



Exclusive U.S. **VAN HOO**L Distributor

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The following excerpt from the Van Hool Operating Manual is reprinted here for your convenience to inform you of the EPA '10 Regeneration Process for the Cummins ISX 11.9 2010 Engine.

Exhaust aftertreatment system

Introduction

Your vehicle has been equipped with an exhaust aftertreatment device. It consists of an oxidation catalyst (DOC), a particulate filter (DPF) and a "Selective Catalytic Reduction" catalyst (SCR) .

Particulate filter (DPF)



WARNING!

During a regeneration, the exhaust temperature can amount to 800°C. The high exhaust temperature can cause material in the flow of the exhaust pipe to start burning. Stay clear of the exhaust, burns hazard!

Most of the soot particles containing carbon and ash are captured in the DPF. The accumulated carbon disappears if the particulate filter is heated to the self-cleaning temperature (approx. 300°C). Once this temperature is reached, the carbon reacts with the nitrogen dioxide and burns to become carbon dioxide. This process is called regeneration.

If the regeneration happens while driving, it is called automatic regeneration. However, if the self-cleaning temperature is not reached while driving (e.g. due to frequent stopping), you have to intervene to make the regeneration take place. To this end, go for a ride driving at high speed (highway) during at least 20 minutes or carry out a stationary regeneration.

The "DPF regeneration" symbol appears on the dashboard display if you have to intervene to make the regeneration take place.

SCR catalyst

During engine operation, an additive (DEF) is injected in the SCR. The additive transforms the harmful nitrogen oxides in the exhaust gas into water and harmless nitrogen.



DEF is short for "Diesel Exhaust Fluid". It is a solution of the chemical substance urea in water, smelling of ammonia

It has to meet the DIN 70070 or ISO 22241-1 standard. In the long run, the use of impure DEF or other fluids can cause loss of quality and in the end clogging of the SCR catalyst. This reduces engine performance.

As soon as the vehicle ignition is switched on, the level in the DEF tank is shown at the top of the dashboard display.

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Messages on dashboard display

Symbol	Message
	<p>DEF level low</p> <ul style="list-style-type: none"> Phase 1: The symbol appears in order to inform that the level in the DEF tank has dropped to below 10 %. Add DEF. Phase 2: If you continue to drive without replenishing DEF and the DEF level drops below 5%, the symbol begins to flash. Replenish with DEF immediately. Phase 3: If you continue to drive without replenishing DEF and the DEF level drops below 3%, the message "ENGINE WARNING" also appears. Replenish with DEF immediately; if not, engine torque is limited. <p><i>NOTE: If the engine is switched off with empty DEF tank, the message "STOP ENGINE" will appear when restarting. Engine torque remains limited and vehicle speed is limited to 8 km/h.</i></p> <p><i>NOTE: Also appears for a few seconds when ignition is switched on.</i></p>
	<p>DPF regeneration required</p> <ul style="list-style-type: none"> Phase 1: The symbol appears to indicate that the particulate filter has to be regenerated at the next opportunity. Phase 2: If you continue driving without carrying out a regeneration, the symbol will start to flash after a while. Carry out the regeneration immediately. Phase 3: If you still do not carry out the regeneration, the "ENGINE WARNING" message also appears after a while. Immediately carry out a stationary regeneration, if you do not, engine power will be reduced. Phase 4: If you still do not carry out the stationary regeneration, the "STOP ENGINE" message will appear after a while. Immediately carry out a stationary regeneration, if you do not, the engine will be shut off. <p><i>NOTE: Also appears for a few seconds when ignition is switched on.</i></p>

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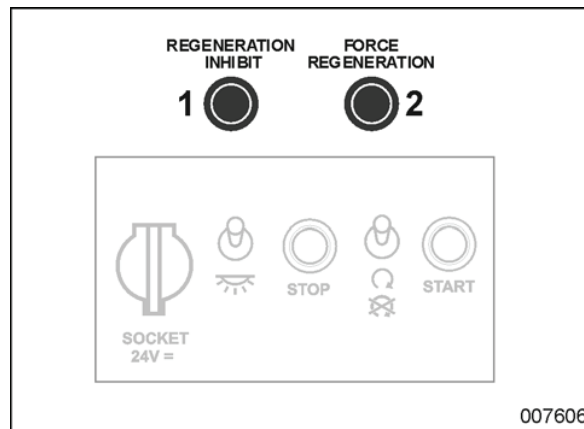
Symbol	Message
	<p>High exhaust temperature.</p> <p>The fact that this symbol appears does not mean that there is an engine problem. It only warns you of a high exhaust temperature due to a regeneration.</p> <p>Make sure the exhaust pipe is not directed toward a surface that will burn or melt at high temperature (grass, ..., asphalt!)</p> <p><i>NOTE: Only appears at low vehicle speed.</i></p> <p><i>NOTE: Also appears for a few seconds when ignition is switched on.</i></p>
DPF REGENERATION ACTIVE	The particulate filter goes through a stationary regeneration
DPF REGENERATION INHIBITED	Regeneration inhibited

