



Mack Chassis - Diesel Exhaust Fluid (DEF) System Cleaning/Flush After DEF Pump Failure Or System Contamination



> **Internal Content**

Refer to Operation ID 2589-11-02-05 under the Service tab in Impact for proper flushing of contamination in the DEF system.



Tags

[k77864401](#)

[mack](#)

Related links and attachments

No links or attachments available



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25950-2 Aftertreatment Diesel Exhaust Fluid (DEF) Contamination Flush



Illustrations may differ slightly from the actual vehicle being serviced. However, key components addressed in this information are represented as accurately as possible.



All threaded fasteners that do not have a tightening torque specification in the information are tightened to a standard torque. Standard torques are available in the following specification. ►
[Standard Tightening Torques](#)



CAUTION

Risk of material damage.

DEF oxidizes metal and the capillary action creeps through lines at a speed of approx. 0.6 meters an hour (2ft per hour).

- Do not spill DEF on disassembled connectors. If this occurs, the connectors must be replaced immediately. Do not try to clean with water or compressed air.



CAUTION

Risk of chemical burn.

Reagent (Diesel Exhaust Fluid) can leak out of the system.

- Do not remove hoses or electrical cables from the exhaust aftertreatment system during normal service or when any component is being moved.



CAUTION

Risk of chemical burn.

If the system is pressurized, Reagent (Diesel Exhaust Fluid) may splash.

- Switch off the ignition. Wait at least two minutes before removing the hoses to allow the automatic draining of the exhaust aftertreatment system.
- Do not use the ADR (European Agreement Concerning the International Carriage of Dangerous Goods by Road) switch until the exhaust aftertreatment system is empty.



CAUTION

Risk of material damage.

The exhaust aftertreatment system can be damaged by foreign particles.

- Clean the hoses and the tank for the reagent (Diesel Exhaust Fluid) before the hoses are removed.


	CAUTION
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Risk of material damage.
 Deficient reagent (Diesel Exhaust Fluid) can cause failure to the exhaust aftertreatment system.

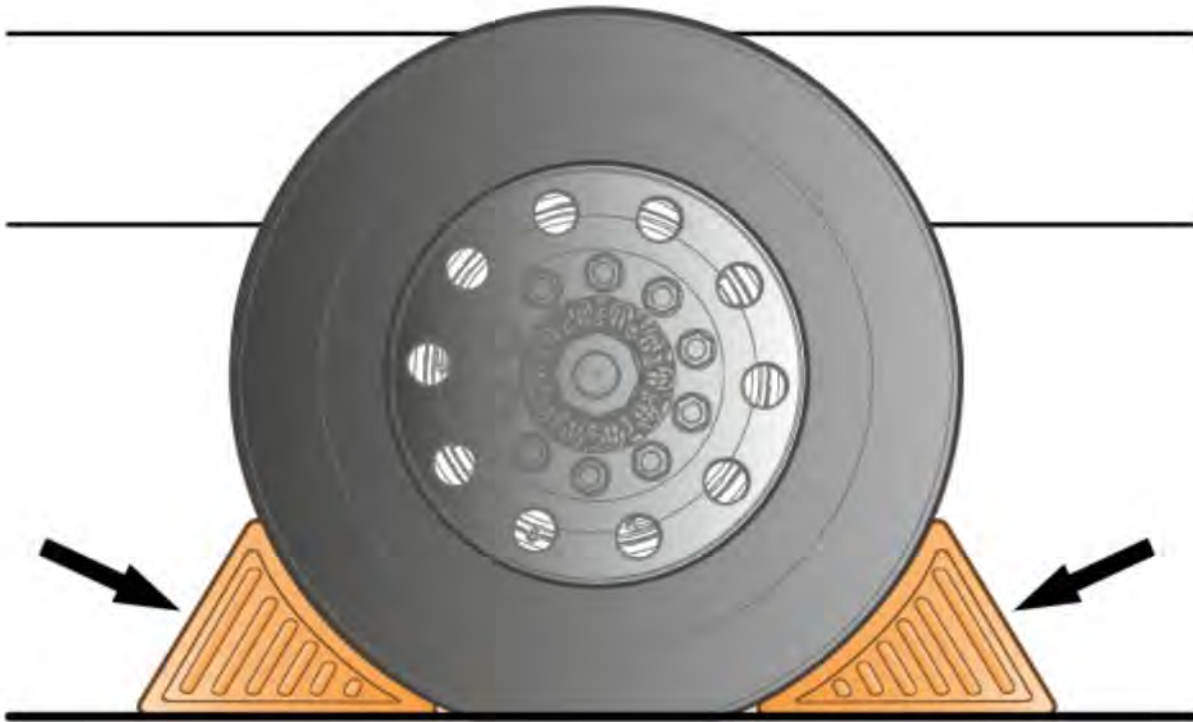
▶	Use only the reagent (Diesel Exhaust Fluid) approved by the manufacturer.
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Special tools

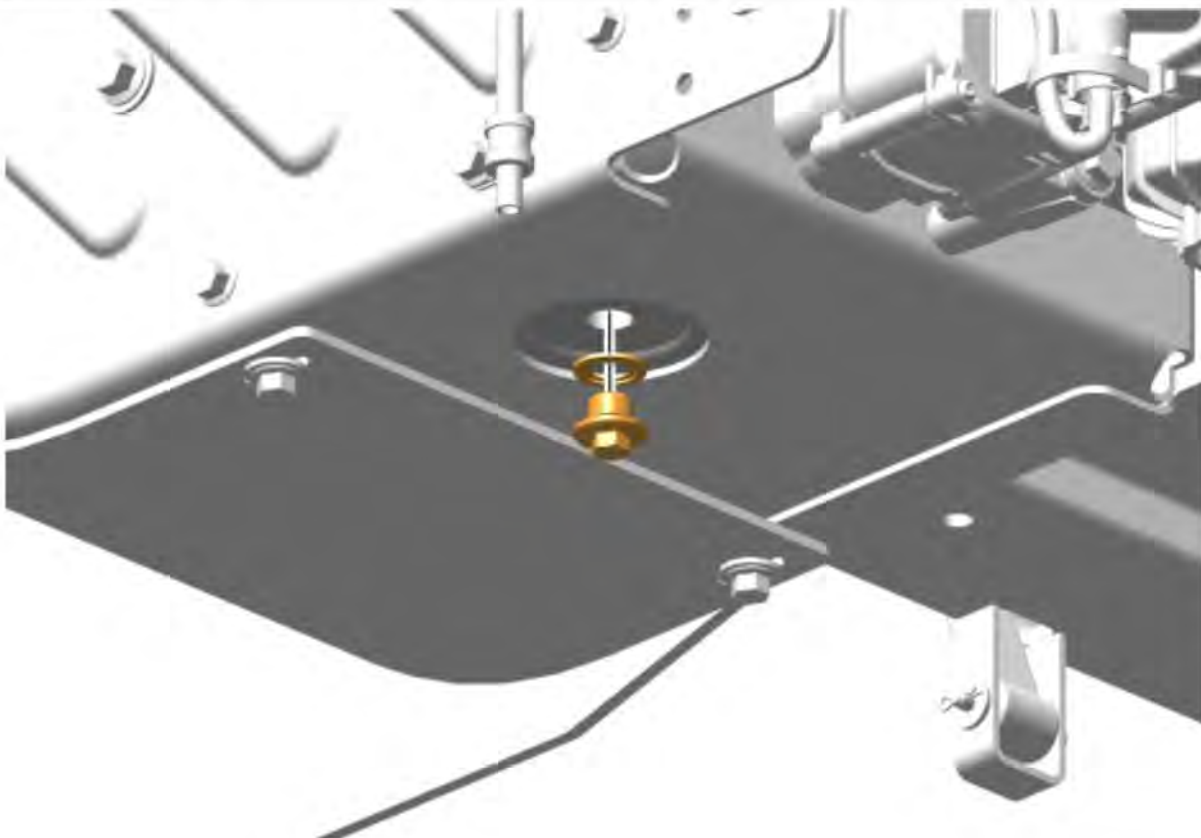
88890105	88890110
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	<p>Note</p> <p>Proper reagent (Diesel Exhaust Fluid) is required for correct operation of the selective catalytic reduction SCR (Selective Catalytic Reduction) aftertreatment system. If a fluid other than reagent (Diesel Exhaust Fluid) is used in the system, or if reagent (Diesel Exhaust Fluid) in the tank should become contaminated with another material, evaluation, cleaning and testing of the reagent (Diesel Exhaust Fluid) system must be performed to ensure returning the system to proper operation.</p> <p>The aftertreatment on-board diagnostic system monitors for SCR system tampering and reagent (Diesel Exhaust Fluid) dilution, and will provide driver warnings, with possible torque and road speed limiting if the issue is not addressed. The warnings may be the result of a contaminated reagent (Diesel Exhaust Fluid) system.</p> <p>This document is not intended to cover cleaning and/or component replacement procedures for all possible reagent (Diesel Exhaust Fluid) contaminants. Instead, general guidelines will be covered here for what inspections should be made and what steps should be taken in the event the reagent (Diesel Exhaust Fluid) in the tank is compromised. The technician is expected to use sound judgment and knowledge of the reagent (Diesel Exhaust Fluid) dosing system to determine if components can be cleaned or will require replacement based on the type of contaminant in the system and what, if any, damage is seen</p> <p>Address all aftertreatment related diagnostic trouble codes DTC (Diagnostic Trouble Code) before continuing with this procedure.</p>
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- | | |
|---|-------------------------------------|
| 1 | Apply the parking brake. |
| 2 | Place the gear selector in neutral. |
| 3 | Remove the power key. |
| 4 | Safeguard the key. |
| 5 | Install the wheel chocks. |



