

Material		
Item	Specification	Fill Capacity
Motorcraft® Premium Cooling System Flush VC-1	ESR-M14P7-A	—
Motorcraft® Orange Antifreeze/Coolant Concentrated VC-3-B (US); CVC-3-B2 (Canada)	WSS-M97B44-D	5.136L (5.427 qt) <sup>a</sup>
Motorcraft® Orange Antifreeze/Coolant Prediluted VC-3DIL-B (US); CVC-3DIL-B (Canada)	WSS-M97B44-D2	5.136L (5.427 qt)

<sup>a</sup> 50/50 mixture coolant and distilled water.

### General Specifications

Item	Specification
<b>Pressure Tests</b>	
Charge Air Cooler (CAC) (out of vehicle)	138 kPa (20 psi)
Complete Cooling System Maximum Pressure	165 kPa (24 psi)
Pressure Relief Cap (opening pressure)	110 kPa (16 psi)
Radiator (out of vehicle)	138 kPa (20 psi)

### Torque Specifications

Description	Nm	lb-ft	lb-in
Coolant pump bolt	10	—	89
Coolant pump nuts	11	—	97
Degas bottle bolt	8	—	71
Front bumper bolts	25	18	—
Radiator nuts	25	18	—

## DESCRIPTION AND OPERATION

### Supercharger Cooling

**NOTICE:** The SC cooling system is filled with Motorcraft® Orange Antifreeze/Coolant. Do not mix coolant types. Mixing coolant types degrades the corrosion protection of Motorcraft® Orange Antifreeze/Coolant.

**NOTE:** During normal vehicle operation, Motorcraft® Orange Antifreeze/Coolant may change color from orange to pink or light red. As long as the coolant is clear and uncontaminated, this color change does not indicate the coolant has degraded nor does it require the coolant to be drained, the system to be flushed, or the coolant to be replaced.

**NOTE:** Stop-leak style pellets/products must not be used as an additive in this engine cooling system. The addition of stop-leak style pellets/products can clog or damage the cooling system, resulting in degraded cooling system performance and/or failure.

**NOTE:** The air charge that exits the SC is cooled by the SC cooling system.

The SC cooling system components include the:

- CAC.
- radiator.
- pressure relief cap.
- degas bottle.
- electric coolant pump.

The coolant flows:

- from the CAC to the degas bottle.
- from the degas bottle to the coolant pump.
- from the coolant pump to the radiator.
- from the radiator to the CAC.

For the coolant flow diagram, refer to Section 303-03A.

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

When adding or topping off the engine coolant:

- a. measure the coolant concentration in the vehicle using Coolant/Battery Refractometer 300-ROB75240 or equivalent.
- b. determine the concentration desired based on the vehicle duty cycle of extreme hot or cold operating conditions.
- c. add/top off or adjust the coolant as follows:
  - A. for concentrations measured 48/52 to 50/50 (equates to a freeze point between -34°C (-30°F) and -37°C (-34°F)), use Motorcraft® Orange Antifreeze/Coolant Prediluted to maintain a coolant concentration in this same range.
  - B. for all other concentrations, use Motorcraft® Orange Antifreeze/Coolant Concentrated and/or distilled water to get to the desired concentration. Refer to Supercharger Cooling System Draining, Filling and Bleeding.

When refilling the engine coolant after a flush procedure, use a mixture of Motorcraft® Orange Antifreeze/Coolant Concentrated and distilled water to get to the desired concentration.

To maintain the integrity of the coolant and the cooling system:

- add Motorcraft® Orange Antifreeze/Coolant or equivalent. Do not mix coolant types.
- do not add or mix with any other type of engine coolant. Mixing coolants may degrade the coolant's corrosion protection.
- do not add alcohol, methanol or brine, or any engine coolants mixed with alcohol or methanol antifreeze. These

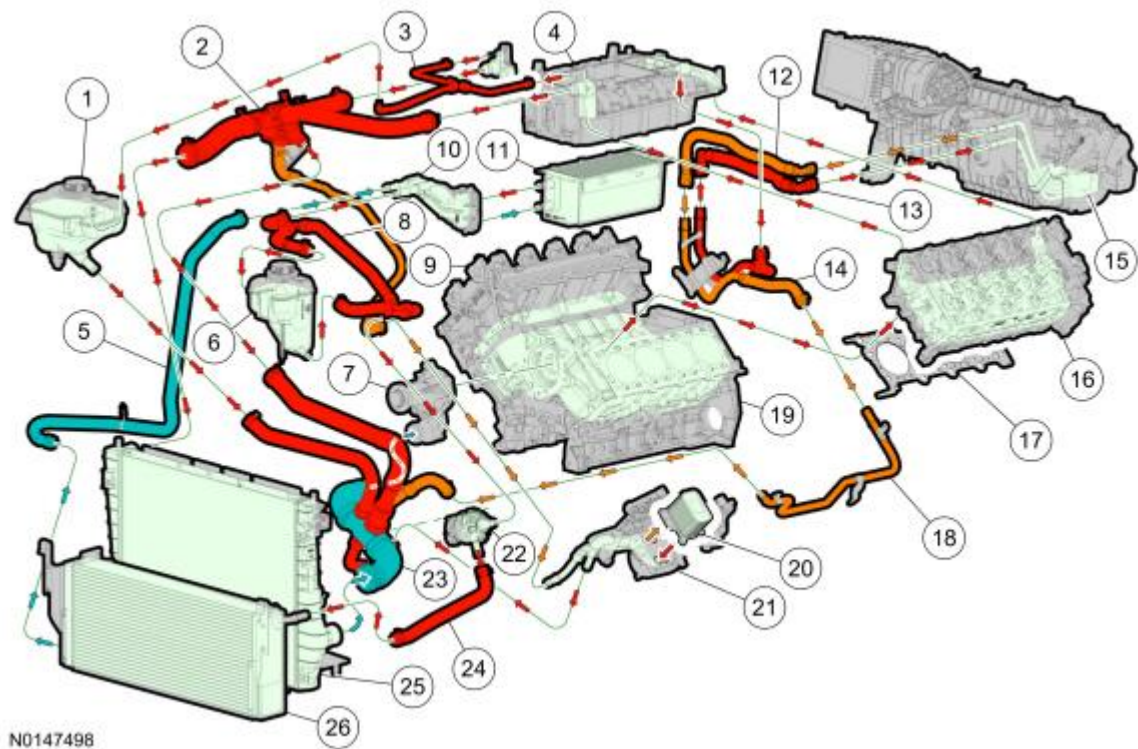
can cause engine damage from overheating or freezing.

