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Service Information Bulletin

SUBJECT	DATE
Symptom Diagnostics	August 2017

Additions, Revisions, or Updates

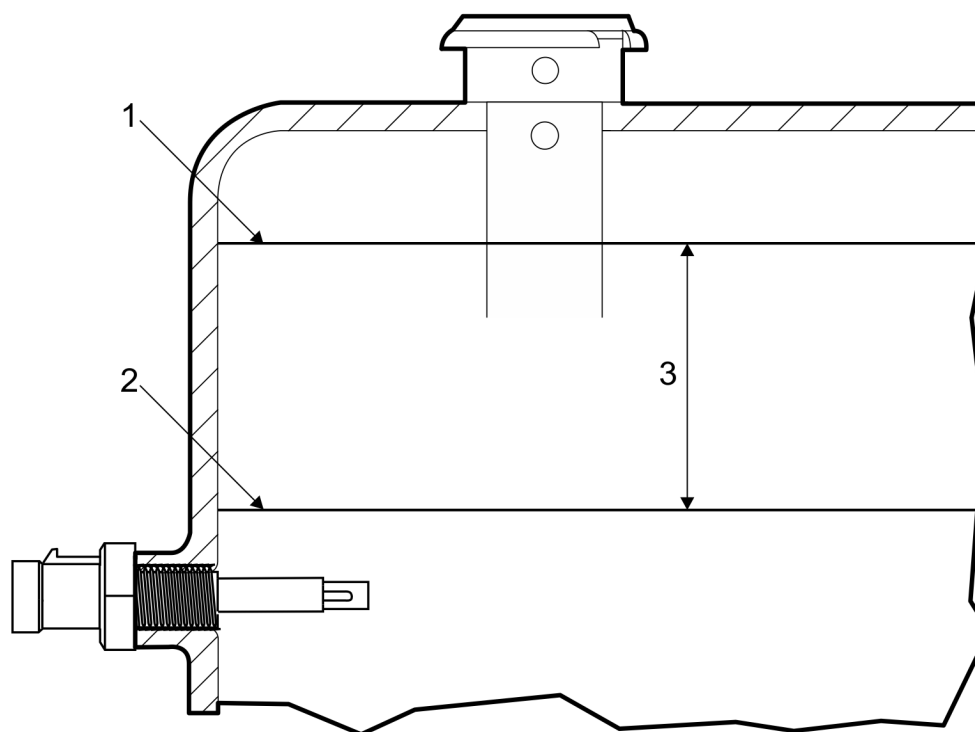
Publication Number / Title	Platform	Section Title	Change
DDC-SVC-MAN-0084	DD Heavy Duty	Coolant Loss	Updated HD diagnostic procedures.
DDC-SVC-MAN-0191			



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2 Symptom Diagnostics - Coolant Loss

NOTE: Prior to diagnosing a coolant loss complaint, make sure that the coolant is not being unnecessarily overfilled. The min/low and max/full marks on the coolant surge tank represent the acceptable operating range of the coolant level. During normal operation, the coolant level will expand and contract between the two lines, depending on temperature. No coolant needs to be added if the coolant level is at the number two line. Overfilling the coolant reservoir will cause the surge tank to push coolant out.



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1. MAX/FULL Mark
2. MIN/LOW Mark

3. Operating Range

Check as follows:

