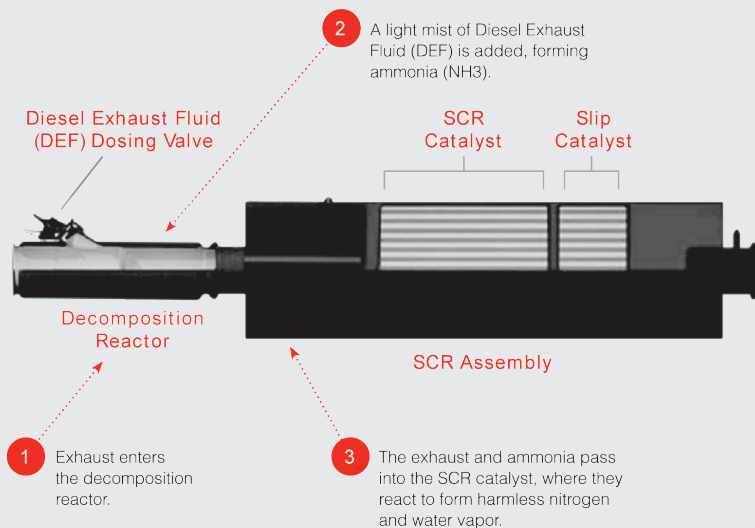


## *Diesel Exhaust Fluid (DEF)*

SCR: The Right Technology for the Right Application.

**Q. What is Selective Catalytic Reduction (SCR)?**

**A.** SCR is a technology that uses a urea based diesel exhaust fluid (DEF) and a catalytic converter to significantly reduce oxides of nitrogen (NOx) emissions.



**Q. How does a SCR system work?**

**A.** The purpose of the SCR system is to reduce levels of NOx (oxides of nitrogen emitted from engines) that are harmful to our health and the environment. SCR is the aftertreatment technology that treats exhaust gas downstream of the engine. Small quantities of diesel exhaust fluid (DEF) are injected into the exhaust upstream of a catalyst, where it vaporizes and decomposes to form ammonia and carbon dioxide. The ammonia (NH<sub>3</sub>) is the desired product, which in conjunction with the SCR catalyst, converts the NOx to harmless nitrogen (N<sub>2</sub>) and water (H<sub>2</sub>O).

**Q. What experience does Cummins have with SCR systems?**

**A.** SCR technology is not new to Cummins. In 2006, Cummins launched its midrange engine certified to the Euro 4 standard using SCR for commercial vehicle applications in Europe. Cummins has built and shipped over 45,000 SCR engines to date. Cummins Emission Solutions has built and shipped over 200,000 SCR systems.

**Q. What is Diesel Exhaust Fluid (DEF)?**

**A.** DEF is the reactant necessary for the functionality of the SCR system. It is a carefully blended aqueous urea solution of 32.5% high synthetic urea and 67.5% deionized water.

**Q. What is urea?**

**A.** Urea is a compound of nitrogen that turns to ammonia when heated. It is used in a variety of industries, including as a fertilizer in agriculture.

**Q. Is DEF a toxic solution?**

**A.** DEF is a nontoxic, nonpolluting and nonflammable solution. It is stable, colourless, odourless, and meets accepted international standards for purity and composition. MSDS sheets are currently available.

**Q. How will I know that the DEF product I purchase will work?**

**A.** The DEF you purchase should state and display the certification of the German Institute of Standardisation DIN70700, the International Organisation for Standardisation ISO 22241-1, and meet AUS – 32 specifications. This will ensure the proper purity and concentration (32.5%) of urea.

**Q. Is the 32.5% urea solution critical?**

**A.** Yes, the 32.5% urea concentration is the ideal solution as it provides the lowest freeze point. Also, SCR systems will be calibrated to 32.5% so that optimum NOx will be reduced during operation.

**Q. What is the freeze point of DEF?**

**A.** A 32.5% solution of DEF will begin to crystallize and freeze at -11°C. At 32.5%, both the urea and water will freeze at the same rate, ensuring that as it thaws, the fluid does not become diluted, or over concentrated.

**Q. With a freezing temperature of -11°C, what happens to the operation of the vehicle if the DEF freezes?**

**A.** If the DEF freezes, it will not inhibit the operator from starting the vehicle. DEF thaws quickly once you start the vehicle.

**Q. Does anything happen to the DEF solution once it freezes?**

**A.** If the DEF freezes and is thawed, it does not change its efficiency.

**Q. Are there special storage requirements for DEF?**

**A.** DEF should be stored in a cool, dry, well-ventilated area, out of direct sunlight. While the optimum storage temperature is up to 25°C, temporary exposure to higher temperatures has little to no impact on the quality of DEF.

**Q. Is DEF corrosive?**

**A.** DEF is corrosive to aluminum and other materials. Tank, packaging and dispensing equipment suppliers take all this into account and only use approved materials for their products.

**Q. If DEF is corrosive to aluminum, what will the DEF tanks be made of?**

**A.** DEF tanks (on vehicles) will be made from a non-corroding, highly durable composite material. Tank, packaging and dispensing equipment suppliers take all this into account and only use approved materials for their products.

**Q. What package sizes will be available?**

**A.** Cummins offers DEF in 4, 10, 20, 205 and 1000 litre containers.

**Q. Where will DEF be available?**

**A.** At all Cummins branches and authorised Cummins dealers in the South Pacific region.

**Q. What is the shelf life of DEF?**

**A.** Fleetguard AdBlue® shelf life is a function of ambient storage temperature. AdBlue® will degrade over time depending on temperature and exposure to sunlight. If stored between -10 and +32 Degrees Celsius the shelf life will be one year.

**Q. How much DEF will a truck consume?**

**A.** DEF consumption is expected to be approximately 4% - 8% of fuel consumption, depending on vehicle operation, duty cycle, geography, load ratings, etc.

**Q. On SCR equipped vehicles, what changes will be expected for service intervals?**

**A.** There will be no changes to the service intervals on SCR equipped vehicles. The SCR process impacts the exhaust emissions after they are produced by the engine, therefore will have no effect on the engine lube service intervals.

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