- Ford Motor Company does NOT recommend the use of recycled engine coolant in vehicles originally equipped with Motorcraft® Orange Antifreeze/Coolant since a Ford-approved recycling process is not yet available.
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# Coolant Flow Diagram

## 5.8L with Coolant-Cooled Oil Cooler

**NOTE:** At 38°C (100°F) ambient temperature, green arrows indicate coolant temperature below 90°C (194°F), amber arrows indicate coolant temperature approximately 90°C (194°F), red arrows indicate coolant temperature above 90°C (194°F),



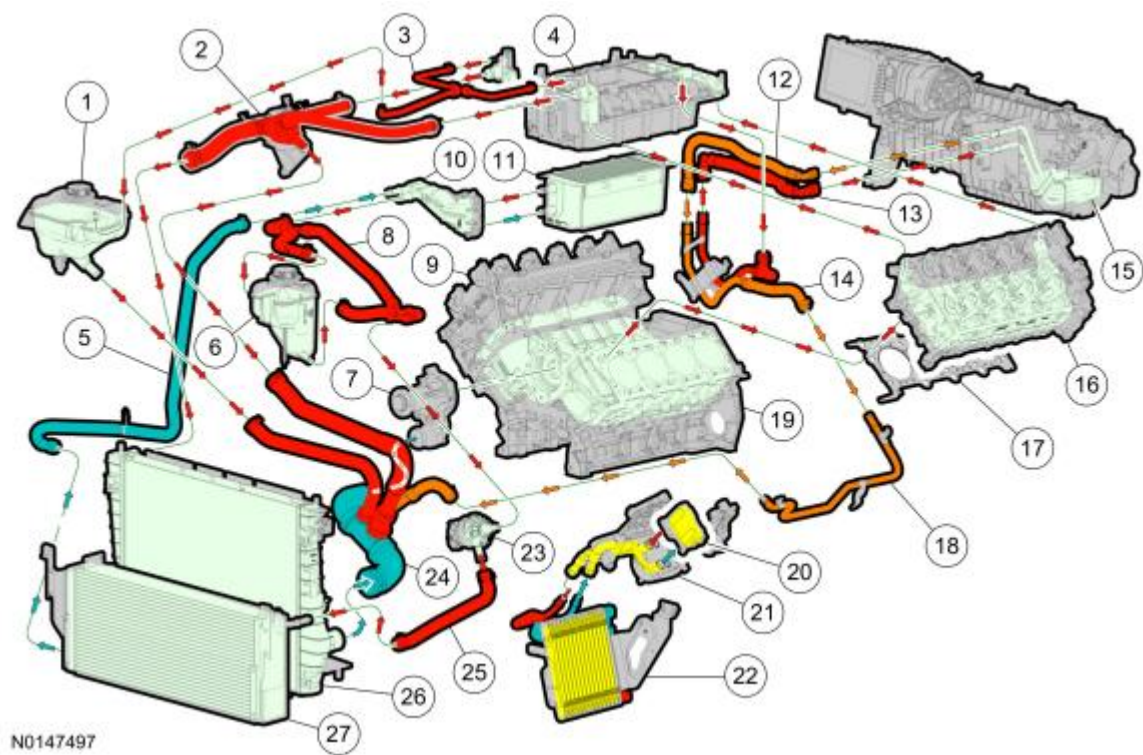
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Item	Part Number	Description
1	8A080	Engine cooling system degas bottle
2	8A586	Thermostat housing and hose assembly
3	8276	Upper intake manifold-to-engine system degas bottle hose
4	9424	Upper intake manifold
5	8D030	Supercharger cooling radiator-to-supercharger cooler hose
6	8D028	Supercharger cooling degas bottle
7	8501	Engine cooling system coolant pump
8	8D029	Supercharger cooling degas bottle-to-supercharger coolant pump hose
9	6049	RH cylinder head
10	9N491	Supercharger tube assembly
11	6K775	Supercharger cooler
12	18K580	Heater core outlet hose
13	18K579	Heater core inlet hose
14	18C553	Heater core hose and tube assembly
15	19B555	Heater core and evaporator housing
16	8050	LH cylinder head
17	6083	LH cylinder head gasket
18	18663	Heater outlet tube
19	6010	Engine block
20	6L635	Oil temperature control thermostat
21	6881	Oil filter adapter
22	6A642	Oil Cooler
23	8K232	Supercharger cooling system coolant pump
24	8B273	Lower radiator hose assembly
25	8K236	Supercharger cooling system coolant pump-to-radiator hose
26	8005	Engine cooling system radiator
27	8009	Supercharging cooling system radiator

# Coolant Flow Diagram

## 5.8L with Air-Cooled Oil Cooler



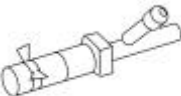

**NOTE:** At 38°C (100°F) ambient temperature, green arrows indicate coolant temperature below 90°C (194°F), amber arrows indicate coolant temperature approximately 90°C (194°F), red arrows indicate coolant temperature above 90°C (194°F),



Item	Part Number	Description
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9	6049	RH cylinder head
10	9N491	Supercharger tube assembly
11	6K775	Supercharger cooler
12	18K580	Heater core outlet hose
13	18K579	Heater core inlet hose
14	18C553	Heater core hose and tube assembly
15	19B555	Heater core and evaporator housing
16	8050	LH cylinder head
17	6083	LH cylinder head gasket
18	18663	Heater outlet tube
19	6010	Engine block
20	6A642	Engine oil cooler
21	6881	Oil filter adapter
22	8K232	Supercharger cooling system coolant pump
23	8B273	Lower radiator hose assembly
24	8K236	Supercharger cooling system coolant pump-to-radiator hose
25	8005	Engine cooling system radiator
26	8009	Supercharging cooling system radiator


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Supercharger Cooling

Special Tool(s)	
 ST3106-A	3-Way HD Antifreeze Coolant Test Kit 328-2050-62291 or equivalent
 ST1720-A	Coolant/Battery Refractometer 300-ROB75240 or equivalent
 ST3280-A	D-Gas Adapter 300-OTC014-R1068 or equivalent
 ST3281-A	Radiator Tester STN12270 or equivalent

Material		
Item		Specification
Motorcraft® Orange Antifreeze/Coolant Concentrated VC-3-B (US); CVC-3-B2 (Canada)		WSS-M97B44-D
Motorcraft® Orange Antifreeze/Coolant Prediluted VC-3DIL-B (US); CVC-3DIL-B (Canada)		WSS-M97B44-D2

Inspection and Verification

 **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.

**NOTICE:** Check the coolant and engine oil levels. Top off the coolant level if needed. If there is engine coolant in the engine oil, the cause must be corrected and the oil changed or major component damage can occur.

**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 Supercharger Cooling System Flushing. Failure to follow these instructions may damage the SC cooling system.



**NOTICE:** The SC cooling system is filled with Motorcraft® Orange Antifreeze/Coolant. Do not mix coolant types. Mixing coolant types degrades the corrosion protection of Motorcraft® Orange Antifreeze/Coolant.


**NOTE:** During normal vehicle operation, Motorcraft Orange Antifreeze/Coolant may change color from orange to pink or light red. As long as the coolant is clear and uncontaminated, this color change does not indicate the coolant has degraded nor does it require the coolant to be drained, the system to be flushed, or the coolant to be replaced.

1. Verify the customer's concern by operating the engine to duplicate the condition.
2. Inspect to determine if any of the following mechanical or electrical concerns apply.

**Visual Inspection Chart**

Mechanical	Electrical
<ul style="list-style-type: none"><li>• Radiator attachments</li><li>• Leaks</li><li>• Damaged hoses</li><li>• Hose clamps</li><li>• Coolant pump</li><li>• Radiator</li><li>• Degas bottle</li><li>• Coolant pump bracket</li></ul>	<ul style="list-style-type: none"><li>• Damaged coolant pump wiring</li></ul>

3. If the inspection reveals an obvious concern that can be readily identified, repair it as necessary.
4. Inspect the coolant condition in the following sequence:

1.  **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.

Allow the engine to cool. Once pressure is released, remove the pressure relief cap.