- | | |
|---|--------------------------------|
| 6 | Unlatch and raise the hood. |
| 7 | Position a draining container. |
| 8 | Remove the drain plug. |
| 9 | Remove the gasket. |



10 Drain the reagent. (Diesel Exhaust Fluid)

i	<p>Note Remove at least 230 ml (8 oz) into clean container.</p>
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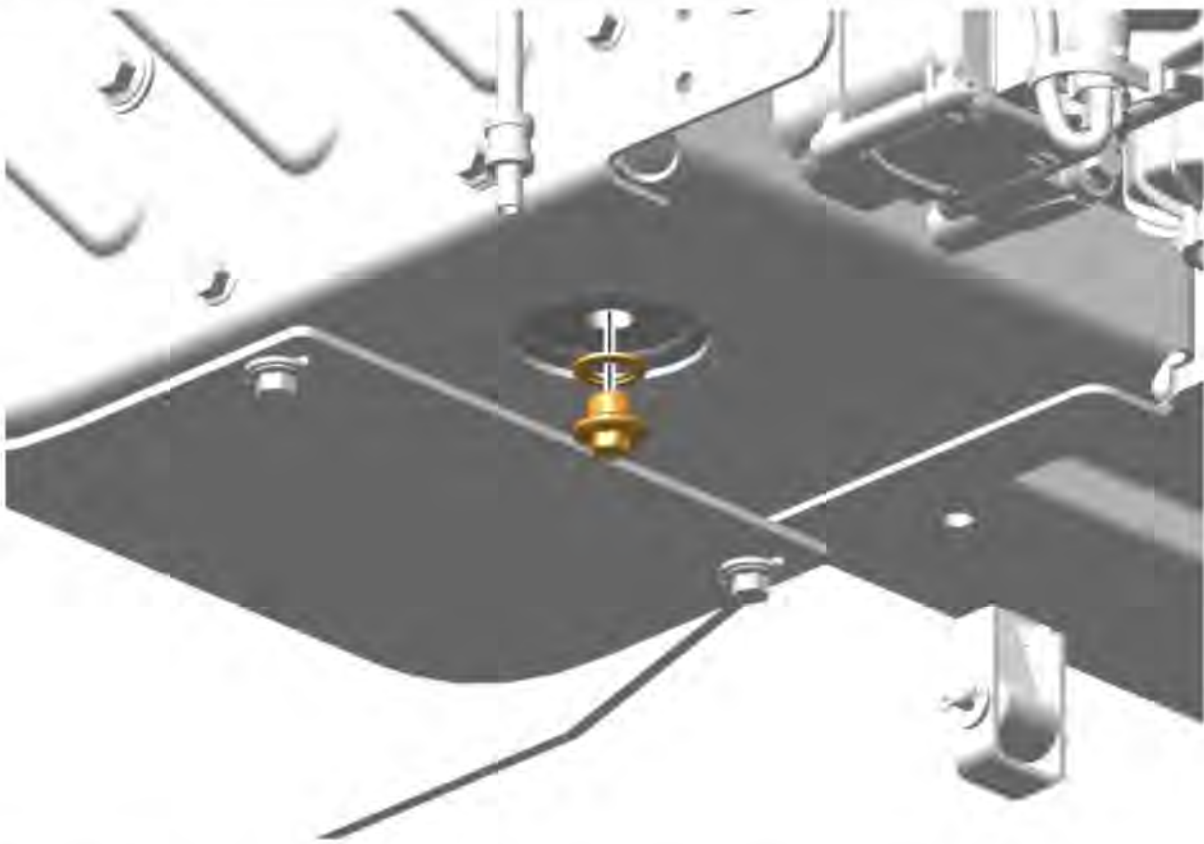
11 Install the gasket.

i	<p>Note Replace the gasket if necessary.</p>
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12 Install the drain plug.

13 Tighten the drain plug to torque.

Tightening torque	
Tank, reagent (Diesel Exhaust Fluid), drain plug	24 ±4 Nm (18 ±3 lb _f ·ft)



14 Compare the reagent (Diesel Exhaust Fluid) sample removed from the reagent (Diesel Exhaust Fluid) tank to a known good sample. If the reagent (Diesel Exhaust Fluid) clear with a slight ammonia odor and free from visible particulate matter contamination.

Note

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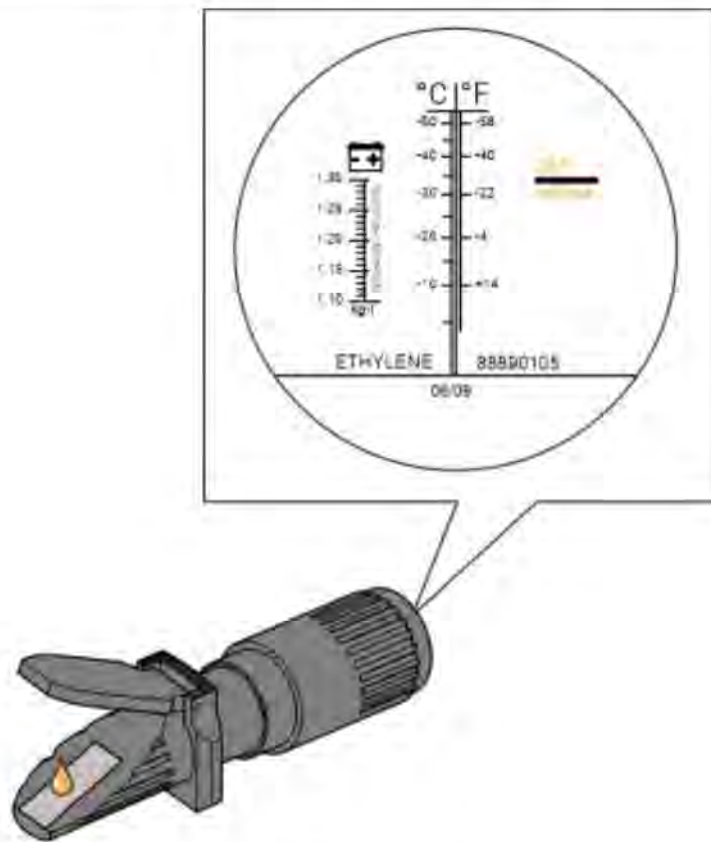
Shining a light through the side of the container can help illuminate fibers and particles.
 If the reagent (Diesel Exhaust Fluid) contaminated, proceed to cleaning.
 If the reagent (Diesel Exhaust Fluid) is not contaminated, proceed to the next step.
 Green, orange or red reagent (Diesel Exhaust Fluid) can indicate coolant. Blue could be windshield washer fluid.

