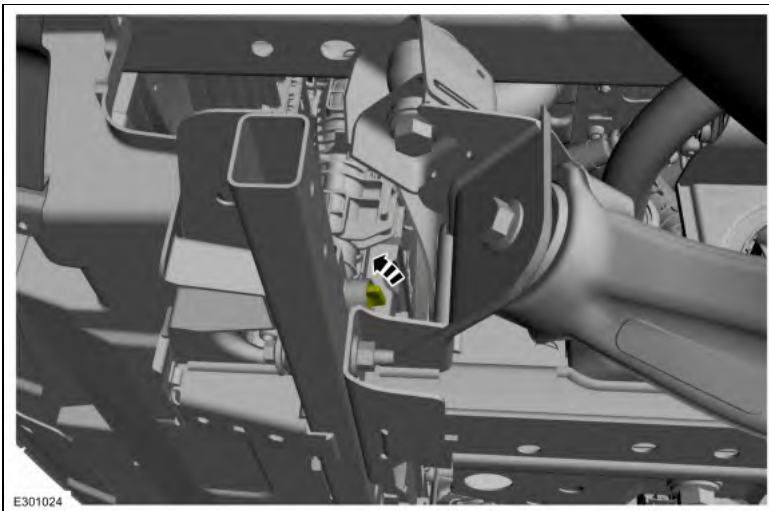




Filling

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.

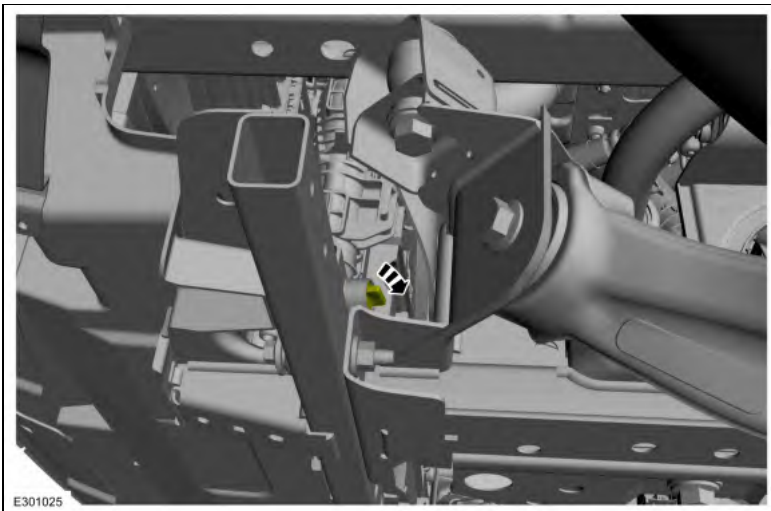
NOTICE: Do not add alcohol, methanol, or brine, or any engine coolants mixed with alcohol or methanol antifreeze. These can cause engine damage from overheating or freezing.

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 (303-03A Engine Cooling - 2.3L EcoBoost (201kW/273PS), Specifications).

2. Close the radiator drain valve.

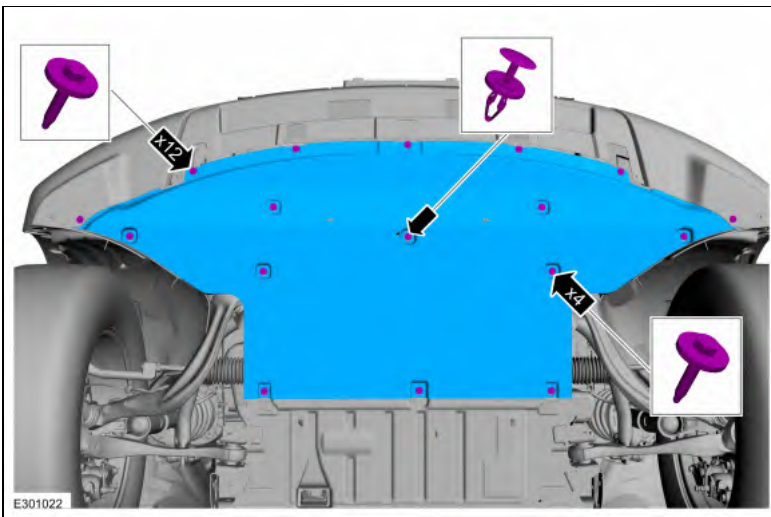


3. Position the radiator air deflector and install the clip.



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4. Install the engine underbodyshield and the retainers.



