



Common Diesel Exhaust Fluid (DEF) Issues and Troubleshooting Guide

Diesel Exhaust Fluid (DEF) is essential for modern diesel engines, as it helps reduce harmful emissions. It is a non-toxic mixture of 67.5% purified water and 32.5% automotive-grade urea.

DEF is a key part of the Selective Catalytic Reduction (SCR) process used by many medium and heavy-duty engine manufacturers to meet EPA 2010 regulations. When injected into the exhaust stream and passed over a catalyst, DEF converts harmful nitrogen oxides (NOx) into harmless nitrogen gas and water vapor.

However, if not handled properly, DEF can cause various issues. This guide will help you understand:

- **Common DEF Problems:** Including freezing, contamination, injector issues, sensor problems, and tank issues.
- **Signs and Symptoms:** How to identify problems early.
- **What to Look For:** Methods to verify the presence of these issues.
- **Solutions:** Suggestions to correct the issues.
- **Prevention:** Tips and best practices to avoid DEF-related problems.

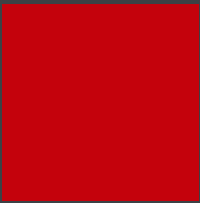
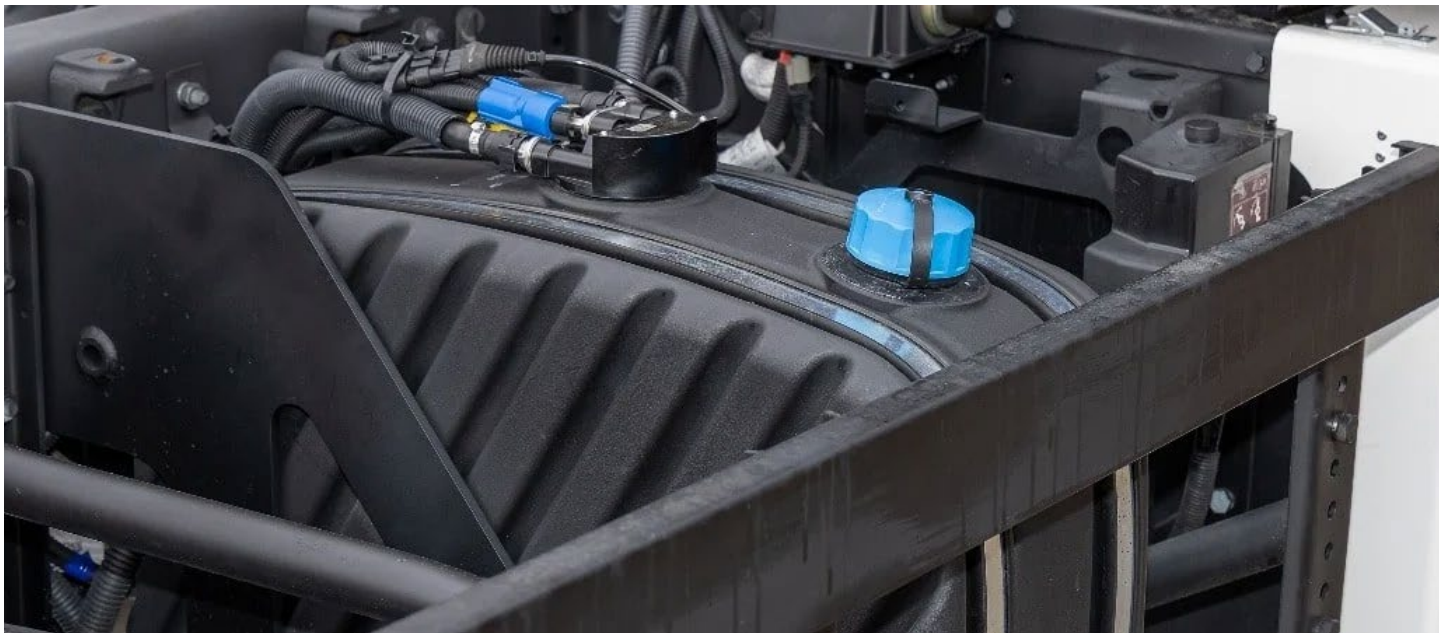


Table of Contents

Click link to jump to page

Top 5 Most Common DEF Problems	1
Contamination	1
Freezing	3
Crystallization	4
Incorrect DEF Concentration	6
System Blockages	7
Proper Storage Practices: The Best Way to Avoid Problems	8
How Can I Tell if Stored Def is Still Suitable For Use?	9





Top 5 Most Common DEF Problems

Disclaimer: This guide is intended to provide information on common issues, but it does not serve as a replacement for seeing a mechanic. For more personalized advice, [Speak with a Keller Heartt-Oil Associate.](#)

1. Contamination

DEF contamination can occur from poor handling practices, use of improper storage containers, or exposure to airborne contaminants.



Signs and Symptoms:

- DEF system warning lights on the dashboard.
- Reduced engine power.
- Increased DEF consumption.
- Crystallization around DEF injection components.