15 Apply a drop of reagent (Diesel Exhaust Fluid) on the viewer of the refractometer.

Required material

REFRACTOMETER

[88890105](#)



16 Perform this procedure when the condition below is met.

Conditions

- If the level is above the word "DEF" or below the word "AdBlue®", reagent (Diesel Exhaust Fluid) is contaminated
- ▶ If the reagent (Diesel Exhaust Fluid) is contaminated, proceed to cleaning.
- ▶ If the reagent (Diesel Exhaust Fluid) is not contaminated, proceed to the next step.

17 Check for hydrocarbon contamination using test paper.

Required material

INDICATOR STRIP	88890110
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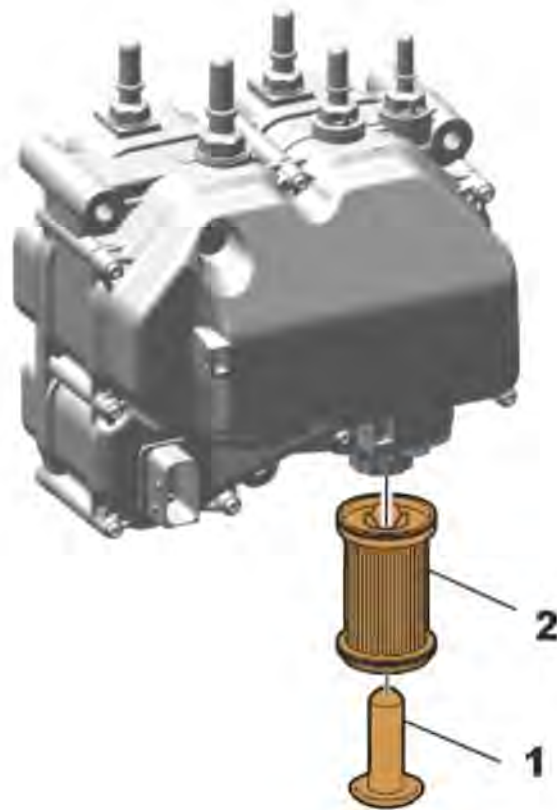


18	<p>Perform this procedure when the condition below is met.</p> <p>Conditions</p> <ul style="list-style-type: none"> • If the paper will turn dark blue, there is hydrocarbon contamination ▶ If the reagent (Diesel Exhaust Fluid) is contaminated, proceed to cleaning. ▶ If the reagent (Diesel Exhaust Fluid) is not contaminated, proceed to the next step.
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19	<p>Allow the sample to sit 30 minutes.</p> <table border="1"> <tr> <td></td> <td> <p>Note Use a suitable tool.</p> </td> </tr> </table>		<p>Note Use a suitable tool.</p>
	<p>Note Use a suitable tool.</p>		



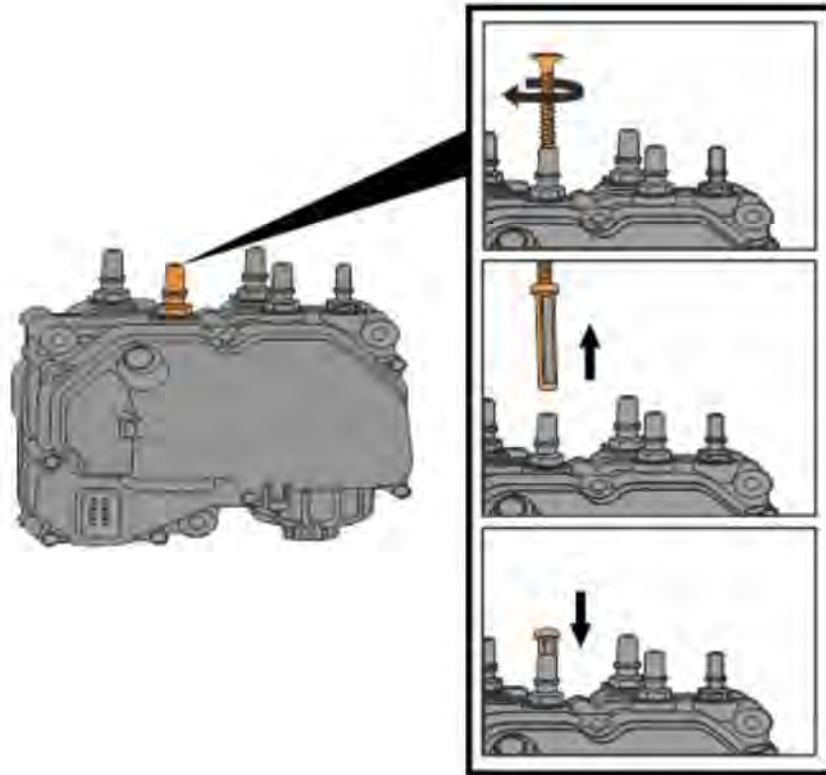
20	<p>Perform this procedure when the condition below is met.</p> <p>Conditions</p> <ul style="list-style-type: none"> • If there is fluid separation or excessive particle contamination found in the bottom ▶ If the reagent (Diesel Exhaust Fluid) is contaminated, proceed to cleaning. ▶ If the reagent (Diesel Exhaust Fluid) is not contaminated, proceed to the next step.
21	Remove the equalizer (1).
22	Remove the filter element (2).



23 Remove the pump and inlet filters.



Note
Refer to the function group for more information.
[Aftertreatment Diesel Exhaust Fluid \(DEF\)
Pump Unit, Replacement](#)



24	Inspect for debris or contaminants.
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25	Perform this procedure when the condition below is met. Conditions
	<ul style="list-style-type: none"> • If debris or contaminants present in the filters
	<ul style="list-style-type: none"> ▶ If the reagent (Diesel Exhaust Fluid) is contaminated, replace the filters and proceed to cleaning.
	<ul style="list-style-type: none"> ▶ If the reagent (Diesel Exhaust Fluid) is not contaminated, proceed to the next step.

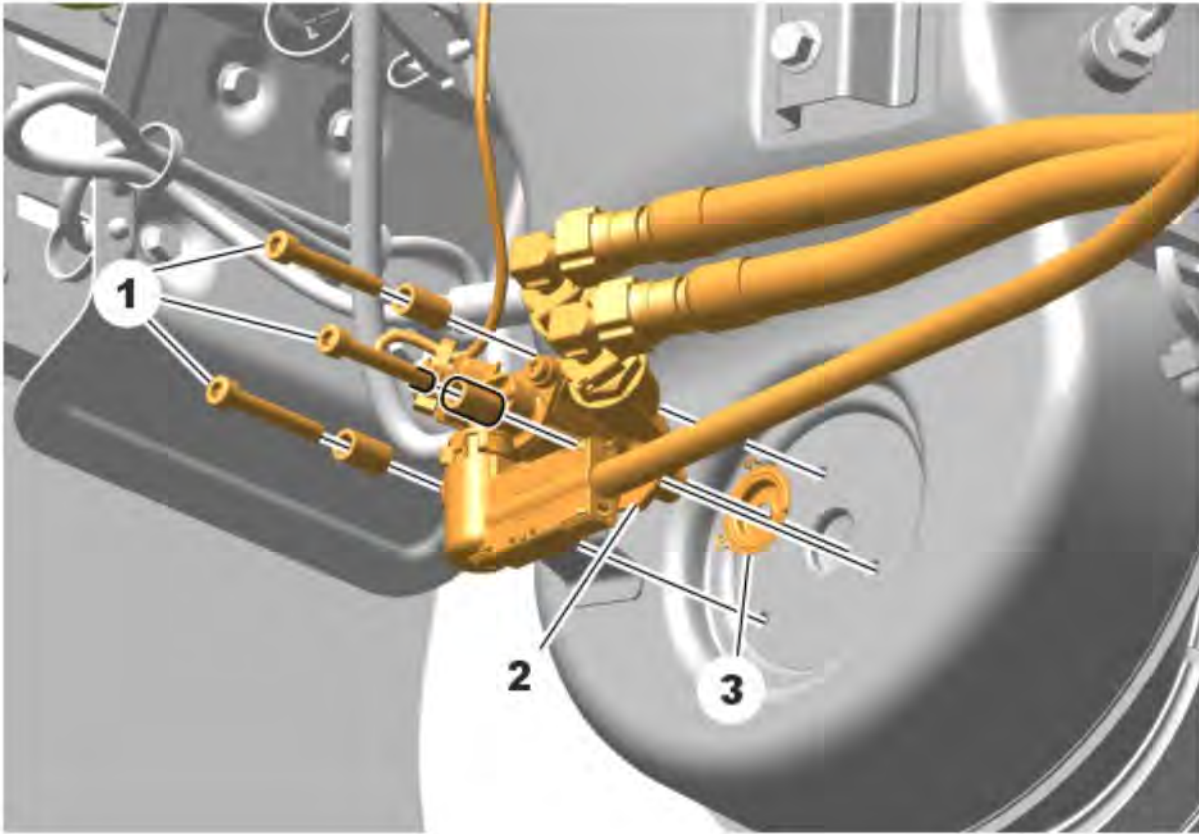
26	Inspect the lines between reagent (Diesel Exhaust Fluid) tank and pump.
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27	Perform this procedure when the condition below is met. Conditions
	<ul style="list-style-type: none"> • If lines between pump and reagent (Diesel Exhaust Fluid) found defective
	<ul style="list-style-type: none"> ▶ If damaged, repair or replace the lines.
	<ul style="list-style-type: none"> ▶ If the lines are not defective, proceed to the next step.