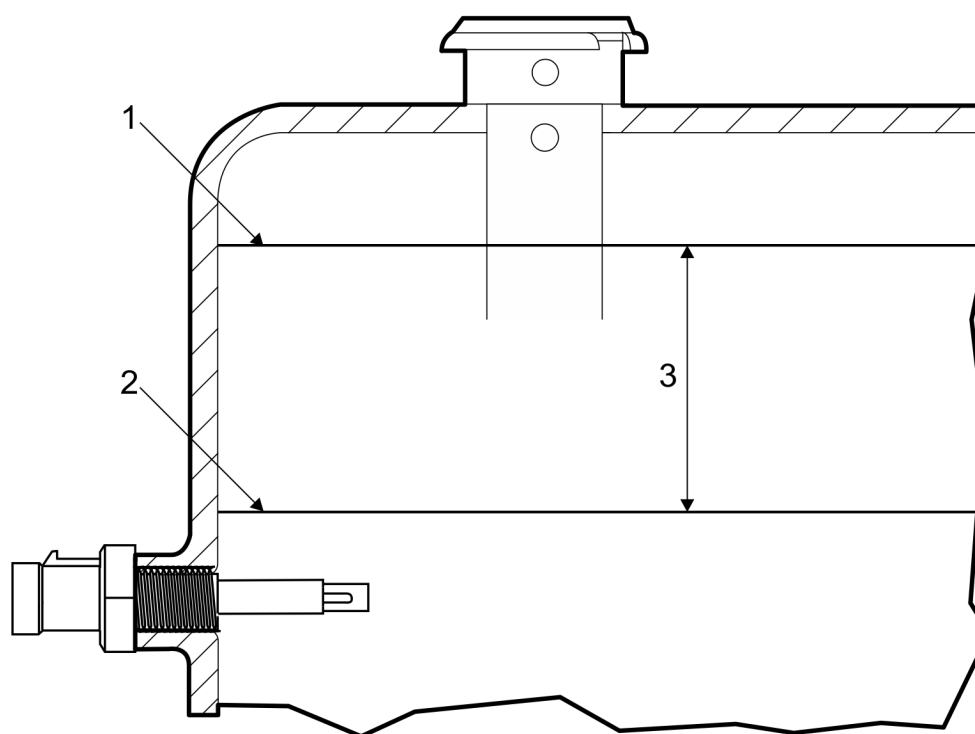
1. Are any Original Equipment Manufacturer (OEM) components leaking coolant externally?
 - a. Yes; inspect the vehicle for the source of the coolant loss and consult OEM procedures for repair instructions.
 - b. No; Go to step 2.
2. Inspect the vehicle for any aftermarket components plumbed into the cooling system. Are there any aftermarket components plumbed into the cooling system on the vehicle?
 - a. Yes; Go to step 3.
 - b. No; Go to step 4.
3. Inspect the aftermarket components; refer to OEM guidelines. Are aftermarket components the source of coolant loss?
 - a. Yes; repair as necessary.
 - b. No; Go to step 4.
4. Pressure test the surge tank cap(s). Do the cap(s) hold the correct rated pressure?
 - a. Yes; Go to step 5.
 - b. No; repair as necessary.
5. Check engine coolant fan operation. Does the fan function correctly?
 - a. Yes; Go to step 6.
 - b. No; repair as necessary.