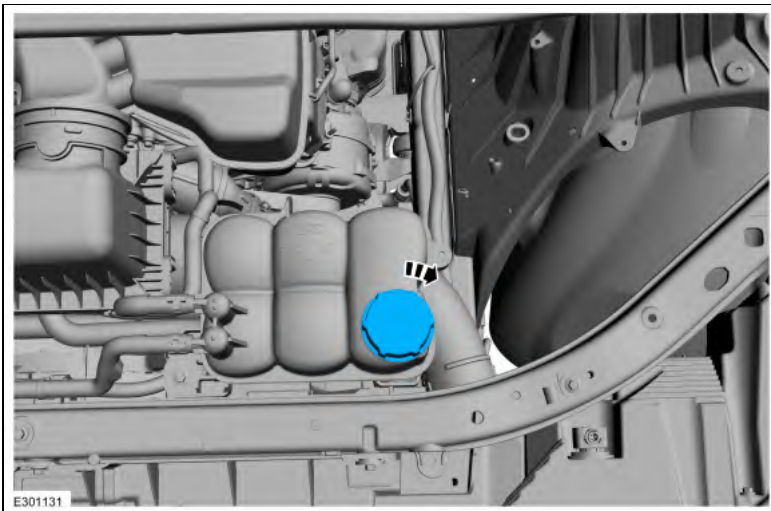
5. Install the vacuum cooling system filler and follow the manufacturer's instructions to fill and bleed the system.
Use the General Equipment: Cooling System Vacuum Tester and Refiller
6. Fill the degas bottle to the MAX FILL line.
7. Install the degas bottle cap until it contacts the hard stop.
8. Turn the climate control system off.
9. Start the engine and increase the engine speed to 3,500 rpm and hold for 30 seconds.
10. Turn the engine off and wait for 1 minute to purge any large air pockets from the cooling system.
11. **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.

12. 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.
13. Increase the engine speed to 3,500 rpm and hold for 30 seconds.
14. Allow the engine to idle for 30 seconds.
15. Turn the engine off for 1 minute.
16. Repeat steps 13 through 15 a total of 10 times to remove any remaining air trapped in the system.
17. **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.

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



Filling and Bleeding without a Vacuum Cooling System Filler

19.

- **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.

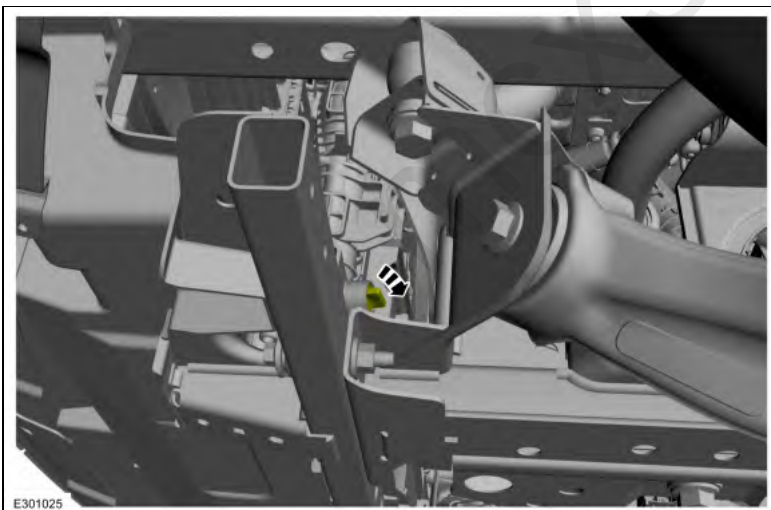
NOTICE: Do not add alcohol, methanol, or brine, or any engine coolants mixed with alcohol or methanol antifreeze. These can cause engine damage from overheating or freezing.