28	Remove the screws (1).
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29	Remove the dosage valve assembly (2).
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30	Remove the gasket (3).
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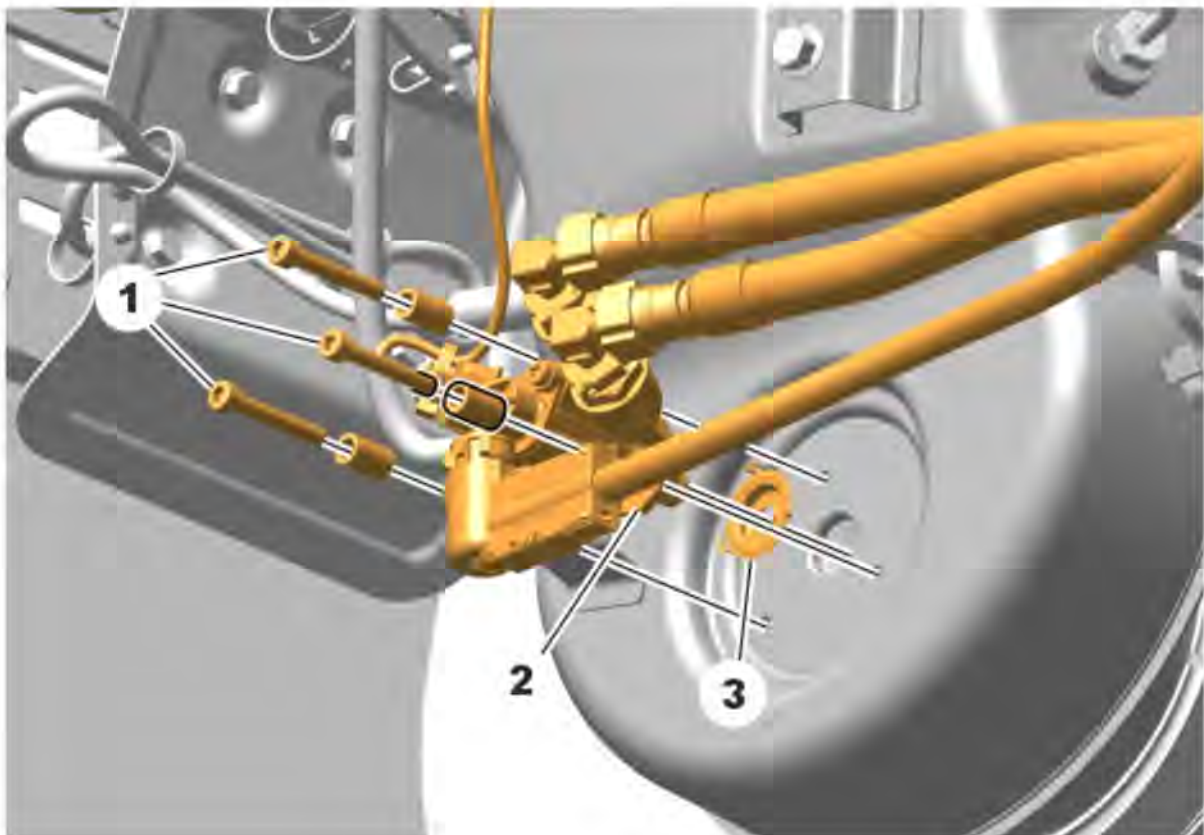
31	Connect the diagnostic tool (Premium Tech Tool).
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32	Execute SCR System, test in the diagnostic tool (Premium Tech Tool).				
	<table border="1"> <tr> <td style="width: 20px; text-align: center;">◀</td> <td>Select Option B "Dosing test".</td> </tr> <tr> <td style="width: 20px; text-align: center;">◀</td> <td>Select button 1 to perform the "Diagnostic test of SCR system with priming".</td> </tr> </table>	◀	Select Option B "Dosing test".	◀	Select button 1 to perform the "Diagnostic test of SCR system with priming".
◀	Select Option B "Dosing test".				
◀	Select button 1 to perform the "Diagnostic test of SCR system with priming".				

33	Perform this procedure when the condition below is met.
	<p>Conditions</p>

•	If the volume test is within the specification, follow guided diagnostics procedures	
▶	If the reagent (Diesel Exhaust Fluid) is not contaminated.	
▶	Install the gasket (3).	
▶	Install the dosage valve assembly (2).	
▶	Install the screws (1).	
Tightening torque		
Screw	M6	
	10.1 ±1.5 Nm (89 ±13 lb _f ·in)	



▶	Disconnect the diagnostic tool (Premium Tech Tool).
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34 Any of the following contaminants found in the system in significant quantity (greater than 20% by volume), like: Diesel fuel, biodiesel, oils/grease, solvents, acidic cleaners.

35	Perform this procedure when the condition below is met.
Conditions	
•	If the system is contaminated
▶	Replace the reagent (Diesel Exhaust Fluid) tank, sending unit, reagent (Diesel Exhaust Fluid) hoses,

reagent (Diesel Exhaust Fluid) pump, reagent (Diesel Exhaust Fluid) doser and all filters. Refer to impact for component replacement procedures.

► Once the system is assembled, perform the following operation.

► Connect the diagnostic tool (Premium Tech Tool).



► Perform SCR system, test in the diagnostic tool (Premium Tech Tool).

► Select option "C – Exit inducement mode".