2. **NOTICE:** The Supercharger (SC) cooling system is filled with Motorcraft® Orange Antifreeze/Coolant. Do not mix coolant types. Mixing coolant types degrades the corrosion protection of Motorcraft® Orange Antifreeze/Coolant.

Inspect the coolant appearance:

- Discoloration may indicate that incorrect coolant may have been added to the system. Use of incorrect (green or yellow in color) coolant degrades the corrosion protection of Motorcraft® Orange Antifreeze/Coolant. Addition of Motorcraft® Specialty Green Engine Coolant may cause the color to appear to be a murky green-brown color. The addition of Motorcraft® Premium Gold Coolant, however, may not change the color or appearance of the orange colored coolant. Detection of contamination with Premium Gold Engine Coolant is determined by the presence of nitrite. If contamination with Motorcraft® Premium Gold Engine Coolant is suspected, test the coolant with the 3-Way HD Antifreeze Coolant Test Kit. Follow the nitrite testing directions in the kit to determine if nitrite is present in the system. If nitrite is present, flush the system and refill with the correct mixture of distilled water and Motorcraft® Orange Antifreeze/Coolant. Refer to Supercharger Cooling System Flushing.
- A darker orange with the presence of debris could indicate a commercially available stop leak may have been used and could result in loss of coolant flow to critical parts of the engine. If sediment is present in the coolant sample, flush the system and refill with the correct mixture of distilled water and Motorcraft® Orange Antifreeze/Coolant. Refer to Supercharger Cooling System Flushing.
- A light or reddish brown color indicates that rust may be present in the cooling system. Flush the system and refill with the correct mixture of distilled water and Motorcraft® Orange Antifreeze/Coolant. Refer to Supercharger Cooling System Flushing.


3. If the coolant appearance is acceptable, test the coolant freezing point range with the Coolant/Battery Refractometer. The coolant concentration should be maintained within 48% to 50%, which equates to a freeze point between -34°C (-30°F) and -37°C (-34°F). If the vehicle is driven in cold climates less than -37°C (-34°F), it may be necessary to increase the coolant concentration to get adequate freeze protection. Recommended coolant concentration is 48/52 to 50/50 (freeze protection -34°C (-30°F) and -37°C (-34°F)) engine coolant to distilled water.
  - Maximum coolant concentration is 60/40 for cold weather areas.
  - Minimum coolant concentration is 40/60 for warm weather areas.
4. Check the coolant system conditions:
  - If the coolant level is low, add Motorcraft® Orange Antifreeze/Coolant Prediluted.
  - If the coolant tests weak, remove some of the coolant and add Motorcraft® Orange Antifreeze/Coolant Concentrated until the readings are within acceptable levels.
  - If the coolant tests strong, remove some of the coolant and add distilled water until readings are within acceptable levels.
5. If the concern remains after the inspection, determine the symptom(s). GO to Symptom Chart.
6. Verify the cooling system is correctly filled and bled. Refer to Supercharger Cooling System Draining, Filling and Bleeding.

## Symptom Chart

Symptom Chart		
Condition	Possible Sources	Action
<ul style="list-style-type: none"> <li>Loss of coolant</li> </ul>	<ul style="list-style-type: none"> <li>Pressure relief cap</li> <li>Degas bottle</li> <li>Coolant hoses</li> <li>Radiator</li> <li>Coolant pump</li> <li>Charge Air Cooler (CAC)</li> </ul>	<ul style="list-style-type: none"> <li>CARRY OUT the Pressure Test component test.</li> </ul>

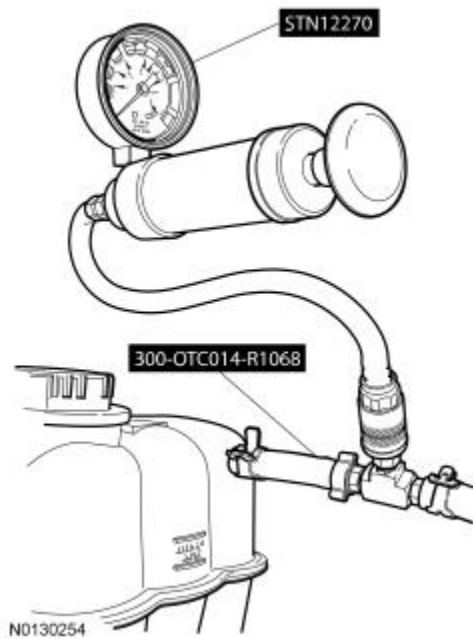
## Component Tests

### Pressure Test

1. Turn the engine OFF.
2.  **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 coolant level. Refer to Supercharger Cooling System Draining, Filling and Bleeding.

3. Connect the D-Gas Adapter to the degas bottle nipple. Install the Radiator Tester to the quick connect fitting of the D-Gas Adapter.



4. **NOTE:** If the plunger of the pump is pressed too fast, an erroneous pressure reading will result.

Slowly press the plunger of the pressure test pump until the pressure gauge reading stops increasing and note the highest pressure reading obtained.

5. If the pressure relief cap does not hold pressure, remove and wash the pressure relief cap in clean water to dislodge all foreign particles from the gaskets. Check the sealing surface in the filler neck.
6. If 110 kPa (16 psi) cannot be reached, install a new pressure relief cap. If more than 165 kPa (24 psi) shows on the gauge, install a new pressure relief cap.
7. **NOTE:** If the pressure drops, check for leaks at the CAC hoses or other system components and connections. Any leaks which are found must be corrected and the system rechecked.

**NOTE:** The SC system is not connected to the main engine cooling system.

Pressurize the SC cooling system as described in Step 4 (using a pressure relief cap that operates within the specified upper and lower pressure limits). Observe the gauge reading for approximately 2 minutes; refer to General Specifications. Pressure should not drop during this time.

- If the pressure drops and no external leak is found, the CAC may be the cause. Remove and inspect the CAC. Install a new CAC if necessary.

8. Release the system pressure by loosening the pressure relief cap. Check the coolant level and replenish, if necessary, with the correct coolant mixture. Refer to Supercharger Cooling System Draining, Filling and Bleeding.


#### Radiator Leak Test, Removed From the Vehicle

**NOTICE:** Never leak test an aluminum radiator or CAC in the same water that copper/brass radiators are tested in. Flux and caustic cleaners may be present in the tank and they will damage aluminum components.

**NOTE:** Clean the radiator or CAC before leak testing to avoid contamination of tank.


1. Leak test the radiator or CAC in clean water with air pressurized to the maximum pressure listed in the Specifications.

Supercharger Cooling System Draining, Filling and Bleeding

Special Tool(s)	
	Airlift Cooling System Tester UVU550000 or equivalent

Material	
Item	Specification
Motorcraft® Orange Antifreeze/Coolant Concentrated VC-3-B (US); CVC-3-B2 (Canada)	WSS-M97B44-D
Motorcraft® Orange Antifreeze/Coolant Prediluted VC-3DIL-B (US); CVC-3DIL-B (Canada)	WSS-M97B44-D2

Draining

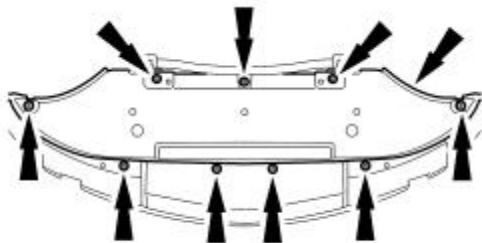
 **WARNING:** Always allow the engine to cool before opening the cooling system. Do not unscrew the coolant pressure relief cap when the engine is operating or the cooling system is hot. The cooling system is under pressure; steam and hot liquid can come out forcefully when the cap is loosened slightly. Failure to follow these instructions may result in serious personal injury.

