait for 1 minute to purge any large air pockets from the cooling system.
24. **⚠️ WARNING: Always allow the engine to cool before opening the cooling system. Do not unscrew the coolant pressure relief cap when the engine is operating or the cooling system is hot. The cooling system is under pressure; steam and hot liquid can come out forcefully when the cap is loosened slightly. Failure to follow these instructions may result in serious personal injury.**

Check the engine coolant level in the degas bottle and if necessary fill to the top of the MAX FILL line on the degas bottle.
25. Start the engine and let it idle until the engine reaches normal operating temperature and the thermostat is fully open. A fully open thermostat is verified by the cooling fan cycling on at least once.
26. Increase the engine speed to 3,500 rpm and hold for 30 seconds.
27. Allow the engine to idle for 30 seconds.
28. Turn the engine off for 1 minute.
29. Repeat steps 26 through 28 a total of 10 times to remove any remaining air trapped in the system.
30. **⚠️ WARNING: Always allow the engine to cool before opening the cooling system. Do not**

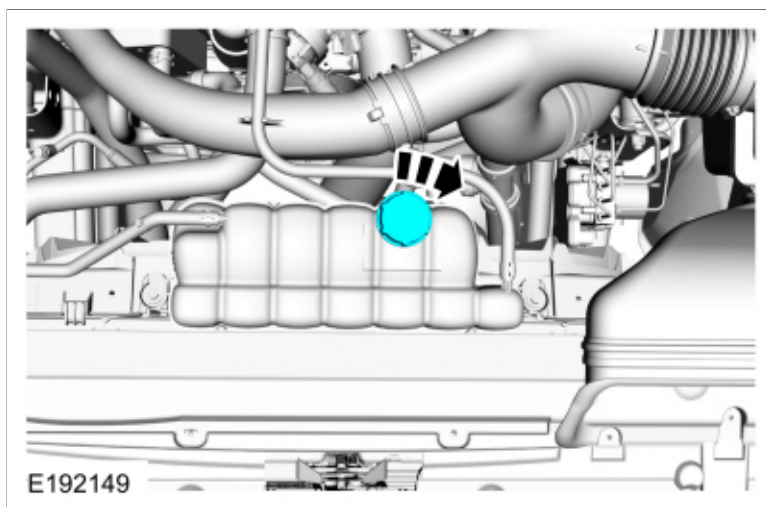
unscrew the coolant pressure relief cap when the engine is operating or the cooling system is hot. The cooling system is under pressure; steam and hot liquid can come out forcefully when the cap is loosened slightly. Failure to follow these instructions may result in serious personal injury.

Check the engine coolant level in the degas bottle and, if necessary, fill to the top of the MAX FILL line on the degas bottle.

31. Select the maximum heater temperature and blower motor speed settings. Position the control to discharge air at A/C vents in instrument panel.
32. Start the engine and allow to idle. While engine is idling, feel for hot air at A/C vents.
33. **NOTICE: If the air discharge remains cool and the Engine Coolant Temperature gauge does not move, the engine coolant level is low and must be filled. Stop the engine, allow the engine to cool and fill cooling system. Failure to follow these instructions may result in damage to the engine.**

Start the engine and allow it to idle until normal operating temperature is reached. Hot air should discharge from A/C vents. The Engine Coolant Temperature (ECT) gauge should maintain a stabilized reading in the middle of the NORMAL range. The upper radiator hose should feel hot to the touch.

34. Shut the engine off and allow the engine to cool.
35. Check the engine coolant level in the degas bottle and fill as necessary.
36. Repeat the previous 4 steps as necessary.
37. Install the pressure relief cap until it contacts the hard stop.



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