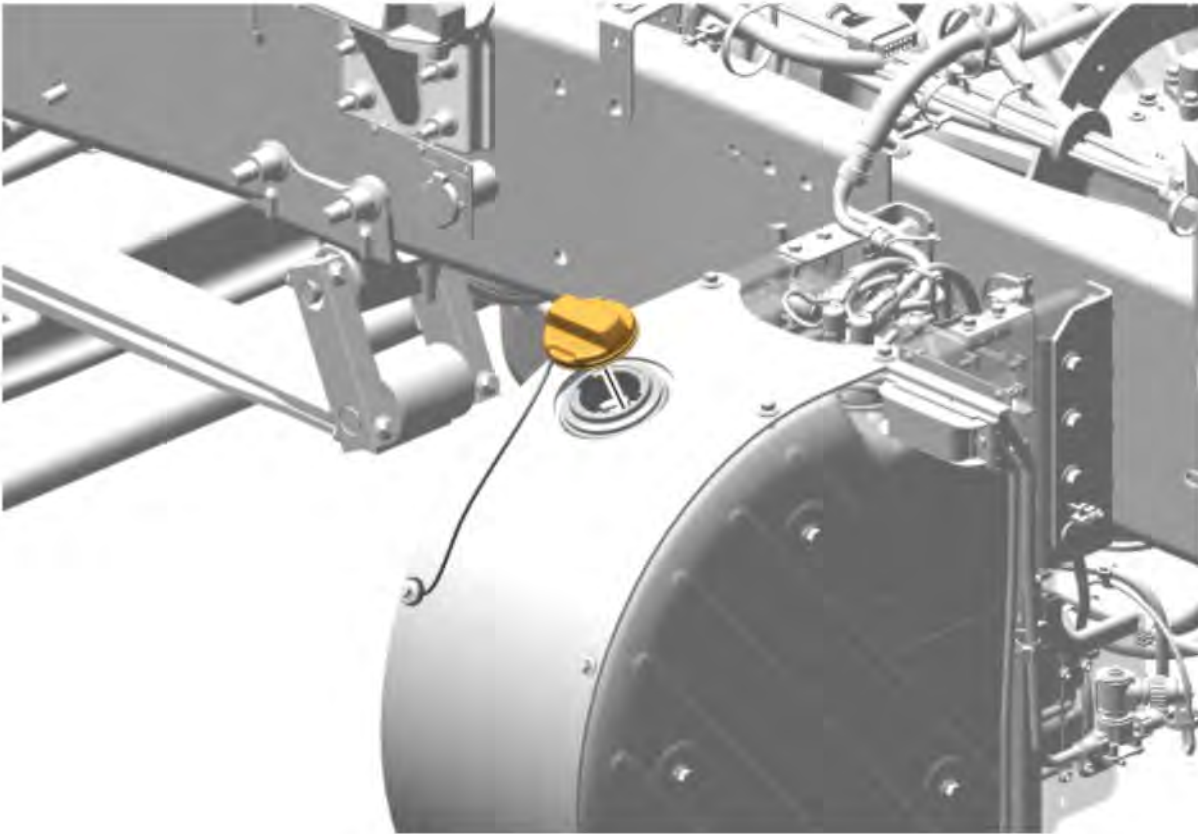
36 Perform this procedure when the condition below is met.

Conditions

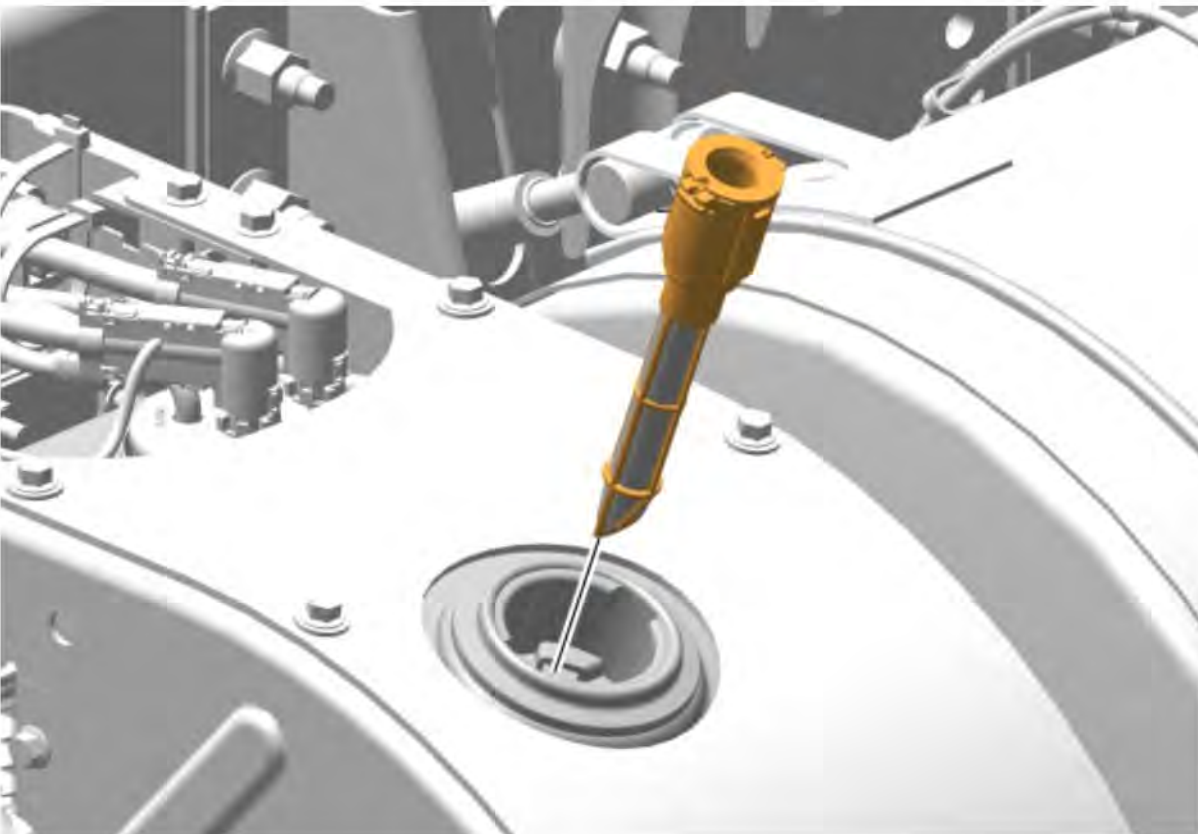
- If the system is not contaminated

► Proceed to the next step.

37 Remove the filler cap.



38 Remove the filler neck and screen.



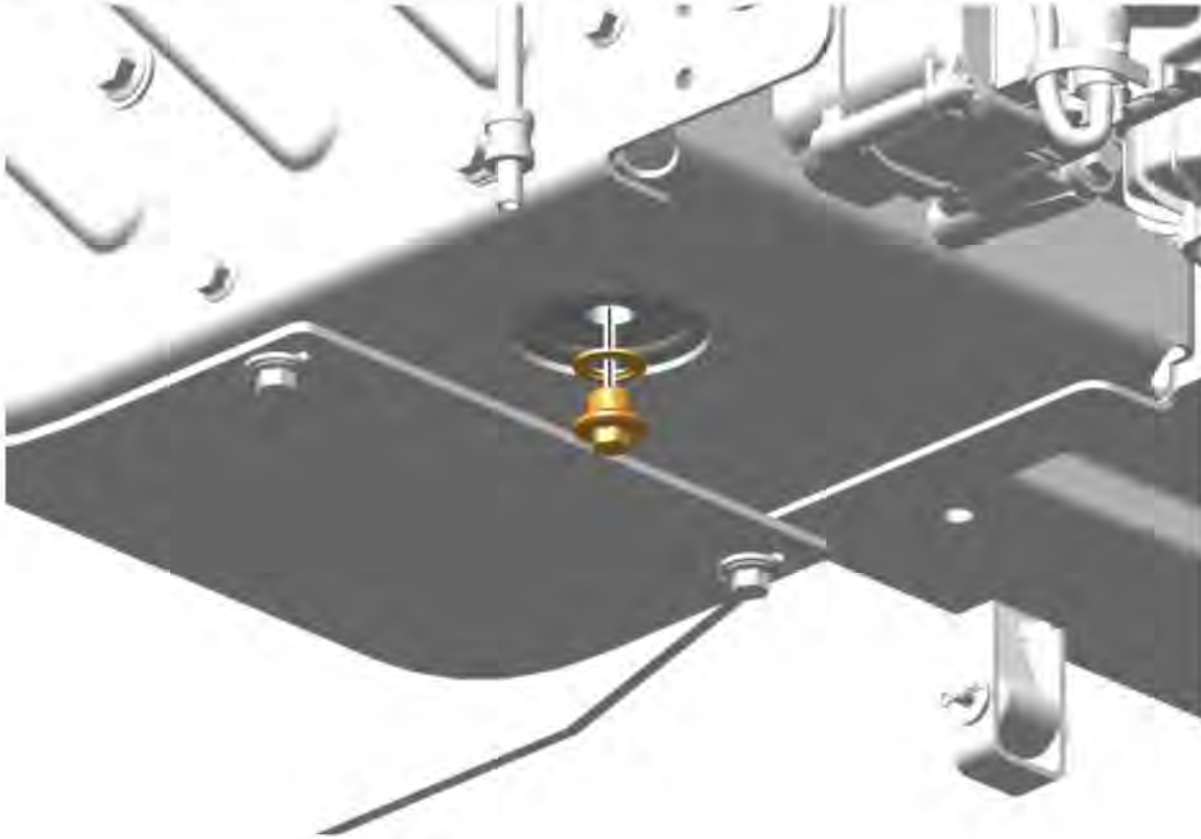
39 Place the filler cap in hot water.



