



# A Better Solution. Every™ Time.

Diesel Exhaust Fluid (DEF) For  
Tier 4 Final/Stage IV Engines With SCR.



# Forward To Final.



U.S. Environmental Protection Agency (EPA) Tier 4 Final and European Union (EU) Stage IV emissions regulations take effect in the 2014-to-2016 time frame, depending on engine power, application and output. To achieve near-zero emissions, Cummins engines above 75 hp (56 kW) use proven Selective Catalytic Reduction (SCR) technology, a solution with the simplicity of a flow-through exhaust aftertreatment system that delivers ultra-low emissions with higher fuel efficiency.

The key to SCR efficiency is an aqueous urea solution called Diesel Exhaust Fluid (DEF) that functions as a reactant in the catalytic process. This is the exact same DEF (or, as it is known in Europe, AdBlue®) currently used in on-highway diesel-powered trucks and cars, and it will be required for use in virtually every off-highway engine starting in 2014. It is widely available, with North American consumption expected to be over 400 million gallons in 2015.

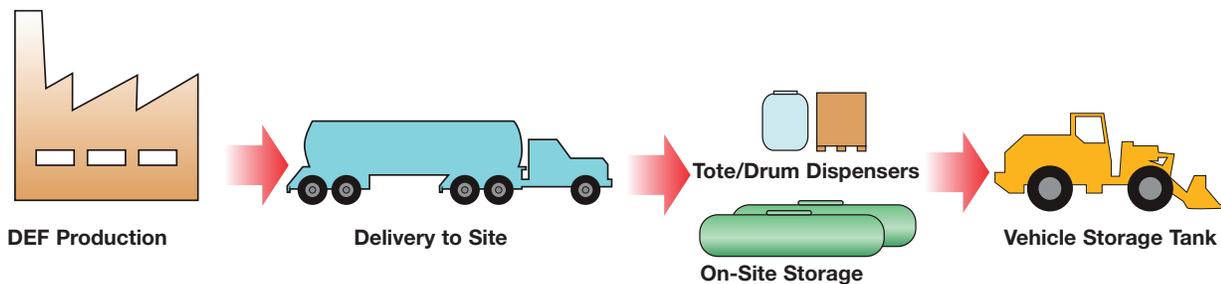
Here are the basics about DEF, its role in reducing emissions to near-zero levels and its ease of handling, use and availability:

- DEF is a water-and-urea solution that's sprayed into the exhaust stream ahead of the catalyst in the SCR system. DEF helps convert oxides of nitrogen (NOx) in the exhaust into harmless nitrogen and water vapor.
- Nonflammable and nontoxic, DEF is composed of 32.5 percent high-purity industrial urea and 67.5 percent deionized water. Urea is a compound of nitrogen that turns into ammonia (NH<sub>3</sub>) when heated. A 32.5 percent urea concentration is the ideal solution, as it provides the lowest freezing point and maintains the proper potency, even through multiple freeze-and-thaw cycles.

- To maximize DEF shelf life, ideal storage temperatures are between 12°F (-11°C) and 86°F (30°C). DEF maintained between those temperatures will have a shelf life of approximately one year.
- A variety of packaging options exist, from 1-gallon top-off jugs to 330-gallon totes. DEF is also widely available in bulk delivery across North America and Europe. Standardized pumps and dispensing systems are used for DEF, and are available at many retailers and from DEF suppliers.
- DEF is readily available in most locations, including at many Cummins distributor locations. A number of online resources can help you locate the DEF retailer nearest you, including retail locator tools available at [cumminsfiltration.com](http://cumminsfiltration.com), [finddef.com](http://finddef.com) and [discoverdef.com](http://discoverdef.com). You may also contact your local Cummins distributor for more information on DEF suppliers in your region.



## DEF Distribution Process



### For Better Quality, Better Check The Label.

DEF quality is important for both the proper functioning and the longevity of the

SCR system. DEF should display the certification of the American Petroleum Institute (API), the German Institute for Standardization (DIN 70700) or the International Organization of Standardization (ISO 2224101). This will ensure the proper purity and correct concentration of the urea in the DEF.

### DEF Tank Sizing And Usage.

Equipment using SCR aftertreatment comes with a DEF tank that is sized by the equipment manufacturer. Storage capacity is usually designed to provide a minimum of two to three diesel tank fill-ups for every one DEF tank fill-up, but that will vary by equipment manufacturer, tank size and the operating environment.

DEF consumption typically runs 3 percent to 5 percent of the amount of fuel used. So for every 100 gallons of diesel burned, your Cummins Tier 4 Final engine with SCR will use 3 to 5 gallons of DEF. At the same time, diesel consumption will be reduced by 2 to 4 gallons, depending on the application.



### DEF Gauge And Lamp – In-Cab Interface.

A DEF gauge located on the equipment's dashboard shows the DEF level at all times. Tier 4 Final equipment with SCR has a DEF lamp, which will illuminate when the DEF is running low. By replenishing the DEF, the operator can keep the equipment operating at optimal levels, and comply with emissions regulations.



The Low DEF lamp illuminates and stays on continuously when the DEF level is low. A flashing DEF lamp indicates that the DEF level has fallen below the critical level.

### Saving Money. Every Hour.

What's most important to know is that the improved fuel economy of a Cummins Tier 4 Final engine with SCR will more than offset the cost of DEF. In fact, equipment users with Cummins Tier 4 Final engines can anticipate a net reduction in operating costs of approximately 2 percent to 4 percent versus Tier 4 Interim models, as DEF typically costs a third less than diesel fuel, depending on the volume supplied.

For equipment users moving from Cummins Tier 3 to Tier 4 Final engines, the reduction in fuel consumption could be 7 percent to 9 percent, depending on application. DEF costs significantly less than diesel fuel, so the result is a major reduction in overall operating costs.

### Every Question. Answered.

To learn more about Cummins Tier 4 Final engines and our fully integrated aftertreatment system with SCR, including details about DEF, please visit [www.Tier4.info](http://www.Tier4.info).

For answers to questions regarding your Cummins engine and aftertreatment system, please contact Cummins Care at 1-800-DIESELS™ (1-800-343-7357). Cummins Care representatives are available 24/7/365 to assist you in locating DEF outlets and authorized service facilities. For support in Europe, please call +44 (0) 1327 886464, or e-mail [emea.customerassistance@cummins.com](mailto:emea.customerassistance@cummins.com).





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Bulletin 4087312 Printed in U.S.A. 9/13  
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