**NOTICE:** Recover the coolant in a suitable, clean container for reuse. If the coolant is contaminated, recycle or dispose of it correctly. Using contaminated coolant may result in damage to the cooling system components.

**NOTICE:** The SC cooling system is filled with Motorcraft® Orange Antifreeze/Coolant. Mixing coolant types degrades the corrosion protection of Motorcraft® Orange Antifreeze/Coolant.

**NOTE:** Dirty, rusty or contaminated coolant requires replacement.

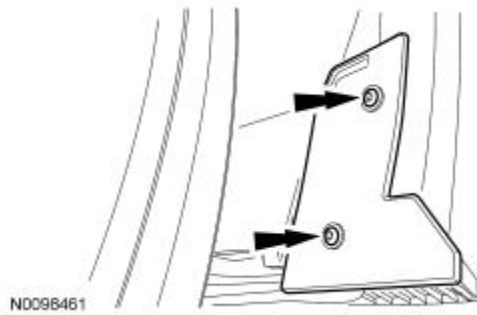
1. With the vehicle in NEUTRAL, position it on a hoist. Refer to Section 100-02.
2. Remove the 9 bolts and the lower splash shield.



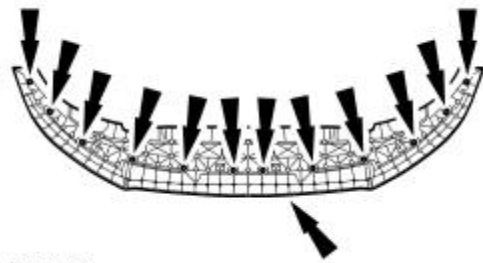
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3. **NOTE:** RH shown, LH similar.

Remove the 2 RH and the 2 LH screws.



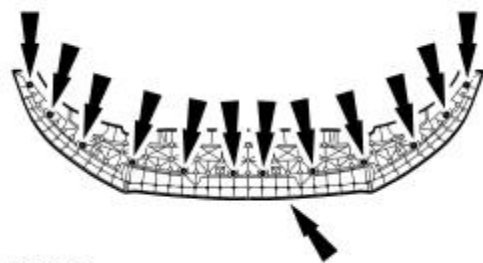
4. Remove the 12 bolts and the front bumper cover lower valance.



5. Disconnect the radiator-to- CAC hose from the radiator and allow the coolant to drain in a suitable container.

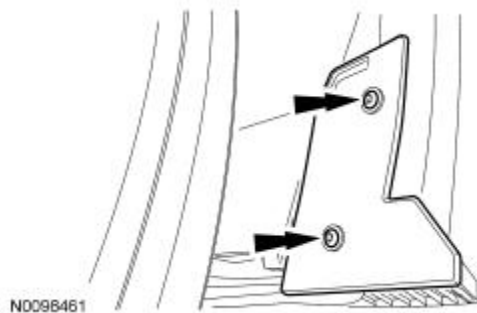
### Filling and Bleeding with a Vacuum Cooling System Refiller

1. Connect the radiator-to- CAC hose to the radiator.
2. Install the front bumper cover lower valance and the 12 bolts.

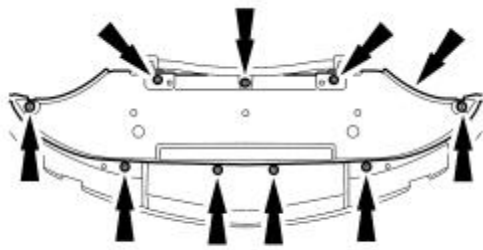


3. **NOTE:** RH shown, LH similar.

Install the 2 RH and the 2 LH screws.



4. Install the lower splash shield and the 9 bolts.



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5. **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.

To maintain the integrity of the coolant and the cooling system:

- Add Motorcraft® Orange Antifreeze/Coolant or equivalent. Do not mix coolant types.
- Do not add or mix with any other type of engine coolant. Mixing coolants may degrade the coolant's corrosion protection.
- 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.
- Ford Motor Company does NOT recommend the use of recycled engine coolant in vehicles originally equipped with Motorcraft® Orange Antifreeze/Coolant since a Ford-approved recycling process is not yet available.

**NOTICE:** Stop-leak style pellets/products must not be used as an additive in this engine cooling system. The addition of stop-leak style pellets/products can clog or damage the cooling system resulting in degraded cooling system performance and/or failure.

Install the vacuum cooling system filler and follow the manufacturer's instructions to fill and bleed the cooling system. When adding or topping off the engine coolant:

5. Measure the coolant concentration in the vehicle using Coolant/Battery Refractometer 300-ROB75240 or equivalent.
- Determine the concentration desired based on the vehicle duty cycle of extreme hot or cold operating conditions.
3. Add/top off or adjust the coolant as follows:
- For concentrations measured 48/52 to 50/50 (equates to a freeze point between -34°C (-30°F) and -37°C (-34°F)), use Motorcraft® Orange Antifreeze/Coolant Prediluted to maintain a coolant concentration in this same range.
  - For all other concentrations, use Motorcraft® Orange Antifreeze/Coolant Concentrated and/or distilled water to get to the desired concentration.
  - When refilling the engine coolant after a flush procedure, use a mixture of Motorcraft® Orange Antifreeze/Coolant Concentrated and distilled water to get to the desired concentration.
4. Recommended coolant concentration is 48/52 to 50/50 (freeze protection -34°C (-30°F) and -37°C (-34°F)) engine coolant to distilled water.
5. For extremely cold climates (less than -37°C (-34°F)):
- It may be necessary to increase the coolant concentration above 50%.
  - NEVER increase the coolant concentration above 60%.
  - Maximum coolant concentration is 60/40 for cold weather areas.
  - A coolant concentration of 60% provides freeze point protection down to -50°C (-58°F).
  - Engine coolant concentration above 60% will decrease the overheat protection characteristics of the engine coolant and may damage the engine.
6. For extremely hot climates:
- It is still necessary to maintain the coolant concentration above 40%.
  - NEVER decrease the coolant concentration below 40%.
  - Minimum coolant concentration is 40/60 for warm weather areas.
  - A coolant concentration of 40% provides freeze point protection down to -34°C (-30°F).

- Engine coolant concentration below 40% will decrease the corrosion and freeze protection characteristics of the engine coolant and may damage the engine.

7. Vehicles driven year-round in non-extreme climates should use a 48/52 to 50/50 (freeze protection -34°C (-30°F) and -37°C (-34°F)) mixture of engine coolant and distilled water for optimum cooling system and engine protection.



6. Install the vacuum cooling system refiller and follow the manufacturer's instructions to fill and bleed the cooling system.

### Filling and Bleeding without a Vacuum Cooling System Refiller

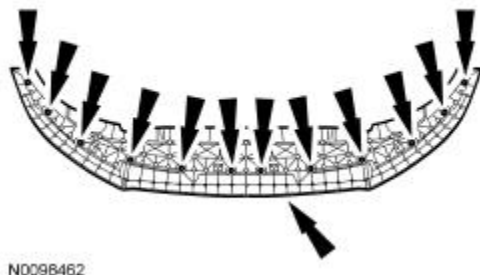
**NOTICE:** Coolant provides boil protection, corrosion protection, freeze protection, and cooling efficiency to the engine and cooling components. In order to obtain these protections, maintain the engine coolant at the correct concentration and fluid level in the degas bottle.

