# Transmission Cooling

**Principles of Operation**

**Inspection and Verification**

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

**DTC Chart**

**DTC chart**

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.
REFER to: Diagnostic Methods (100-00 General Information, Description and Operation).

| DTC | Description | Action |
|---|---|---|
| P1783 | Transmission overtemperature condition | Refer to Symptom Chart |

**Symptom Chart - Automatic Transmission Cooling**

The ideal TFT for Super Duty vehicles equipped with a TorqShift6 (6R140) transmission is 200Â°F-240Â°F (93Â°C-115Â°C). Above 240Â° F (115Â°C), the transmission control strategy and calibration will take action to prevent temperatures from exceeding 250Â° F (121Â°C). These actions can include changes to converter lock scheduling and shift scheduling.

Symptom Chart - Automatic Transmission Cooling

| Symptom | Possible Sources | Action |
|---|---|---|
| • Transmission overheating | • Excessive vehicle or towing loads, severe vehicle use<br>• Incorrect transmission fluid level<br>• Transmission fluid condition<br>• Incorrect transmission fluid type<br>• Transmission cooling system damaged, blocked, restricted or installed incorrectly<br>• System leaks<br>• Engine overheating<br>• Diesel engine transmission fluid cooler coolant thermostat<br>• Powertrain control system electrical inputs/outputs, vehicle wiring harnesses, | • REFER to the vehicle specification manual for load and GVW information. REFER to the Owner's Literature.<br>• CHECK and, if necessary, ADJUST the transmission fluid to the correct level.<br>REFER to: Transmission Fluid Level Check (307-01A Automatic Transmission, Transfer Case and Power Transfer Unit - 6-Speed Automatic Transmission â€“ 6R100, General Procedures).<br>or REFER to: Transmission Fluid Level Check (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission â€“ 10R140, General Procedures).<br>• CHECK transmission fluid condition.<br>REFER to: Diagnosis By Symptom (307-01A Automatic Transmission, Transfer Case and Power Transfer Unit - 6-Speed Automatic Transmission â€“ 6R100, Diagnosis and Testing).<br>or REFER to: Diagnosis By Symptom (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission â€“ 10R140, Diagnosis and Testing).<br>•<br>REFER to: Specifications (307-01A Automatic Transmission, |

| | | |
|---|---|---|
| | PCM, TCC solenoid<br>• Internal transmission concerns | Transfer Case and Power Transfer Unit - 6-Speed Automatic Transmission â€“ 6R100, Specifications).<br>or REFER to: Specifications (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission â€“ 10R140, Specifications).<br>• INSPECT the transmission fluid cooler tubes for damage and correct installation. INSPECT the transmission fluid cooler and transmission fluid cooler tubes for internal blockage. REPAIR as necessary.<br>• REFER to: Leakage Inspection (307-01A Automatic Transmission, Transfer Case and Power Transfer Unit - 6-Speed Automatic Transmission â€“ 6R100, Diagnosis and Testing).<br>or REFER to: Leakage Inspection (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission â€“ 10R140, Diagnosis and Testing).<br>• REFER to: Engine Cooling (303-03A Engine Cooling - 6.2L V8, Diagnosis and Testing).<br>or REFER to: Radiator (303-03B Engine Cooling - 6.7L Power Stroke Diesel, Removal and Installation).<br>or REFER to: Engine Cooling (303-03B Engine Cooling - 6.7L Power Stroke Diesel, Diagnosis and Testing).<br>• CARRY OUT OBD. Refer to Powertrain Control/Emissions Diagnosis (PC/ED) manual. and<br>REFER to: Diagnosis By Symptom (307-01A Automatic Transmission, Transfer Case and Power Transfer Unit - 6-Speed Automatic Transmission â€“ 6R100, Diagnosis and Testing).<br>or REFER to: Diagnosis By Symptom (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission â€“ 10R140, Diagnosis and Testing).<br>• REFER to: Diagnosis By Symptom (307-01A Automatic Transmission, Transfer Case and Power Transfer Unit - 6-Speed Automatic Transmission â€“ 6R100, Diagnosis and Testing).<br>or REFER to: Diagnosis By Symptom (307-01B Automatic Transmission, Transfer Case and Power Transfer Unit - 10-Speed Automatic Transmission â€“ 10R140, Diagnosis and Testing). |
| • Transmission fluid leak at transmission in-tank cooler | • Transmission fluid cooler tube-to-transmission fluid cooler fitting | • REFER to Component Test |

**Symptom Chart - NVH**

NVH symptoms should be identified using the diagnostic tools that are available. For a list of these tools, an explanation of their uses and a glossary of common terms,
REFER to: Noise, Vibration and Harshness (NVH) (100-04 Noise, Vibration and Harshness, Diagnosis and Testing).
. Since it is possible any one of multiple systems may be the cause of a symptom, it may be necessary to use a process of elimination type of diagnostic approach to pinpoint the responsible system. If this is not the causal system for the symptom, REFER to: Noise, Vibration and Harshness (NVH) (100-04 Noise, Vibration and Harshness, Diagnosis and Testing).
for the next likely system and continue diagnosis.