6. Pressure test the cooling system and inspect for coolant leaks. Is the engine leaking coolant externally?
 - a. Yes; Go to step 7.
 - b. No; Go to step 10.
7. Is the external leak at the cylinder head to cylinder block joint?
 - a. Yes; remove the cylinder head.
For DD13, Refer to section "Removal of the DD13 Cylinder Head Assembly"
For DD15/16, Refer to section "Removal of the DD15 and DD16 Cylinder Head Assembly"
Go to step 8.
 - b. No; inspect the engine for the source for the coolant leak and make the repair.
8. Is the vehicle equipped with a GHG14 engine?
 - a. Yes; Go to step 9.
 - b. No; Go to step 11.
9. Inspect the cylinder head gasket coolant grommet(s) for damage. Are the grommet(s) damaged?
 - a. Yes; replace the cylinder head gasket.
 - b. No; Go to step 10.
10. Inspect the cylinder liner for cracks that would lead to coolant loss. Refer to section "Inspection of the Cylinder Liner". Are the liners cracked?
 - a. Yes; replace the cracked liner(s). Refer to section "Removal of the Cylinder Liner".
 - b. No; test the cylinder liner upper O-ring. Refer to section "Testing of the Cylinder Liner Upper O-Ring".
11. Inspect the cylinder head gasket coolant grommet(s) for damage. Are the grommet(s) damaged?
 - a. Yes; replace the cylinder head gasket. Go to step 12.
 - b. No; Go to step 12.
12. Inspect the cylinder liner for cracks that would lead to coolant loss. Refer to section "Inspection of the Cylinder Liner". Are the liners cracked?
 - a. Yes; replace the cracked liner(s), Refer to section "Removal of the Cylinder Liner" and test the cylinder liner upper O-ring, Refer to section "Testing of the Cylinder Liner Upper O-Ring".
 - b. No; test the cylinder liner upper O-ring, Refer to section "Testing of the Cylinder Liner Upper O-Ring".
13. Is the vehicle equipped with an EPA07 engine?
 - a. Yes; Go to step 15.
 - b. No; Go to step 14.
14. Is there coolant contamination in the Diesel Exhaust Fluid (DEF)?
 - a. Yes; replace the DEF tank header assembly. Select the proper tank:
Refer to section "Removal of the EPA10 13 and 23 Gallon Diesel Exhaust Fluid Tank Header Unit"
Refer to section "Removal of the GHG14 13 and 23 Gallon Diesel Exhaust Fluid Tank Header Unit"
Refer to section "Removal of the GHG14 Six-Gallon Diesel Exhaust Fluid Tank Header"
 - b. No; Go to step 15.
15. Is there coolant contamination in the oil?
 - a. Yes; Refer to section "Coolant in Oil".
 - b. No; Go to step 16.
16. Is there coolant contamination in the fuel?
 - a. Yes; Refer to section "Fuel in Coolant/Coolant in Fuel".
 - b. No; Go to step 17.
17. Pressurize the cooling system; refer to OEM guidelines. Does the cooling system pass the pressure test?
 - a. Yes; Go to step 19.
 - b. No; Go to step 18.
18. Remove the EGR hot pipe and inspect for signs of coolant contamination. Is coolant contamination present?
 - a. Yes; replace the EGR cooler. Verify repairs.
Refer to section "Removal of the DD13 Exhaust Gas Recirculation Cooler Water Manifold Assembly"
Refer to section "Removal of the DD15 and DD16 Exhaust Gas Recirculation Cooler"
 - b. No; Go to step 19.
19. Pressure test the Exhaust Gas Recirculation (EGR) cooler. Does the EGR cooler pass testing and inspection?
Refer to section "Testing of the DD13 Exhaust Gas Recirculation Cooler Water Manifold Assembly - In Chassis"
Refer to section "Testing of the DD15 and DD16 Exhaust Gas Recirculation Cooler - In Chassis"

- a. Yes; Go to step 20.
 - b. No; replace the EGR cooler.
 - For DD13, Refer to section "Installation of the DD13 EGR Cooler Water Manifold Assembly"
 - For DD15/16, Refer to section "Installation of the DD15 and DD16 Exhaust Gas Recirculation Cooler"
20. Inspect the air system for the presence of coolant. Is coolant present?
- a. Yes; replace the air compressor.
 - b. No; release the vehicle and monitor coolant consumption During normal operation, the coolant level will expand and contract. Overfilling the coolant reservoir will cause the surge tank to push coolant out.

3 Symptom Diagnostics - Coolant Loss

NOTE: Prior to diagnosing a coolant loss complaint, make sure that the coolant is not being unnecessarily overfilled. The min/low and max/full marks on the coolant surge tank represent the acceptable operating range of the coolant level. During normal operation, the coolant level will expand and contract between the two lines, depending on temperature. No coolant needs to be added if the coolant level is at the number two line. Overfilling the coolant reservoir will cause the surge tank to push coolant out.