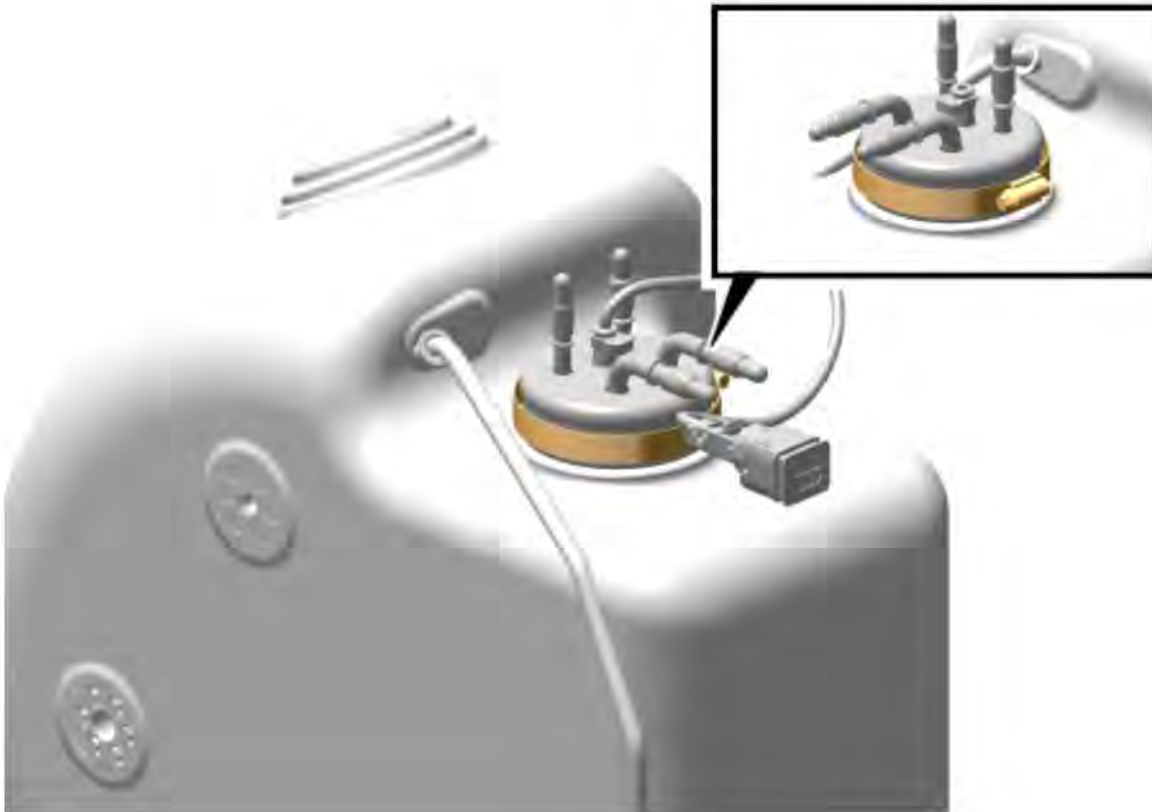
Note

Rinse and allow to dry.

40	Position a suitable container.
41	Remove the drain plug.
42	Remove the gasket.



43	Drain the reagent (Diesel Exhaust Fluid).
44	Remove the reagent (Diesel Exhaust Fluid) tank from the vehicle. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>i Note Refer to the function group for more information. Aftertreatment Diesel Exhaust Fluid (DEF) Tank, Replacement</p> </div>
45	Loosen the clamp.
46	Remove the clamp.



47	Remove the level sensor.
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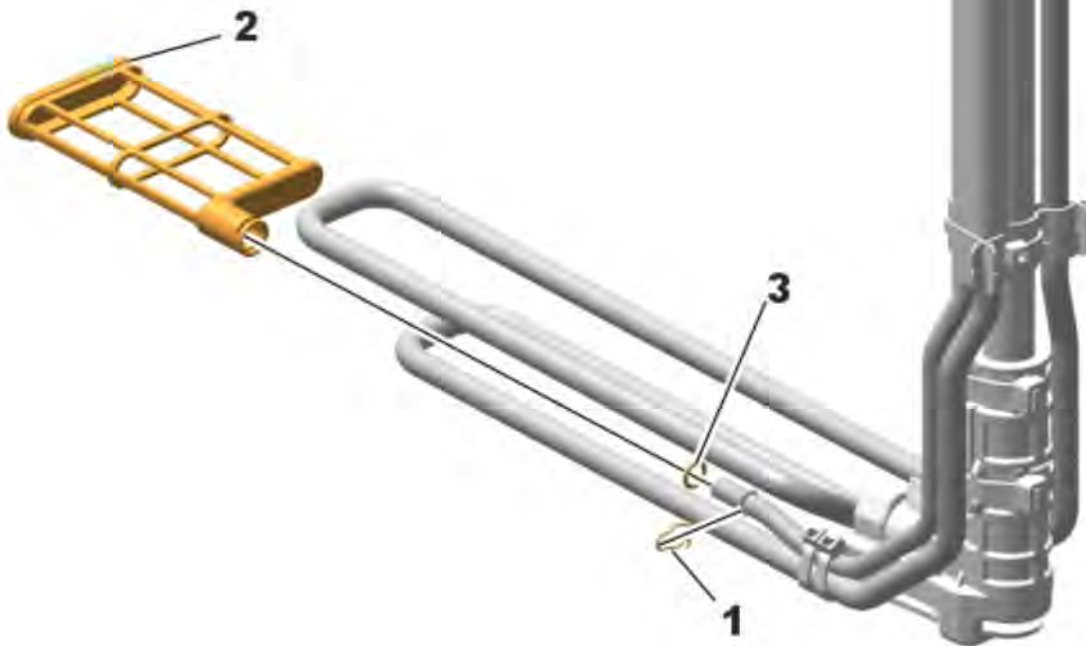
48	Remove the retaining clip (1).
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49	Remove the filter (2).
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50	Remove the O-ring. (3).
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51 Flush the reagent (Diesel Exhaust Fluid) pickup tube with hot pressurized water.



52 Install the O-ring. (3).

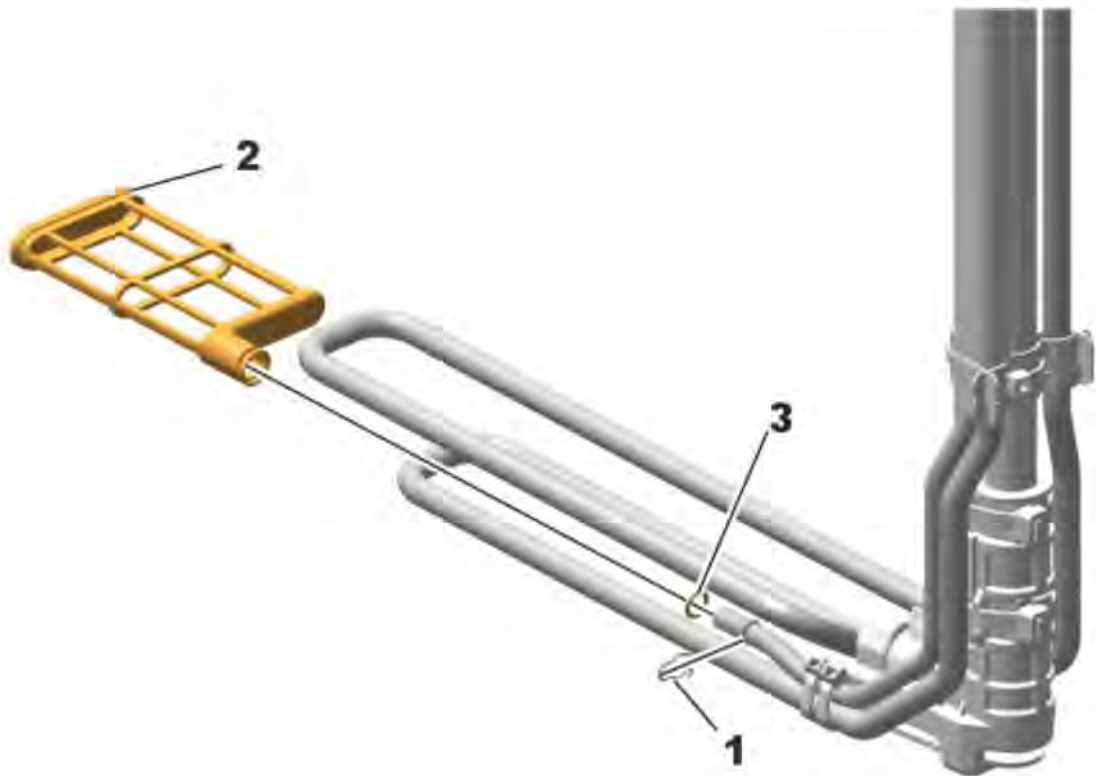


Note
Use a new part.