Symptom Chart - NVH

| Symptom | Possible Sources | Action |
|---|---|---|

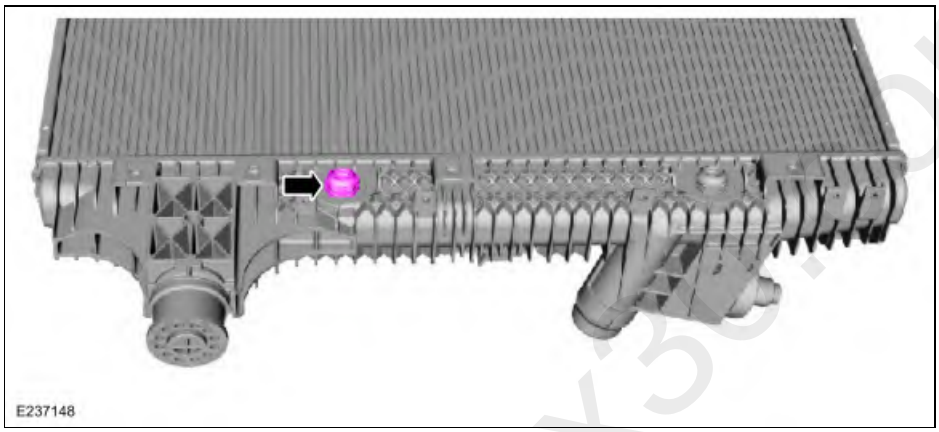
| | | |
|---|---|---|
| • Vibration â€" a high frequency (20-80 Hz) that is felt through the seat or selector lever. Changes with engine speed | • Transmission fluid cooler tubes grounded out | • CHECK the transmission fluid cooler tubes. REPAIR as necessary. |

**Component Test - Gasoline Engine Vehicles**

**Transmission Fluid Cooler Leaks at Radiator**

1. Clean the area around the transmission fluid cooler fittings
2. Verify that transmission fluid is leaking between the transmission fluid cooler and the transmission fluid cooler fitting (not the transmission fluid cooler tube fitting into the transmission fluid cooler fitting).
3. Remove the radiator from the vehicle and place it on a flat surface with the transmission fluid cooler fittings facing upward.
   REFER to: Radiator (303-03A Engine Cooling - 6.2L V8, Removal and Installation).
   or REFER to: Radiator (303-03B Engine Cooling - 6.7L Power Stroke Diesel, Removal and Installation).
4. **NOTICE: Oil-based solvents and cleaners should not be used when cleaning the radiator. Oil-based solvents and cleaners can damage the radiator end tank seals and cause leaks.**

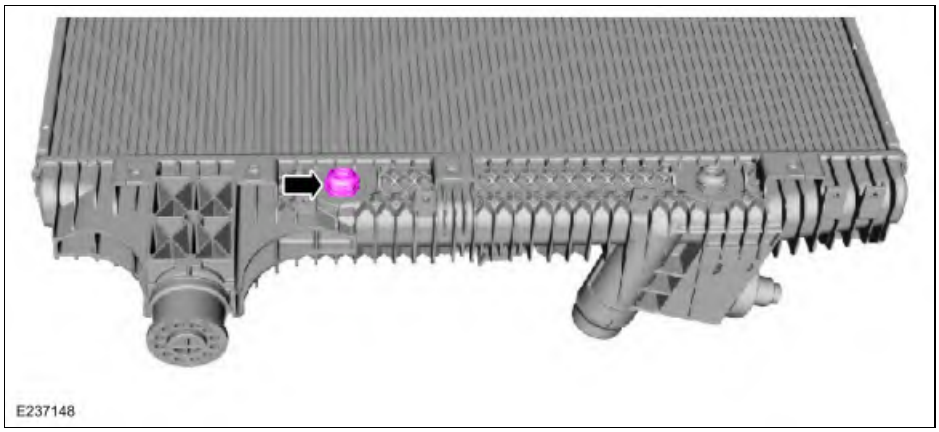
   Clean the area around the transmission fluid cooler fittings so that contaminants do not enter the transmission fluid cooler when the transmission fluid cooler fittings are removed.