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3. Operating Range

Check as follows:

1. Are any Original Equipment Manufacturer (OEM) components leaking coolant externally?
 - a. Yes; inspect the vehicle for the source of the coolant loss and consult OEM procedures for repair instructions.
 - b. No; Go to step 2.
2. Inspect the vehicle for any aftermarket components plumbed into the cooling system. Are there any aftermarket components plumbed into the cooling system on the vehicle?
 - a. Yes; Go to step 3.
 - b. No; Go to step 4.
3. Inspect the aftermarket components; refer to OEM guidelines. Are aftermarket components the source of coolant loss?
 - a. Yes; repair as necessary.
 - b. No; Go to step 4.
4. Pressure test the surge tank cap(s). Do the cap(s) hold the correct rated pressure?
 - a. Yes; Go to step 5.
 - b. No; repair as necessary.
5. Check engine coolant fan operation. Does the fan function correctly?
 - a. Yes; Go to step 6.
 - b. No; repair as necessary.

6. Pressure test the cooling system and inspect for coolant leaks. Is the engine leaking coolant externally?
 - a. Yes; Go to step 7.
 - b. No; Go to step 10.
7. Is the external leak at the cylinder head to cylinder block joint?
 - a. Yes; remove the cylinder head.
For DD13, Refer to section "Removal of the DD13 Cylinder Head Assembly"
For DD15/16, Refer to section "Installation of the DD15 and DD16 Cylinder Head Assembly"
Go to step 8.
 - b. No; inspect the engine for the source for the coolant leak and make the repair.
8. Inspect the cylinder head gasket coolant grommet(s) for damage. Are the grommet(s) damaged?
 - a. Yes; replace the cylinder head gasket.
 - b. No; Go to step 9.
9. Inspect the cylinder liner for cracks that would lead to coolant loss. Refer to section "Inspection of the Cylinder Liner". Are the liners cracked?
 - a. Yes; replace the cracked liner(s), Refer to section "Removal of the Cylinder Liner".
 - b. No; test the cylinder liner upper O-ring, Refer to section "Testing of the Cylinder Liner Upper O-Ring".
10. Is there coolant contamination in the Diesel Exhaust Fluid (DEF)?
 - a. Yes; replace the DEF tank header assembly. Select the proper tank:
Refer to section "Removal of the 13- and 23-Gallon Diesel Exhaust Fluid Tank Header Unit".
Refer to section "Removal of the Six-Gallon Diesel Exhaust Fluid Tank Header".
 - b. No; Go to step
11. Is there coolant contamination in the oil?
 - a. Yes; Refer to section "Coolant in Oil".
 - b. No; Go to step 12.
12. Is there coolant contamination in the fuel?
 - a. Yes; Refer to section "Fuel in Coolant/Coolant in Fuel".
 - b. No; Go to step 13.
13. Pressurize the cooling system; refer to OEM guidelines. Does the cooling system pass the pressure test?
 - a. Yes; Go to step 15.
 - b. No; Go to step 14.
14. Remove the EGR mixer pipe and inspect for signs of coolant contamination. Is coolant contamination present?
 - a. Yes; replace the EGR cooler. Verify repairs.
Refer to section "Removal of the DD13 Exhaust Gas Recirculation Cooler Water Manifold Assembly".
Refer to section "Removal of the DD15 and DD16 Exhaust Gas Recirculation Cooler".
 - b. No; Go to step 15.
15. Pressure test the Exhaust Gas Recirculation (EGR) cooler. Does the EGR cooler pass testing and inspection?
Refer to section "Testing of the DD13 Exhaust Gas Recirculation Cooler Water Manifold Assembly - In Chassis"
Refer to section "Testing of the DD15 and DD16 Exhaust Gas Recirculation Cooler - In Chassis"
 - a. Yes; Refer to section "Testing the Upper Liner O-Ring".
 - b. No; replace the EGR cooler.
For DD13, Refer to section "Installation of the DD13 Exhaust Gas Recirculation Cooler Water Manifold Assembly".
For DD15/16, Refer to section "Installation of the DD15 and DD16 Exhaust Gas Recirculation Cooler".
16. Inspect the air system for the presence of coolant. Is coolant present?
 - a. Yes; replace the air compressor.
 - b. No; release the vehicle and monitor coolant consumption During normal operation, the coolant level will expand and contract. Overfilling the coolant reservoir will cause the surge tank to push coolant out.