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53	Install the filter (2). <table border="1" style="width: 100%;"> <tr> <td style="width: 30px; text-align: center;">i</td> <td> Note Use a new part. </td> </tr> </table>	i	Note Use a new part.
i	Note Use a new part.		




54	Install the retaining clip (1). <table border="1" style="width: 100%;"> <tr> <td style="width: 30px; text-align: center;">i</td> <td> Note Use a new part. </td> </tr> </table>	i	Note Use a new part.
i	Note Use a new part.		



55	Check that the filter is secure on the pickup tube.
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56	Flush all reagent (Diesel Exhaust Fluid) hoses with hot pressurized water. <table border="1" style="width: 100%;"> <tr> <td style="width: 30px; text-align: center;">i</td> <td> Note Replace the hoses if necessary. </td> </tr> </table>	i	Note Replace the hoses if necessary.
i	Note Replace the hoses if necessary.		

57	Flush the reagent (Diesel Exhaust Fluid) tank with hot pressurized water through the filler neck.
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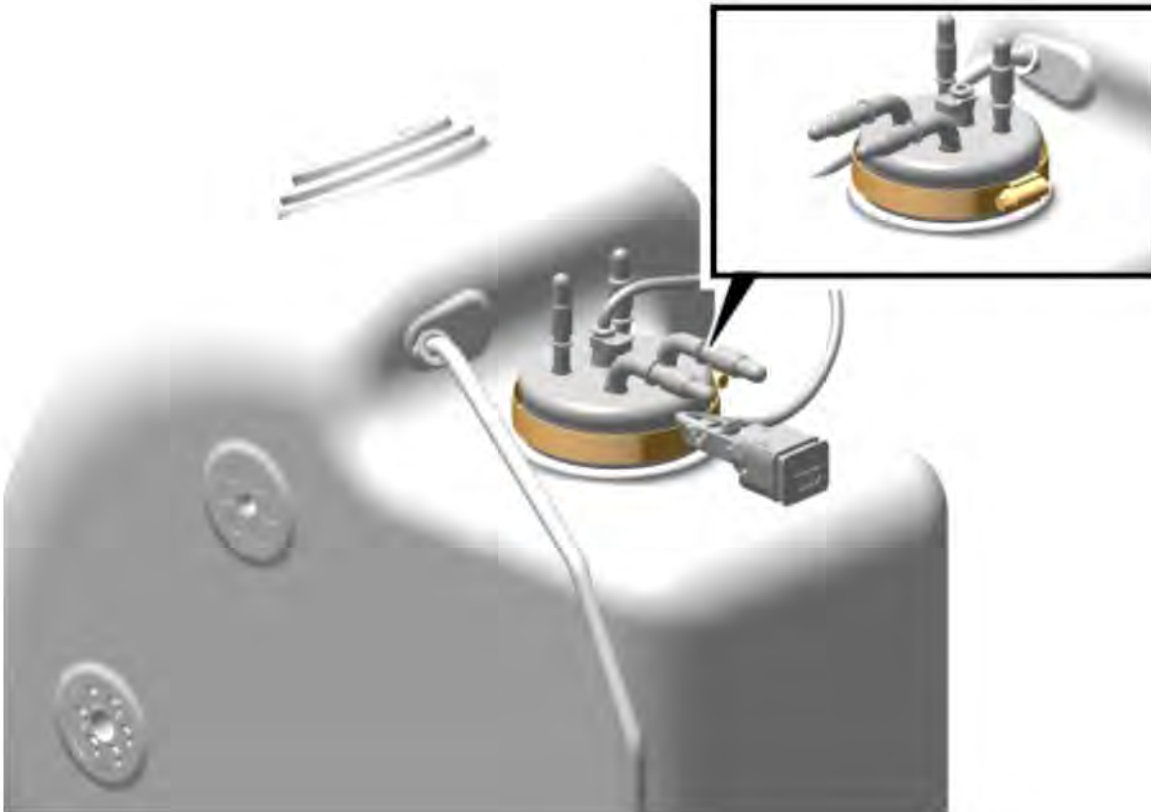
58	Drain all water, debris and contaminants from the reagent (Diesel Exhaust Fluid) tank. <table border="1"> <tr> <td>  </td> <td> Note Do not use paper or cloth towels to remove water from tank. </td> </tr> </table>		Note Do not use paper or cloth towels to remove water from tank.
	Note Do not use paper or cloth towels to remove water from tank.		

59	Install the level sensor.
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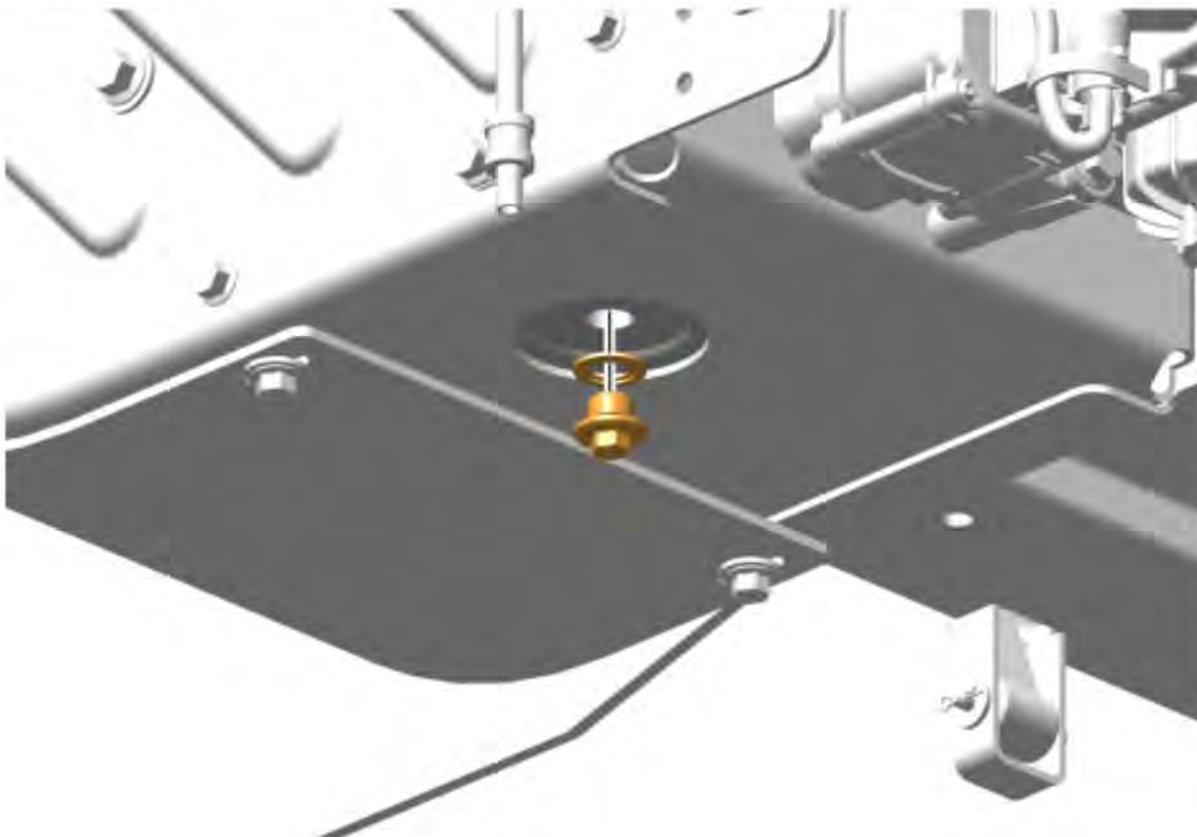
60	Install the clamp.
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61	Tighten the clamp.	
	Tightening torque	
	Tank, clamp	5 – 5.5 Nm (4 – 4 lb _f -ft)



62	Install the gasket.
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63	Install the drain plug.
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64	Install the reagent (Diesel Exhaust Fluid) tank on the vehicle.
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Refer to the function group for more information.