What to Look For:

- Inspect the DEF tank for visible particles or discoloration.
- Use a DEF test kit to measure purity levels.
- Check the DEF filter for clogs or residues.



Solutions:

- Drain the contaminated DEF from the tank and replace it with fresh, high-quality DEF.
- Clean the DEF tank and lines to remove any residual contaminants.
- Replace the DEF filter if it shows signs of contamination.



Preventative Measures:

- Store DEF in [clean, sealed containers](#).
- Avoid using metal containers that can react with DEF.
- Regularly clean DEF dispensing equipment.
- Ensure that the DEF tank is capped when not in use.

2. Freezing

DEF is composed of 32.5% urea and 67.5% deionized water, and it begins to freeze at 12°F (-11°C).



Signs and Symptoms:

- DEF warning light indicates low fluid, even if the tank is full.
- DEF pump fails to operate.
- Reduced vehicle performance.



What to Look For:

- Check the temperature of the DEF tank and lines.
- Inspect the DEF tank for ice formation.



Solutions:

- Move the vehicle to a warmer environment, or use a DEF heating system to thaw the frozen DEF.
- Ensure DEF heaters are operational and replace any faulty components.



Preventative Measures:

- Regularly check the functionality of DEF heaters.
- Ensure proper insulation of DEF components in colder regions.
- Use winterized DEF solutions designed for lower temperatures.
- Park the vehicle in a warm environment when possible.

3. Crystallization

Crystallization occurs when DEF evaporates, leaving urea crystals that can clog the system.



Signs and Symptoms:

- Crystallized DEF around the fill port or injection points.
- Reduced DEF flow rate.
- DEF system warning lights.



What to Look For:

- Visual inspection of DEF lines and injectors for white residue.
- Check DEF flow rate during system operation.





Solutions:

- Clean or replace (depending on severity) any injectors affected by crystallization with deionized water.
- Flush the system with deionized water to dissolve and remove crystals.



Preventative Measures:

- Regularly use the vehicle to prevent DEF from sitting and evaporating.
- Ensure that the DEF cap is properly sealed after each use.
- Routinely clean the DEF tank and lines.
- Avoid overfilling the DEF tank to reduce the risk of spillage and evaporation.

4. Incorrect DEF Concentration

Incorrect mixing or low-quality DEF can lead to improper urea concentration.



Signs and Symptoms:

- Increased DEF consumption.
- Poor vehicle performance.
- DEF warning lights.



What to Look For:

- Use a refractometer to check the urea concentration in DEF (32.5%).
- Inspect the DEF label for concentration information.



Solutions:

- Remove the incorrect DEF and refill with properly concentrated DEF.
- Ensure the new DEF meets the correct concentration standards before use.

Preventative Measures:



- Always buy DEF from trusted suppliers with verified concentration levels.
- Never dilute DEF with water or other substances.
- Keep DEF containers sealed and stored properly to maintain concentration.
- Regularly test DEF concentration using appropriate tools.

5. System Blockages

Blockages can occur due to crystallization, contamination, or degraded DEF components.



Signs and Symptoms:

- Reduced DEF flow rate.
- Increased back pressure in the DEF system.
- DEF system warning lights.



What to Look For:

- Inspect DEF lines and injectors for blockages or residue.
- Check the DEF filter for clogs.



Solutions:

- Clean or replace blocked filters, lines, or injectors.
- Use deionized water to flush out any remaining blockages.



Preventative Measures:

- Regularly clean and maintain DEF lines and filters.
- Avoid using contaminated or degraded DEF.

Proper Storage Practices: The Best Way to Avoid Problems

Proper storage practices are crucial to maintaining the quality and effectiveness of DEF. Following these guidelines can help prevent many common DEF-related issues:

- **Temperature Control:** Store DEF between 12°F (-11°C) and 86°F (30°C) to prevent freezing and degradation.
- **Sealed Containers:** Always keep DEF in tightly sealed containers to avoid contamination from dirt, dust, and other particles.
- **Clean Environment:** Store DEF in a clean, dry area away from direct sunlight and moisture to prevent contamination and degradation.
- **Avoid Metal Containers:** Use plastic or stainless steel containers, as metal can react with DEF and cause contamination.
- **Proper Handling:** Always use dedicated equipment for handling and dispensing DEF to prevent cross-contamination.

How can I tell if stored DEF is still suitable for use?

To determine if stored DEF is safe to use, check these factors:

- **Expiration date:** DEF packaging includes an expiration date that is valid when the DEF is stored properly.
- **Color and clarity:** Fresh DEF is clear with a yellow tinge. Discolored or cloudy DEF may be unsafe.
- **Consistency:** As DEF degrades, particulate matter (i.e., crystals or solid matter) may be seen around the lid or spout.
- **Smell:** A slight ammonia smell is typical, but a strong odor indicates a chemical breakdown of DEF.

If visual checks are not conclusive and you suspect a problem, it's always best to avoid using DEF that might damage your vehicle.

For all your DEF needs, trust Keller-Heartt Oil. As a leading distributor, we offer expert advice, high-quality [DEF fluids](#), [storage containers](#), and [related equipment](#) to keep your engine running at its best.