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

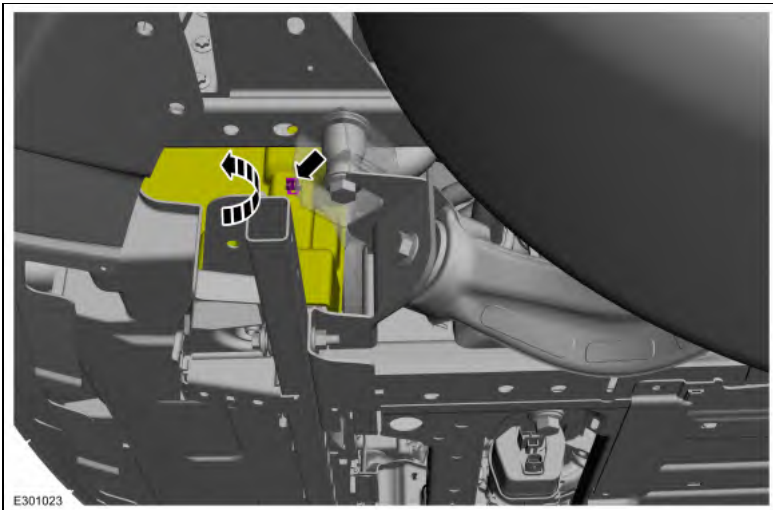
When adding or topping off the engine coolant:

- 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 (303-03A Engine Cooling - 2.3L EcoBoost (201kW/273PS), Specifications).

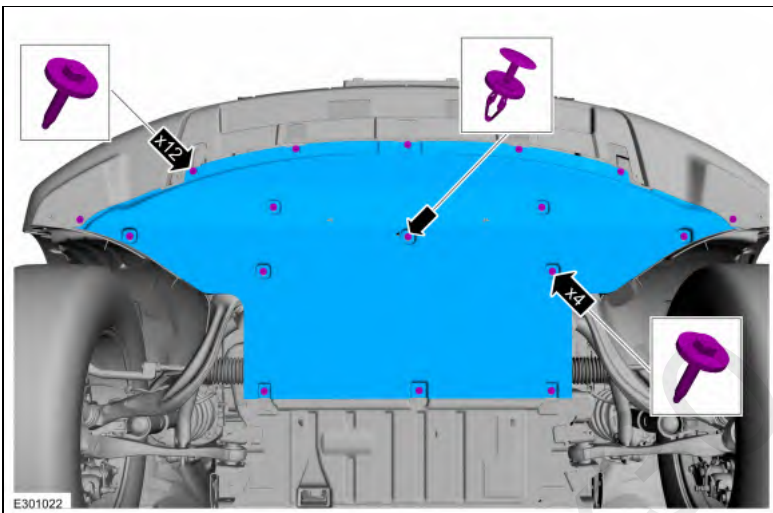
20. Close the radiator drain valve.



21. Position the radiator air deflector and install the clip.



22. Install the engine underbodyshield and the retainers.



23. Fill the degas bottle to the MAX FILL line.

24. Install the degas bottle cap until it contacts the hard stop.

25. Turn the climate control system off.

26. Start the engine and increase the engine speed to 3,500 rpm and hold for 30 seconds.

27. Turn the engine off and wait for 1 minute to purge any large air pockets from the cooling system.

28. ⚠️**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.

29. 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.

