



**Emission
Solutions**

DEF Quality And Maintenance.

For Selective Catalytic
Reduction (SCR) Systems.



Why Is DEF Needed?

Many engines use Cummins Emission Solutions proven Selective Catalytic Reduction (SCR) systems to deliver ultra-low oxides of nitrogen (NOx) emissions to meet regulations while optimizing fuel efficiency. SCR efficiency is dependent on Diesel Exhaust Fluid (DEF), so it is important to understand how to properly handle and store your DEF for a properly maintained and fully optimized engine system.



DEF Handling.

DEF is not hazardous, but short-term exposure can be mildly irritating to eyes and skin, and proper personal protective equipment should be used when handling DEF. Some materials may corrode if contact with DEF occurs for an extended period of time. Such materials include:

- Carbon steel, zinc-coated carbon steel and mild iron
- Non-ferrous metals and alloys: copper, copper alloys, zinc and lead
- Solder-containing lead, silver, zinc or copper
- Aluminum alloys
- Magnesium and magnesium alloys
- Plastics or metals coated with nickel

It is important to keep the system and tools clean; however, if material contact with DEF occurs, clean the surface immediately. Reference Service Bulletin 4021566 for additional information.

DEF Transportation And Storage.

Only approved containers should be used to transport and store DEF. Containers made of polyethylene, polypropylene or stainless steel (Grade 316) are recommended.

Some DEF containers include a paper seal under the cap. The seal will degrade over time and contribute to DEF contamination. Such containers must be inspected regularly once opened, in order to prevent contamination. To avoid crystal precipitation or hydrolysis of the DEF, store it at a temperature of 77°F (25°C). Avoid direct contact of DEF with sunlight.

When stored between 10°F (-12°C) and 90°F (32°C), DEF will remain stable for at least one year. Bulk (1,000-gallon) dispensers have climate-control systems, but intermediate bulk containers (IBCs) do not. Therefore, in cold temperatures, IBCs should be kept in a storage unit. In warm temperatures, IBCs should be stored in a shaded area to avoid potential water evaporation and conversion to ammonia. DEF's freezing point is 12°F (-11°C). Cummins recommends the use of Fleetguard® DEF, which is in accordance with the requirements of ISO 22241-1.

Minimum Cleanliness Requirements.

Materials that come into contact with DEF must be free from contamination, oil, fuel, dust, detergents and any other chemicals. Containers, funnels and other equipment that will contact or store DEF should be cleaned before use. Wash thoroughly and rinse with distilled water. If distilled water is unavailable, rinse with tap water, then rinse with DEF.

To avoid contamination when filling the tank:

- Clean the in-vehicle DEF tank before removing the cap
- Clean the in-tank neck and neck filter, if applicable, after removing the cap
- Wipe the DEF container prior to opening for refill
- Clean the dispensing nozzle prior to filling
- Ensure that the dispensing nozzle is kept in the DEF tank to minimize drips and mishandling

To avoid contaminating DEF during routine maintenance tasks:

- Close DEF ports during operation or repair
- Remove dust and debris before using a coupler or insert connection
- Ensure that a proper DEF storage container is being used and inspected as necessary
- Conduct periodic inspections, and remove crystallized DEF, if present



Visual Inspection.

Periodic inspections of the system are critical to preventing contamination and its associated risks. Recommendations include:

- Periodically inspecting the tank neck and tank venting filters for cleanliness. Use a refractometer to measure the quality of in-tank DEF on the application or in storage (refractometer part number 4919554)
- Watching for signs of possible contamination, debris or other fluid mixtures
- Checking for damaged parts that could compromise DEF quality due to exposure
- Inspecting maintenance areas for possible contaminants that could be introduced during servicing
- Following manufacturer-recommended precautions during service and system maintenance
- Ensuring that the DEF label shows certification for proper purity levels and concentration of urea in your DEF
- Inspecting and replacing the DEF tank venting filter, per the owner's manual specifications, if applicable

If the application or operation of the equipment does not allow for a clean environment for refilling the DEF tank, a closed system will keep the system free from contamination. If any contamination is noticed during routine inspection, schedule your equipment for service.



Achieving Maximum Performance.

These and your equipment manufacturer's recommendations are intended to optimize system performance and minimize the risk of contamination in your system, keeping your operation running and lowering your risk of derates. Keep adequate records of maintenance events to help determine and predict future maintenance needs and to keep track of past exposure. These practices will help in achieving maximum performance.

For more information, contact your local distributor or visit QuickServe® Online.

The following service bulletins can be found at quickserve.cummins.com.

- Technical Service Bulletin 150002: Diesel Exhaust Fluid (DEF) Cleanliness
- Technical Service Bulletin 140093: Recommended Practices If Contamination Is Found
- Technical Service Bulletin 110168: High-Efficiency Diesel Exhaust Fluid (DEF) Tank Filter
- Technical Service Bulletin 4021566: Diesel Exhaust Fluid (DEF) Specifications
- ISO 22241-1: Diesel Engines Oxides Of Nitrogen (NOx) Reduction Agent
- ISO 22241-3: Handling, Transportation And Storage Of Diesel Exhaust Fluid (DEF)





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