

Feature

DEF is Coming! DEF is Here!

The Ins And Outs of Diesel Exhaust Fluid

By Vijay Srinivasan

You know that Diesel Exhaust Fluid (DEF), a high purity urea solution in water, will be used to control diesel engine emissions in order to meet EPA standards. Here's how you can be prepared to dispense and profit from DEF.

The EPA has mandated tougher emission control standards for all on-highway diesel vehicles, effective Jan. 1, 2010. Vehicle manufacturers have developed Selective Catalytic Reduction (SCR) technology, which uses DEF to convert noxious NOx into harmless nitrogen gas, which makes up 80% of the air we breathe. (It's expected to provide a 5% fuel economy advantage.) DEF is a high purity solution of 32.5% urea in water. Urea is a colorless, odorless, non-hazardous, non-flammable, non-combustible crystalline solid made from natural gas. Between 50% and 75% of diesel cars and light duty vehicles are expected to use SCR technology.

ISO standards require the use of stainless steel and certain plastics for DEF storage in order to prevent SCR catalyst poisoning. Materials specifically not recommended include non-ferrous metals and alloys (copper, aluminum, magnesium, silver, zinc and lead), solders containing non-ferrous metals, and nickel-coated plastics and metals. Bortles (2.5 gallon), drums (55 gallon) and totes are most commonly made of polyethylene. Large storage tanks can be made of stainless steel or coated

carbon steel. To ease the burden of compliance to ISO standards, the American Petroleum Institute (API) has developed a certification program for the fluid. API will certify licensed DEF marketers and enforce compliance to the program, so that when consumers purchase DEF carrying the API certification, they can be confident that the fluid will not damage their vehicle exhaust systems.

Another storage and handling issue is the regulatory role of local authorities. As you are aware, there are numerous local authorities you have to satisfy. DEF is a non-flammable and non-combustible fluid, over two-thirds of which is water. As such, storage and dispensing of the fluid should be of no concern to fire marshals.

A potential problem in handling DEF is that it freezes at 11°F. The most cost-effective solution for the majority of dealerships that will handle small quantities (1,000 gallons per year) is to store and dispense DEF indoors. If indoor dispensing is practical, you don't need heated enclosures. Another problem with DEF is that heating for long periods above 85°F causes the DEF to decompose, slowly decreasing shelf life of the fluid from about 18 months. For most of the country this slow loss of shelf life will not matter because the fluid should be consumed much faster than that. Store and dispense indoors and keep the containers away from direct sunlight.

Most cars and light duty trucks will have 5-7 gallon on-vehicle tanks to store DEF. The DEF will be metered by the on-board computer into the exhaust gas at rates required to meet the tailpipe NOx standards. Based on a 7-gallon DEF tank, 20 miles per gallon of diesel, and 24 gallons of DEF per 100 gallons of diesel, a vehicle owner would need to fill the DEF tank every 3,500-7,000 miles, or about the interval between oil changes. The average quantity per fill (at 5,000 mile intervals) is less than one gallon. The dealership can charge a flat fee to fill the DEF tank, which could mean some customers would pay more than others depending on how empty the tank is when a vehicle comes in for service. Because customer fees do not depend on the amount of fluid sold, users of this method avoid having to meet complicated, onerous and expensive weights and measures regulations.

The amount of DEF used will vary widely. DEF demand per vehicle should be less than 10 gallons per year, assuming that the vehicle travels 12,000 mile per year @ 25 miles per gallon and that 4 gallons of DEF is used per 100 gallons of diesel. The average DEF usage per dealership will be about 100 gallons in 2010, growing to 900 gallons in 2013.

The lowest cost dispensing system (\$100-\$300) is a DEF-compatible rotary pump with appropriate dip tube, required hose and a manual or auto-shutoff nozzle.

The system, which is easy to set up and use, will fit 55-gallon drums and 16-gallon kegs. The unit is most useful for dealerships with small maintenance facilities with low demand (50-200 gallons per year).



Typically costing about \$1,000, an IBC / drum top dispenser systems can get the service department



running with minimal installation time. The systems include stainless steel pump, suction tube with coupler, digital battery operated meter and an automatic shut off stainless nozzle. The system can be mounted on a cart or a dolly so that a mobile system would be available anywhere in the shop. This is suitable for shops dispensing 200-1,000 gallons per year, which should handle all but the largest dealerships.



An indoor system with inventory control and tracking can be outfitted with the DEF control panel, which has the capability to control and manage the consumption of DEF for very large dealerships. The inventory control system consists of a dedicated multi-user panel with the option to connect to a PC. Depending on options used, these could

range from \$3,000-\$4,000.

In summary, DEF is here, it's inexpensive and easy to acquire, store and dispense in any service department. And now you're ready for DEF!



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