To maintain the integrity of the coolant and the cooling system:

- Add Motorcraft® Orange Antifreeze/Coolant or equivalent. Do not mix coolant types.
- Do not add or mix with any other type of engine coolant. Mixing coolants may degrade the coolant's corrosion protection.
- 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.
- Ford Motor Company does NOT recommend the use of recycled engine coolant in vehicles originally equipped with Motorcraft® Orange Antifreeze/Coolant since a Ford-approved recycling process is not yet available.

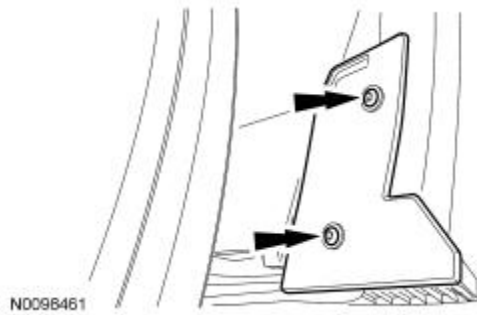
**NOTICE:** Do not use stop-leak style pellets/products as an additive in this engine cooling system. The addition of stop-leak style pellets/products can clog or damage the cooling system resulting in degraded cooling system performance and/or failure.

1. Connect the radiator-to- CAC hose to the radiator.
2. Install the front bumper cover lower valance and the 12 bolts.

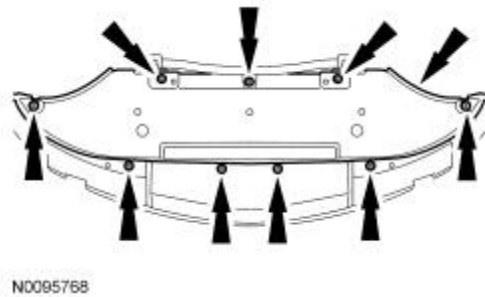


3. **NOTE:** RH shown, LH similar.

Install the 2 RH and the 2 LH screws.



4. Install the lower splash shield and the 9 bolts.



5. **NOTE:** Make sure the coolant flows from the radiator through the upper radiator hose and fills the engine. When full, coolant should flow from the bleed hole.

Fill the system through the degas bottle.

When adding or topping off the engine coolant:

1. Measure the coolant concentration in the vehicle using Coolant/Battery Refractometer 300-ROB75240 or equivalent.
2. Determine the concentration desired based on the vehicle duty cycle of extreme hot or cold operating conditions.
3. Add/top off or adjust the coolant as follows:
  - For concentrations measured 48/52 to 50/50 (equates to a freeze point between  $-34^{\circ}\text{C}$  ( $-30^{\circ}\text{F}$ ) and  $-37^{\circ}\text{C}$  ( $-34^{\circ}\text{F}$ )), use Motorcraft® Orange Antifreeze/Coolant Prediluted to maintain a coolant concentration in this same range.
  - For all other concentrations, use Motorcraft® Orange Antifreeze/Coolant Concentrated and/or distilled water to get to the desired concentration.
  - When refilling the engine coolant after a flush procedure, use a mixture of Motorcraft® Orange Antifreeze/Coolant Concentrated and distilled water to get to the desired concentration.
4. Recommended coolant concentration is 48/52 to 50/50 (freeze protection  $-34^{\circ}\text{C}$  ( $-30^{\circ}\text{F}$ ) and  $-37^{\circ}\text{C}$  ( $-34^{\circ}\text{F}$ )) engine coolant to distilled water.
5. For extremely cold climates (less than  $-37^{\circ}\text{C}$  ( $-34^{\circ}\text{F}$ )):
  - It may be necessary to increase the coolant concentration above 50%.
  - NEVER increase the coolant concentration above 60%.
  - Maximum coolant concentration is 60/40 for cold weather areas.
  - A coolant concentration of 60% provides freeze point protection down to  $-50^{\circ}\text{C}$  ( $-58^{\circ}\text{F}$ ).
  - Engine coolant concentration above 60% will decrease the overheat protection characteristics of the engine coolant and may damage the engine.
6. For extremely hot climates:
  - It is still necessary to maintain the coolant concentration above 40%.
  - NEVER decrease the coolant concentration below 40%.
  - Minimum coolant concentration is 40/60 for warm weather areas.
  - A coolant concentration of 40% provides freeze point protection down to  $-34^{\circ}\text{C}$  ( $-30^{\circ}\text{F}$ ).
  - Engine coolant concentration below 40% will decrease the corrosion and freeze protection characteristics of the engine coolant and may damage the engine.

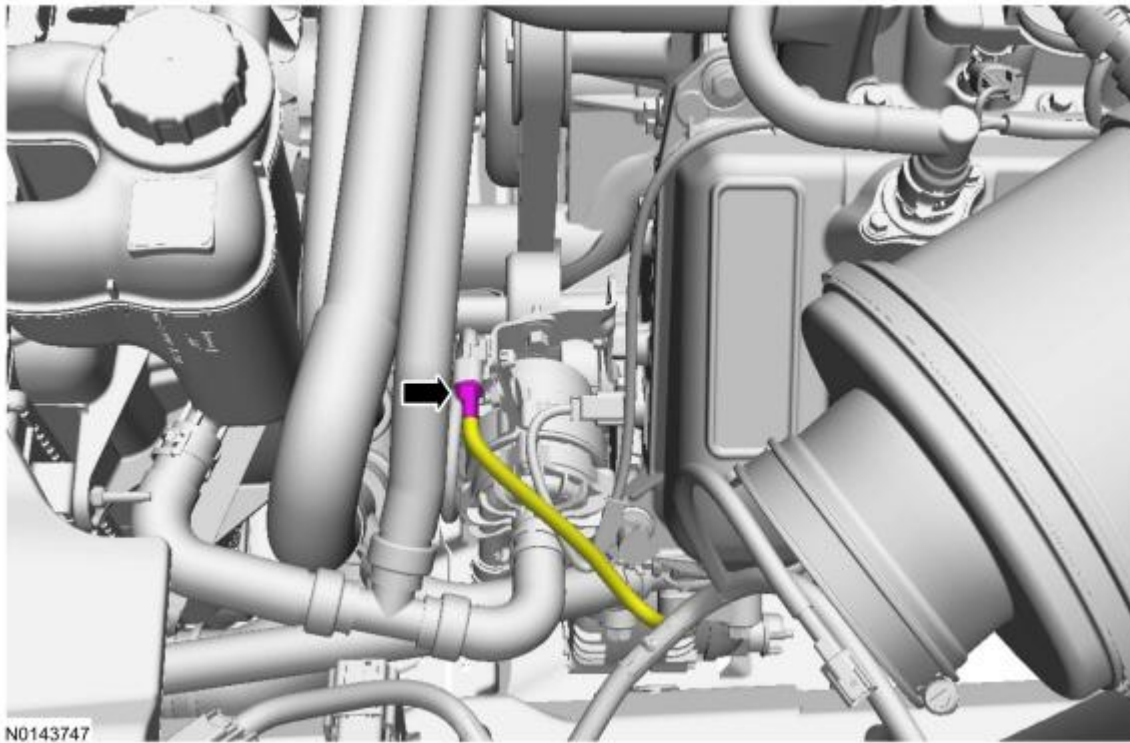


7. Vehicles driven year-round in non-extreme climates should use a 48/52 to 50/50 (freeze protection -34°C (-30°F) and -37°C (-34°F)) mixture of engine coolant and distilled water for optimum cooling system and engine protection.
  6. Start the engine and allow to run until coolant circulation is observed in the degas bottle. Absence of circulation indicates air is trapped in the system.
    - Turn the engine off.
  7. Add coolant as needed.
  8. Repeat the above procedure to make sure all entrapped air is released.
-

