



## What is Diesel Exhaust Fluid (DEF)?

Diesel Exhaust Fluid (DEF) is intended for use with diesel vehicles using SCR technology only. DEF is a clear, non-toxic, non-flammable, and nonhazardous organic compound consisting of 32.5% urea and 67.5% de-ionized water that requires no special handling.

- DEF may have a slight odor similar to that of household ammonia
- DEF is a high-purity urea solution complying with the Standards of ISO 22241
- DEF is safe to handle
- DEF weighs approximately 9.2 lbs. per gallon

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When it comes to the success of your operation, you can rely on your local energy specialists. They are uniquely qualified with the knowledge and expertise to help you improve profits, cut downtime and reduce maintenance expenses. Count on the energy experts at Sunderland Co-operative Inc. to help you go further.

[www.fsdef.ca](http://www.fsdef.ca)

**1-800-567-2667**



**Diesel Exhaust Fluid**

The QUALITY you want, the PURITY you need.

## Why use Diesel Exhaust Fluid (DEF)?

To achieve the nitrogen oxide (NOX) levels required by the EPA 2010 standard, most engine manufacturers are utilizing Selective Catalytic Reduction (SCR) systems that require the addition of DEF. Off-road engines will be impacted by similar emission standards which began in 2014.

## How do I know when to refill the DEF tank?

The EPA requires manufacturers to put measures in place to ensure that SCR equipped diesel engines do not run without DEF. In response, manufacturers have equipped both on-road and off-road SCR units with multiple step driver notification systems. Before the DEF tank runs empty, the operator is given a series of alerts on their dashboard display.

DEF notification systems vary among manufacturers but all are designed to give the operator ample opportunity to refill the DEF storage tank before any impact to full operability. However, if these driver inducements are ignored and DEF levels become too low or the fluid is of poor quality, the engine is derated and ultimately speed is limited to 8 kph.



## How does the SCR process work?

The NOX reduction process starts with an engine burning clean Ultra Low Sulfur Diesel and producing exhaust that is already much cleaner due to leaner and more complete combustion.

Under the control of the vehicle's onboard computer, precisely metered spray patterns of DEF are injected into the exhaust stream ahead of the SCR converter allowing the exhaust gases and atomized mist of DEF to enter the converter simultaneously. Together with the catalyst inside the converter, the mixture undergoes a chemical reaction that converts the nitrogen oxides to elemental nitrogen (N<sub>2</sub>) and water (H<sub>2</sub>O).

Exhaust gases are monitored via a sensor as they leave the SCR catalyst. Feedback is supplied to the main computer that adjusts the DEF flow to keep NOX levels within acceptable parameters.

## How many litres of Diesel Exhaust Fluid will I USE on average?

Consumption rates vary but are usually around 5% of diesel fuel consumed. It can be expected that 5 litres of DEF will be used for every 100 litres of diesel fuel.

## FS DEF is available in jugs, totes and drums for your convenience.



## Is there a chance of mixing DEF with the diesel fuel?

It is not likely. While the fuel and DEF tanks may be located in close proximity, the DEF tank has a smaller opening and a different color cap than the fuel tank to prevent contamination.

## How does DEF perform in cold weather?

SCR systems are designed to operate in cold climates. DEF begins to freeze into a crystalline slush at 12° F (-11° C). The 32.5% urea solution ensures that both the water and urea freeze and thaw at the same rate preventing the solution from becoming diluted. Repeated freezing and thawing does not degrade the product.

Frozen DEF expands approximately 7% and tanks are designed to accommodate the expansion.

The SCR system is designed to quickly return frozen DEF back into a liquid form. Manufacturers use a variety of heating methods to thaw frozen DEF tanks, including in-tank heating elements. Sometimes supply lines are also heated to prevent freezing during operation. While the SCR system and DEF is thawing, the vehicle's performance is unaffected.

## How long can DEF be stored?

Between 12°F (-11° C) and 86°F (30° C), DEF can be stored for a maximum of 12 months. Shelf life deteriorates to 6 months when temperatures are held at a constant 95°F (35° C) or higher.

***The QUALITY you want, the PURITY you need.***