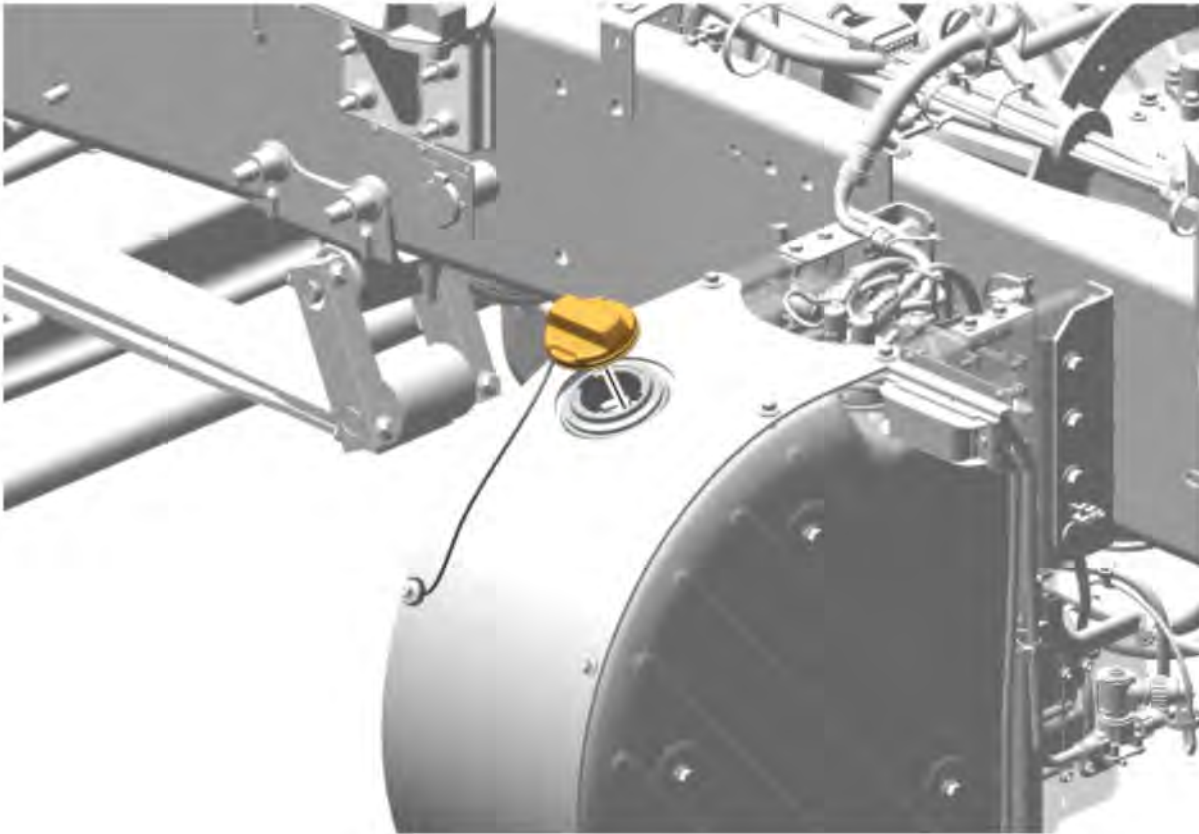
[Aftertreatment Diesel Exhaust Fluid \(DEF\)
Tank, Replacement](#)

65 Install the filler neck and screen.

66 Fill the tank with reagent. (Diesel Exhaust Fluid)



67 Install the filler cap.

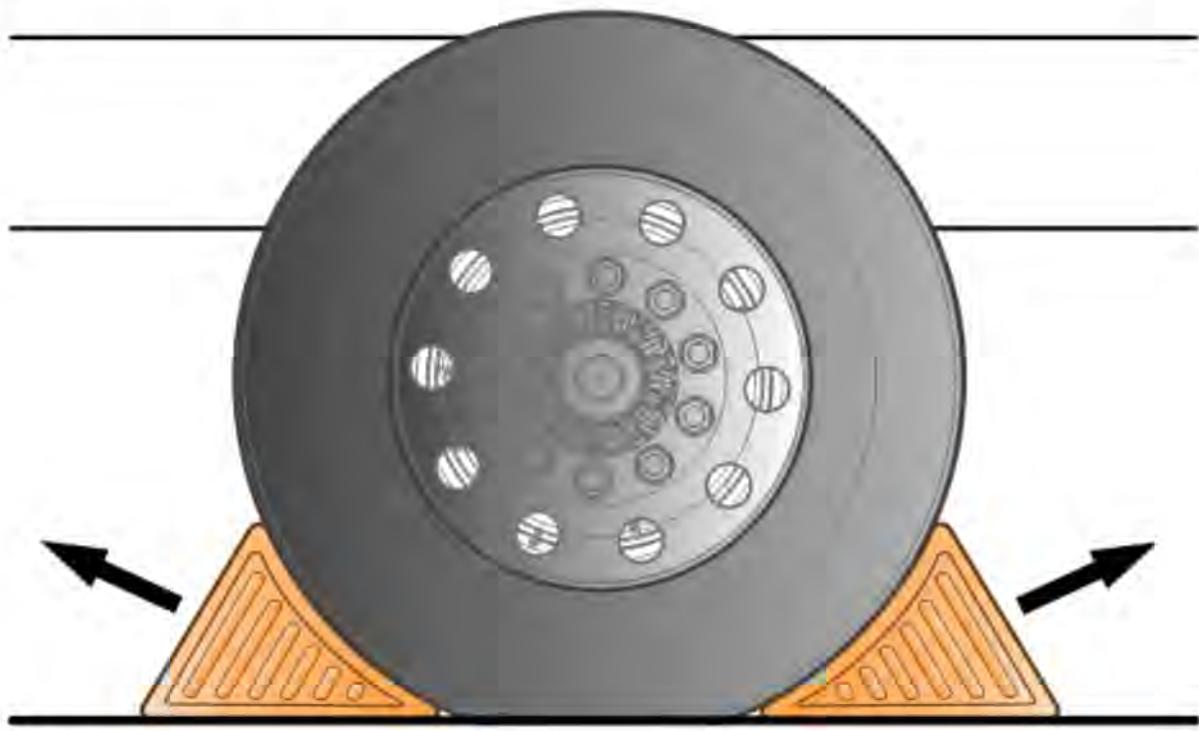


68	<p>Start the engine, allow it to idle.</p> <table border="1"> <tr> <td> </td> <td> <p>Note Approximately 2 minutes.</p> </td> </tr> </table>		<p>Note Approximately 2 minutes.</p>
	<p>Note Approximately 2 minutes.</p>		
69	<p>Connect the diagnostic tool (Premium Tech Tool).</p>		



70	<p>Perform SCR system, test in the diagnostic tool (Premium Tech Tool).</p>
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71	Perform Function parameters reset, calibration as instructed in the diagnostic tool (Premium Tech Tool).
72	Reset the DPF Differential Pressure sensor.
73	<p>Perform this procedure when the condition below is met.</p> <p>Conditions</p> <ul style="list-style-type: none"> • If the reagent (Diesel Exhaust Fluid) volume collected within the specification ▶ If the reagent (Diesel Exhaust Fluid) volume is not collected within the specification, replace reagent (Diesel Exhaust Fluid) pump and verify proper repair. ▶ If the reagent (Diesel Exhaust Fluid) volume collected within the specification, return vehicle to service.
74	Disconnect the diagnostic tool (Premium Tech Tool).
75	Turn off the engine.
76	Remove the wheel chocks.



77	Clean the equipment and tools that have come into contact with the reagent (Diesel Exhaust Fluid).
78	Discard used gloves in the container for recycling.