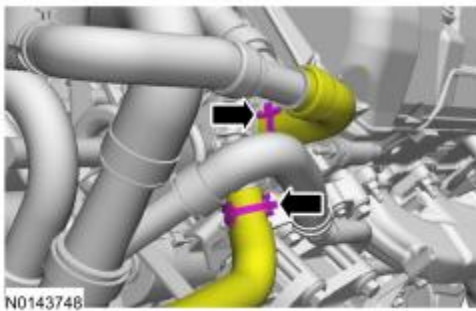
### Coolant Pump

#### Removal

1. Remove the ACL housing and the ACL inlet pipe. Refer to Section 303-12.
2. Drain the SC cooling system. Refer to Supercharger Cooling System Draining, Filling and Bleeding.
- 3.

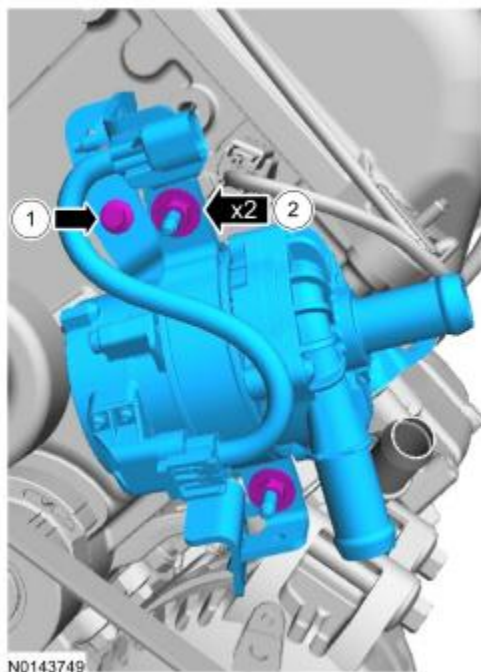


4.



5.

1. To install, tighten to 10 Nm (89 lb-in).
2. To install, tighten to 11 Nm (97 lb-in).



## Installation

1. To install, reverse the removal procedure.
  2. Fill and bleed the SC cooling system. Refer to Supercharger Cooling System Draining, Filling and Bleeding.
-

# Degas Bottle


## General Equipment

Hose Clamping Pliers

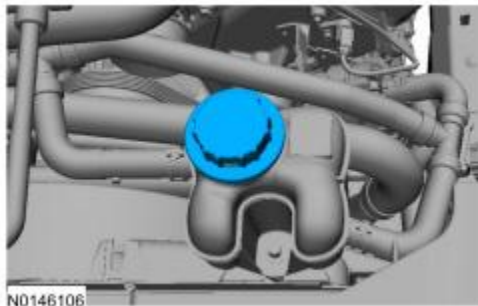
Syringe

Hose Clamp Remover/Installer

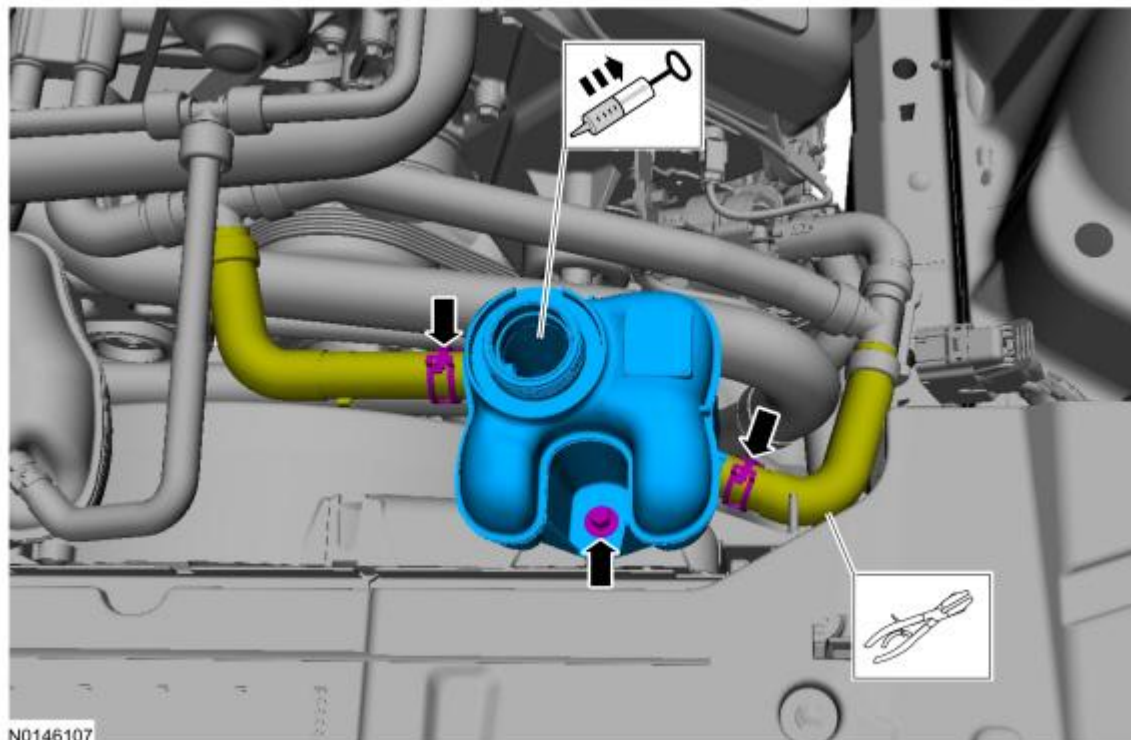
## Removal

-  **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.

Release the pressure in the cooling system by slowly turning the pressure relief cap one half turn counterclockwise. When the pressure is released, remove the pressure relief cap.



- General Equipment: Hose Clamping Pliers.  
Extract the fluid with a syringe.  
General Equipment: Hose Clamp Remover/Installer.
  - To install, tighten to 8 Nm (71 lb-in).