Figure: regeneration buttons in engine compartment



1 "Regeneration inhibited" push-button (with integrated lamp)

2 "Stationary regeneration request" push-button

To request a stationary regeneration




WARNING!

During regeneration, engine speed can increase up to 1 000 to 1 500 rpm.

NOTE: Only carry out stationary regeneration with warm engine (coolant temperature above 85°C).

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Step	Action
1	Select an appropriate location to park the vehicle. Refer to "Appropriate location for stationary regeneration".
2	Apply the parking brake.
3	Make sure the transmission is in neutral position.
4	Put chocks in front of and behind the wheels.
5	Shut off the climate-control system.
6	Set up a safety area around the exhaust. Refer to "Safety area around exhaust".
7	<p>Press the "Stationary regeneration request" button and hold it for at least 2 seconds.</p> <p>If allowed by engine electronics, the stationary regeneration is started. The engine speed increases. The "DPF regeneration" symbol disappears from the dashboard display and the "DPF REGENERATION ACTIVE" message appears.</p>
8	 <p>WARNING!</p> <p>If an unsafe situation occurs, stop the regeneration process immediately by pushing the brake pedal or by switching off the engine. The regeneration process is also stopped if you momentarily press the "Regeneration inhibition" button.</p> <p>Observe the vehicle and its immediate surroundings during regeneration.</p> <p>The regeneration process takes 20 to 40 minutes. The regeneration has succeeded if the engine speed automatically returns to idling speed and if the "DPF regeneration" symbol does not reappear.</p> <p>If the "DPF regeneration" symbol reappears, the regeneration process has failed. In that case, ask for technical assistance.</p>

To inhibit/ interrupt regeneration



CAUTION!

Only use this function for a short while. Carbon accumulates in the device if the engine keeps turning with this function on.

If regeneration causes hazardous situations, you can inhibit/interrupt the regeneration process. To this end, momentarily press the "Regeneration inhibition" button.

The lamp integrated in the push-button comes on. On the dashboard display appears the text "DPF REGENERATION INHIBITED".

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Appropriate location for stationary regeneration

- Surface that will not start to burn or to melt under high temperatures (such as clean concrete; no grass or asphalt!);
- Away from anything that can burn, melt or explode;
- Not near gas or vapors that can ignite, explode or contribute to a fire (such as LPG, diesel vapors, ...).

Safety area around exhaust

- If bystanders can access the area, set up barriers at least 1,5 m away from the exhaust.
- If regeneration takes place in a confined space, connect an exhaust gas evacuation system to the exhaust pipe. The evacuation system has to resist temperatures of at least 800°C.
- Keep a fire extinguisher nearby.

To top up with DEF**WARNING!**

DEF can cause irritation of the bronchial tubes, the skin, the eyes and the mucous membranes. In the event of contact with the eyes, rinse the eyes immediately with ample water for at least 15 minutes. Avoid prolonged contact with the skin; in case of contact with the skin, wash with soap and water. In case of ingestion, seek medical assistance immediately.

DEF is stored in a separate tank on the vehicle, from where it is automatically injected in the SCR catalyst.

For the location of the DEF tank, refer to "Access doors and controls at the outside".

DEF is slimy to the hands; it is best to wear watertight gloves (PVC) while refilling.

Spilt DEF on the outside of the bodywork?

To prevent lacquer damage, immediately wash the affected area with water and then dry with a shammy.

Can DEF freeze in the tank?

If the temperature of the DEF drops below -11 °C, the solution "freezes". The crystalization already starts at 15 °C above the freezing point of the DEF. The injection system protects itself against DEF crystals in the tubes and in the DEF injector by cutting out when temperature is too low and cleaning itself by blowing.

System operation in cold environment is in accordance with the legal regulations and is an integral part of vehicle approval.

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Freezing has no influence whatsoever on the quality of the DEF and the solution can be used as soon as it is defrosted.