30. Increase the engine speed to 3,500 rpm and hold for 30 seconds.

31. Allow the engine to idle for 30 seconds.

32. Turn the engine off for 1 minute.

33. Repeat steps 30 through 32 a total of 10 times to remove any remaining air trapped in the system.

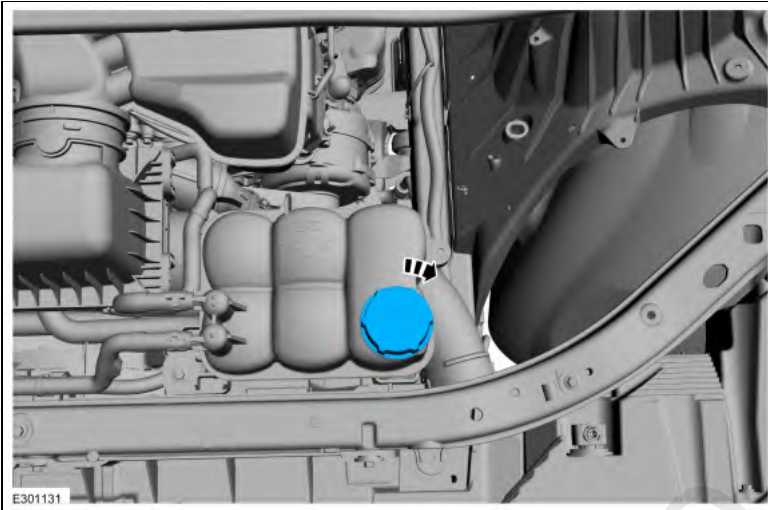
34. ⚠️**WARNING: Always allow the engine to cool before opening the cooling system. Do not unscrew the coolant pressure relief cap when the engine is operating or the cooling system is hot. The cooling system is under pressure; steam and hot liquid can come out forcefully when the cap is loosened slightly. 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.

35. Select the maximum heater temperature and blower motor speed settings. Position the control to discharge air at A/C vents in instrument panel.
36. Start the engine and allow to idle. While engine is idling, feel for hot air at A/C vents.
37. **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.

38. Shut the engine off and allow the engine to cool.
39. Check the engine coolant level in the degas bottle and fill as necessary.
40. Repeat the previous 4 steps as necessary.
41. Install the pressure relief cap until it contacts the hard stop.



Engine Cooling System Flushing

Materials

Name	Specification
Motorcraft® Premium Cooling System Flush VC-1	ESR-M14P7-A

Flushing

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.

NOTE: To remove rust, sludge and other foreign material from the cooling system, use cooling system flush that is safe for use with aluminum radiators. This cleaning restores cooling system efficiency and helps prevent overheating. A pulsating or reversed direction of flushing water will loosen sediment more quickly than a steady flow in the normal coolant flow direction. In severe cases where cleaning solvents will not clean the cooling system efficiently, it will be necessary to use the pressure flushing method using cooling system flusher. Dispose of old coolant and flushing water contaminated with antifreeze and cleaning chemicals in accordance with local, state or federal laws.

1. Add Motorcraft® Premium Cooling System Flush to the cooling system and follow the directions on the package.
Material: Motorcraft® Premium Cooling System Flush / VC-1 (ESR-M14P7-A)
2. Drain the cooling system.
Refer to: Engine Cooling System Draining, Vacuum Filling and Bleeding (303-03C Engine Cooling - 3.3L Duratec-V6, General Procedures).
3. Remove the radiator.
Refer to: Radiator (303-03C Engine Cooling - 3.3L Duratec-V6, Removal and Installation).
4. **NOTICE: Radiator internal pressure must not exceed 138 kPa (20 psi). Damage to the radiator can result.**

Position the radiator upside down and with a high pressure hose in the lower radiator hose opening, backflush the radiator.
5. Remove the thermostat.
Refer to: Thermostat (303-03C Engine Cooling - 3.3L Duratec-V6, Removal and Installation).
6. Install the coolant inlet connection without the thermostat.
Torque: 89 lb.in (10 Nm)
7. Backflush the engine. Position the high-pressure water hose into the engine through the upper radiator hose and backflush the engine.
8. Install the thermostat.
Refer to: Thermostat (303-03C Engine Cooling - 3.3L Duratec-V6, Removal and Installation).
9. Install the radiator.
Refer to: Radiator (303-03C Engine Cooling - 3.3L Duratec-V6, Removal and Installation).
10. Fill and bleed the cooling system.
Refer to: Engine Cooling System Draining, Vacuum Filling and Bleeding (303-03C Engine Cooling - 3.3L Duratec-V6, General Procedures).