## Installation

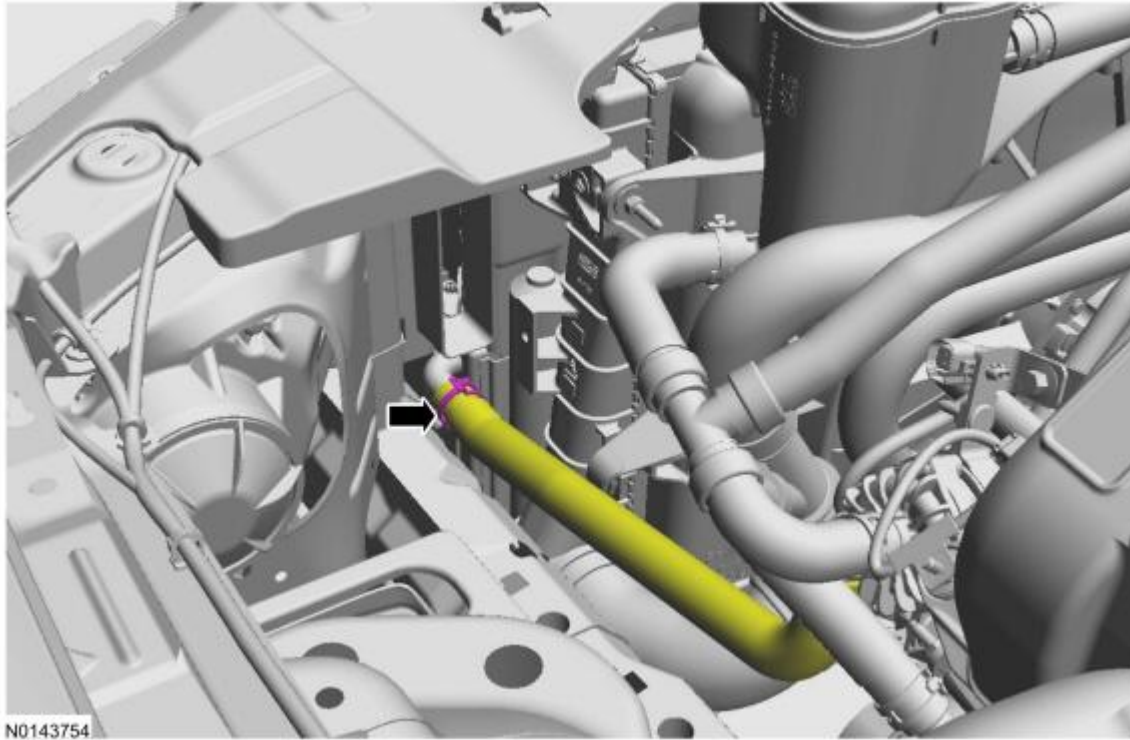
1. To install, reverse the removal procedure.
  2. Fill the degas bottle. For additional information, refer to Supercharger Cooling System Draining, Filling and Bleeding for the recommended coolant mixture and fill level.
-

# Radiator

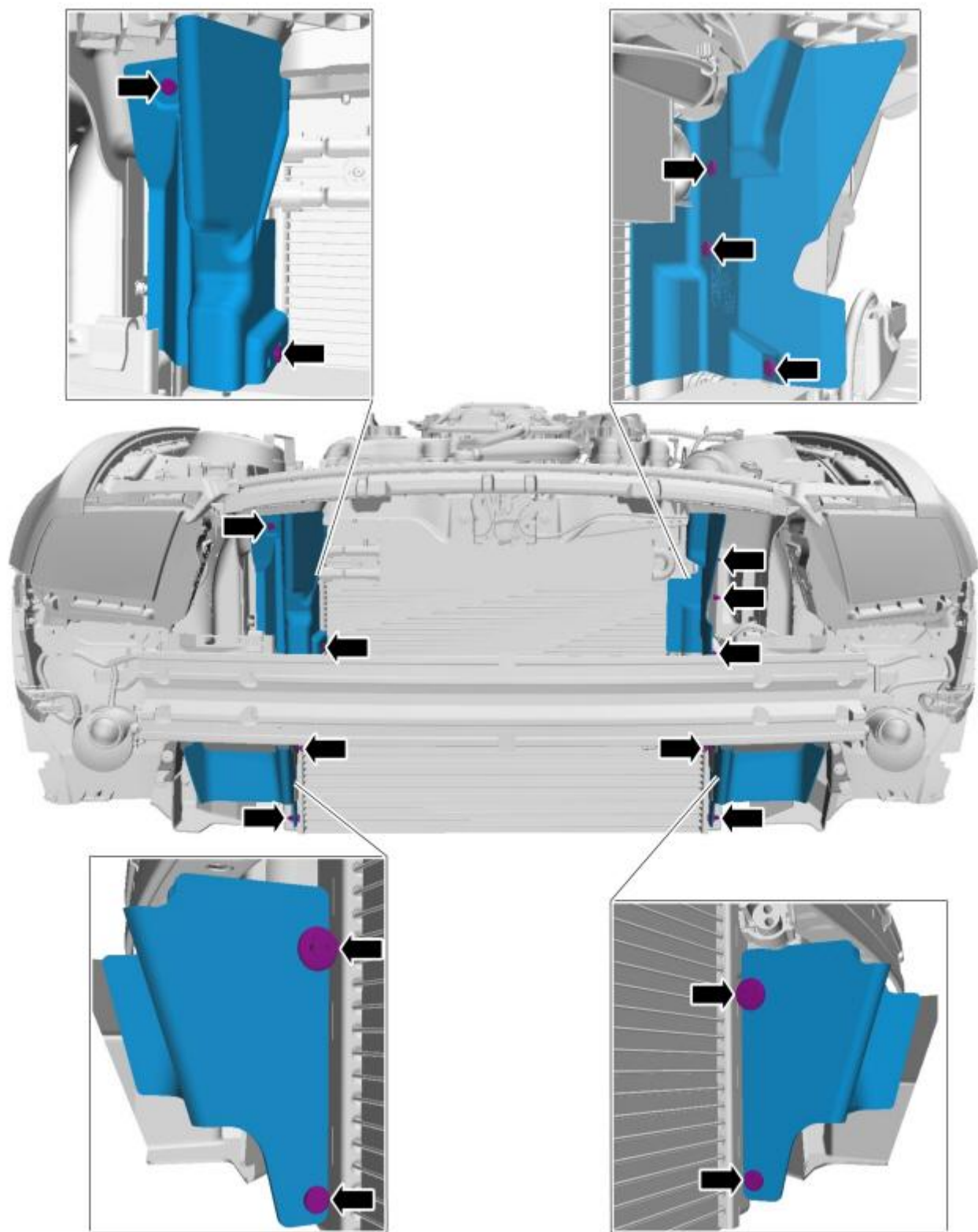
## Removal

**NOTE:** Removal steps in this procedure may contain installation details.

1. Remove the front bumper cover. Refer to Section 501-19.
2. Drain the SC cooling system. Refer to Supercharger Cooling System Draining, Filling and Bleeding.
3. Remove the ACL housing and the ACL inlet pipe. Refer to Section 303-12.
- 4.