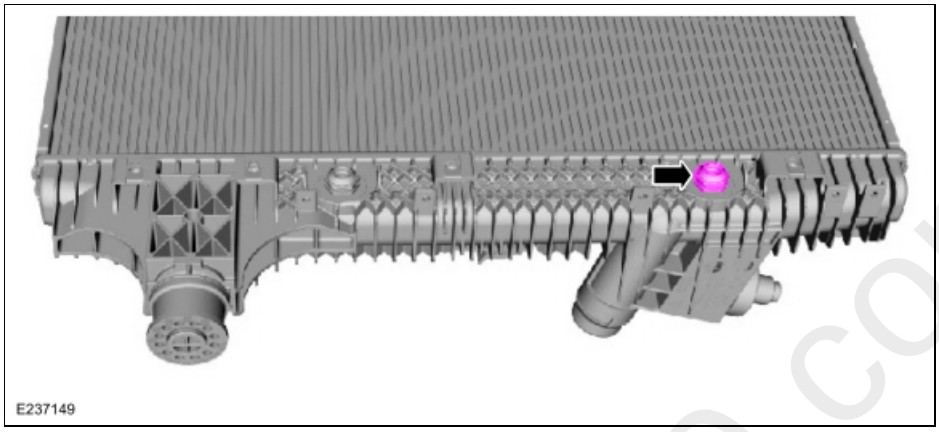

5. **NOTE:** *Remove only one transmission fluid cooler fitting at a time, otherwise the transmission fluid cooler may drop into the radiator.*

   Remove the upper transmission fluid cooler fitting.
6. Once the transmission fluid cooler fitting is removed from the transmission fluid cooler, verify that there is a gasket between the transmission fluid cooler and the inside of the radiator tank.
   - If there is no gasket, install a new radiator.
   - If there is a gasket, continue with this procedure.
7. Inspect the transmission fluid cooler fitting threads for damage.
   - If the transmission fluid cooler fitting threads are damaged, install a new radiator.
   - If the transmission fluid cooler fitting threads show no sign of damage, continue with this procedure.
8. **NOTICE: Thread sealant or tape should never be used on the threads of the transmission fluid cooler fittings. The use of such materials will create a leak path.**

   Install a new O-ring on the transmission fluid cooler fitting.




9. Making sure that the gasket between the transmission fluid cooler and the inside of the radiator tank is still in place, install the upper transmission fluid cooler fitting.
    - Tighten to 60 Nm (44 lb-ft).




10. **NOTE:** *Remove only one transmission fluid cooler fitting at a time, otherwise the transmission fluid cooler may drop into the radiator.*

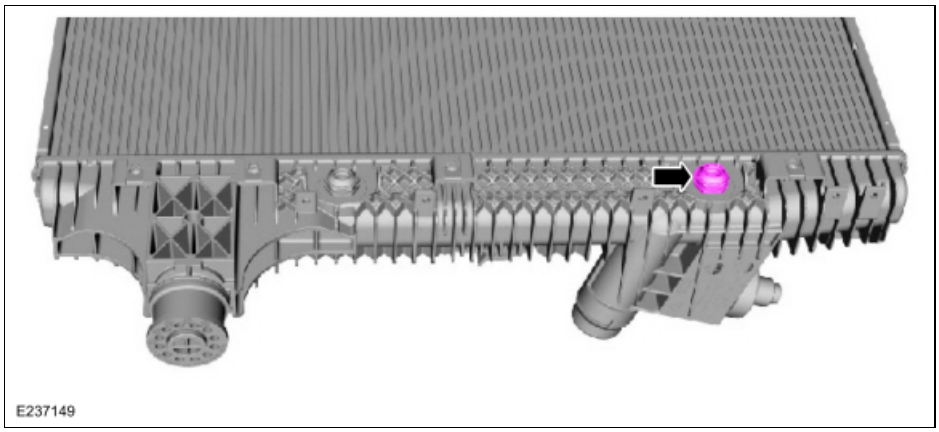
    Remove the lower transmission fluid cooler fitting.

11. Once the transmission fluid cooler fitting is removed from the transmission fluid cooler, verify that there is a gasket between the transmission fluid cooler and the inside of the radiator tank.
    - If there is no gasket, install a new radiator.
    - If there is a gasket, continue with this procedure.

12. Inspect the transmission fluid cooler fitting threads for damage.
    - If the transmission fluid cooler fitting threads are damaged, install a new radiator.
    - If the transmission fluid cooler fitting threads show no sign of damage, continue with this procedure.

13. **NOTICE: Thread sealant or tape should never be used on the threads of the transmission fluid cooler fittings. The use of such materials will create a leak path.**

    Install a new O-ring on the transmission fluid cooler fitting.




14. Making sure that the gasket between the transmission fluid cooler and the inside of the radiator tank is still in place, install the lower

transmission fluid cooler fitting.
- Tighten to 60 Nm (44 lb-ft).

15. Make sure that no engine coolant has entered the transmission fluid cooler. Install the radiator in the vehicle.
REFER to: Radiator (303-03A Engine Cooling - 6.2L V8, Removal and Installation).
or REFER to: Radiator (303-03B Engine Cooling - 6.7L Power Stroke Diesel, Removal and Installation).

16. Verify that both the transmission and the engine cooling system fluids are at the correct levels.

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