



Diesel Exhaust Fluid (DEF): Planning Ahead

Key considerations for effective
on-going operations

A new day has dawned for diesel vehicles and with it, two new terms that every fleet manager will have to know: **Selective Catalytic Reduction (SCR) and Diesel Exhaust Fluid (DEF), also known as urea or AdBlue in Europe.** In the battle to reduce nitrous oxide emissions (NOx) to the new US EPA regulations, diesel engine manufacturers are switching to SCR technology. The only exception is Navistar/International, which is clinging to their version of "enhanced EGR". Rumor has it that even they will convert to SCR in the near future. But we are not here to debate the benefits and shortcomings of each method. Instead, let's focus on the material handling issues involved with DEF.

By now, most every fleet manager has been introduced to the fundamentals of SCR and DEF. Basically, a catalytic convertor and DEF injector has been added to the exhaust system. The DEF chemically bonds with the nitrous oxides in the exhaust stream and is converted to nitrogen and water by the SCR catalyst, significantly reducing NOx emissions. While this is great news for the air we breathe, we now have a new chemical to deal with. So, what are the issues?

DEF is essentially urea (ammonia and CO₂) and water. It is not flammable. It is not considered hazardous in the sense that acids and caustics are but caution should be used in handling. You should talk to your DEF supplier and read the MSDS information for specifics. The more important issues are related to quality, contamination, storage and dispensing.

Quality and contamination are major factors for DEF. Contaminated or out-of-spec DEF will not function properly, causing higher emissions and possible damage to the catalytic convertor. The best way to insure product quality is to purchase from a reputable DEF supplier. They will provide a Certificate Of Analysis (COA) to ISO-22241 with each shipment. DEF is easily contaminated, so it must be stored in and dispensed by specialized equipment using only stainless steel, polypropylene and other approved materials. A closed system is best to keep contaminants out of the fluid. ***DEF cannot be stored in or dispensed by standard fuel handling equipment such as tanks, piping, pumps, hoses and nozzles!***

DEF can be purchased in bulk for tank storage, in 275 or 330 gallon IBC totes, or 55 gallon drums. DEF is also packaged in 2 gallon jugs sold at retail locations. Your storage choice should take into consideration the expected DEF monthly consumption over the next 2-3 years and whether drivers will top off DEF tanks as part of the fueling process or mechanics will manage DEF as part of vehicle maintenance. Estimates are that DEF usage will be about 2-3% of diesel usage. An operation with a couple of DEF-equipped vehicles can be managed using 55 gallon drums. As consumption increases, totes and bulk tanks become more practical and economical. This is particularly true if drivers will be handling the DEF and dispensing moves from the shop to the fuel island. In that case, temperature becomes a factor as DEF freezes at 12° F, so heating is needed. Products are on the market today to manage storage and dispensing at each volume level.

Drum pumps are available to dispense from 55 gallon drums. These pumps must be specifically designed for DEF. The best pumps are pre-wired, plumbed and come with an approved hose and stainless steel nozzle. They should be equipped with an inlet air filter to eliminate contaminants. Care must be taken when switching drums so as not to contaminate the new drum by laying the pump down on a dirty surface. Drum carts are now available to make this operation portable.

Tote pumps come in two configurations: tote-mounted pump and heavy duty stand pump. Both should be equipped with the closed system fittings that correspond with the tote. Optional meters are generally available as are pulsers for connecting to a fleet fueling management system. Stand pumps are heavier duty, have higher flow rates plus the added flexibility of adding a high hose retriever or hose reel.

Outdoor storage presents the challenge of dealing with temperature. DEF shelf life is reduced by prolonged exposure to average temperatures above 86° F but we are much more concerned about freezing. The solution for northern climates is heated storage. These systems come in several configurations for tanks and totes. They house the dispenser and hose as well. It is the only option that makes sense for making DEF available at the fuel island. For most fleets of any size, this will be ultimate solution. It is the solution now being rolled out at truck stops and large trucking operations.

It's time to make plans for DEF so that you are ready when that first truck shows up at your site. A new playing field has opened in the US and there are many equipment manufacturers trying to get into the game. Planning for your future fleet needs will help you to determine where to start. Seek advice from a knowledgeable professional. It will help you make the right choices and protect your long term investment.

Questions?

Please contact us so that we can help.

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