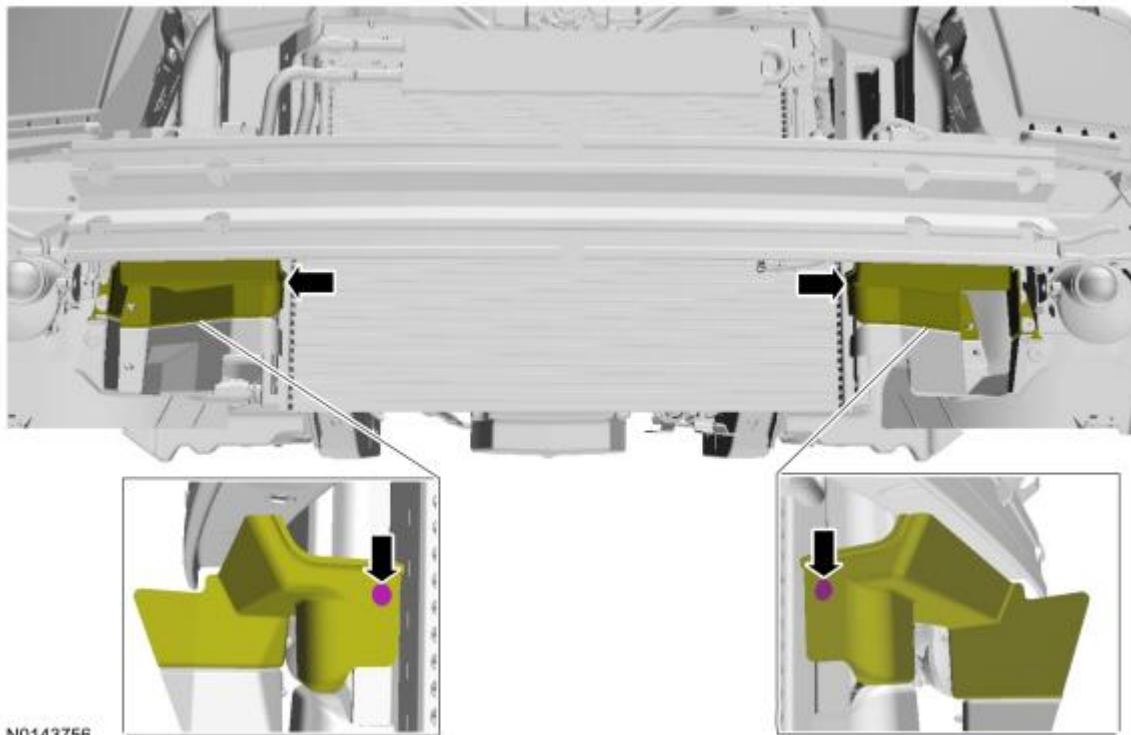


- 5.



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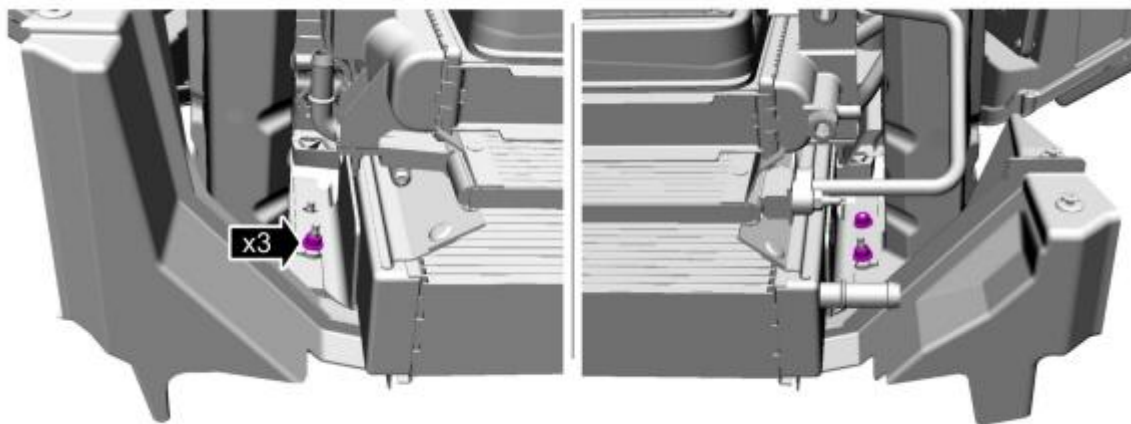




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7.

- To install, tighten to 25 Nm (18 lb-ft).

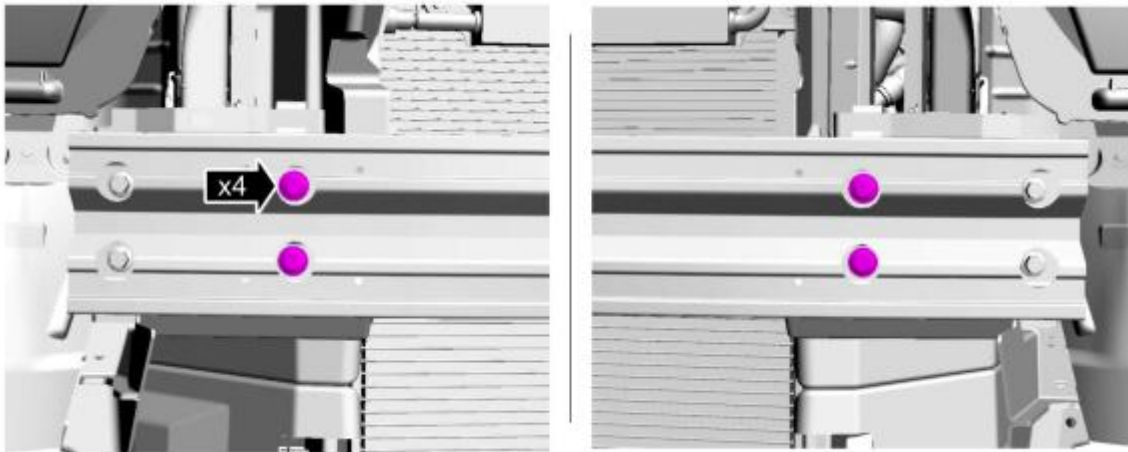


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8.

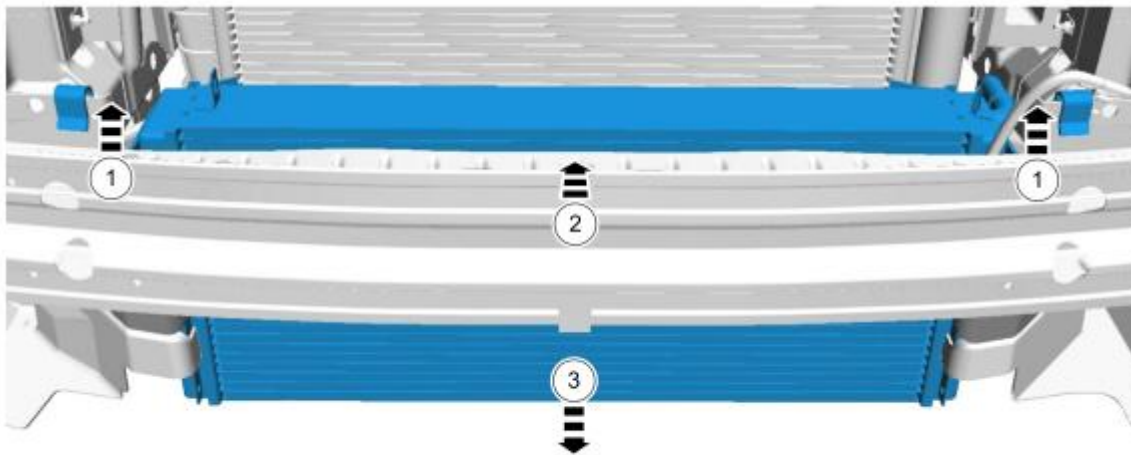
- To install, tighten to 25 Nm (18 lb-ft).





N0143758

9.



N0143759

## Installation

1. To install, reverse the removal procedure.
2. Fill and bleed the SC cooling system. Refer to Supercharger Cooling System Draining, Filling and Bleeding.

