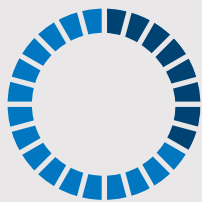


# ALL ABOUT DIESEL EXHAUST FLUID

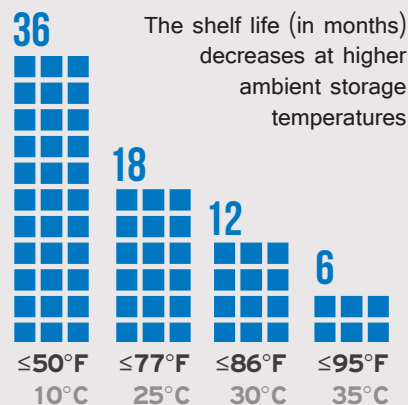
## THE BASICS



DEF is **32.5%** automotive grade urea and **67.5%** de-ionized water.

### IS DEF DANGEROUS?

The colorless fluid is not toxic, hazardous or flammable. It can be corrosive to certain materials such as steel, iron, zinc, nickel, copper, aluminum and magnesium. If a small amount should happen to be spilled, it can be rinsed with water or wiped up.



**12°F** [-11°C]

At or below this temperature for prolonged periods, DEF will freeze. Freezing doesn't hurt DEF, but it does expand when frozen. This can cause a fully filled, closed container to burst.

## DEF CONTAMINATION

Manufacturers of high horsepower diesel engines, specifically those 75hp and above, are using Selective Catalytic Reduction (SCR) systems to meet emissions regulations.

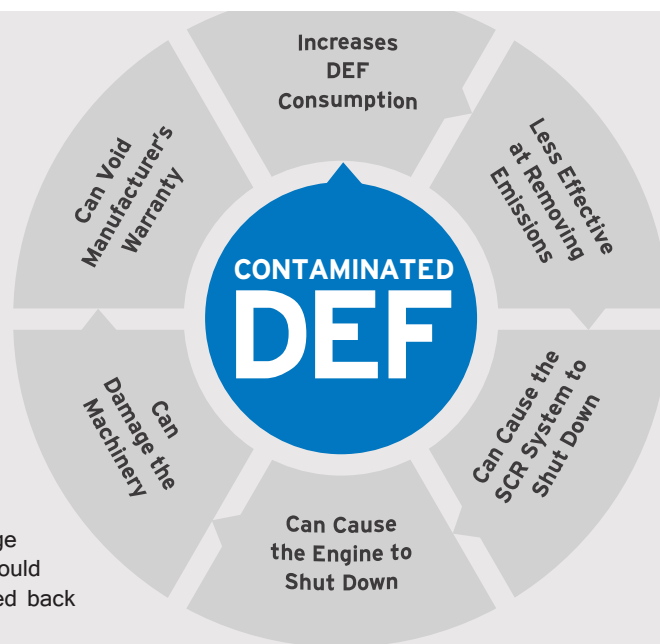
SCR technology involves a process where DEF is injected into the engine exhaust. This produces a chemical reaction with nitrogen oxides, converting them to water and nitrogen before releasing them through the equipment's tailpipe.

In order for the SCR system to function effectively, it is imperative that the quality of the fluid is maintained. DEF is sensitive to chemical impurities.

A small concentration of common elements (listed below) can contaminate an entire tank of DEF.

Contaminated DEF poses risk to your operation. A system using contaminated DEF will consume more fluid and be less effective at reducing emissions from the exhaust.

Over time, this can damage the catalyst in the SCR system, causing the engine to shut down and leaving your equipment idle in the field. It may damage your machinery and a manufacturer could opt to void the warranty if damage is tied back to contaminated DEF.



DEF CONTAMINANTS | Copper, Zinc, Chromium, Nickel, Iron, Aluminum, Phosphorous, Magnesium, Calcium, Sodium, Potassium.

## MAINTAINING PURITY

Because DEF is easily contaminated and purity is crucial in the SCR process, the International Organization for Standardization has developed the ISO 22241 Standard for how DEF is manufactured and how it should be handled. Here's what you need to know to prevent contamination in off-road environments.

### STEP 1

Make sure the fluid you purchase meets the ISO Standard by looking for the API Diesel Exhaust Fluid Certification Mark.

### STEP 2

Use a container made for DEF. It should be constructed with materials approved in the standard, and sterilized and sealed properly.

### STEP 3

Maintain a clean, closed fluid path. The standard allows for open systems, but they must be sterilized between each use. This isn't practical in off-road environments, so closed systems are best here.

### STEP 4

Keep your workspace clean. Dirt and debris near the DEF fill port can also lead to contamination.

# DEF DELIVERY SOLUTIONS

INDUSTRY LEADING SOLUTIONS  
FROM THUNDER CREEK

## CLOSED 2-IN-1 SYSTEM



Fill from Bulk Supply



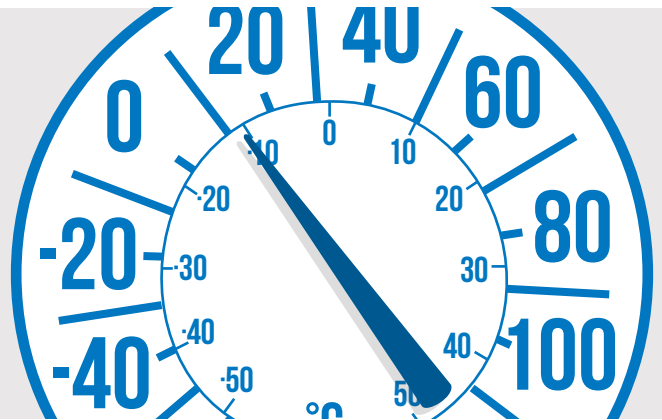
Dispense into Machinery



Manufacturers of off-road machinery and makers of DEF agree closed systems are best to maintain DEF purity. If you don't use a closed system, the ISO Standard recommends sterilization between each use. Thunder Creek's exclusive, patent-pending 2-in-1 DEF Pumping System fills and dispenses without exposing DEF to contamination. It also eliminates the need for a separate transfer pump.

## FREEZE PROTECTION

Thunder Creek's FST Series Trailers are the only DEF handling system on the market equipped with specialized tanks design to accommodate expansion as DEF freezes. The 2-in-1 DEF Pumping System easily back flushes residual fluid into the tank so you can safely store DEF in the trailer over winter months without causing damage. For operations that require year round DEF use, heating systems are available options on every Thunder Creek DEF Delivery Solution.



## THE BEST WAY TO HANDLE DEF

Thunder Creek's DEF Delivery Solutions are the cleanest and most convenient way to deliver DEF to high horsepower off-road machinery. All are made in strict accordance with the ISO 22241 Standard. By using the exclusive, closed 2-in-1 DEF Pumping System to fill and dispense, the systems are designed to maintain ISO compliance for life.



866.535.7667 | [ThunderCreek.com](http://ThunderCreek.com)



Thunder Creek Equipment  
1833 Highway 163  
Pella, IA 50219  
A division of LDJ Manufacturing, Inc.