



AdBlue® Q & A

Aqueous Urea Solution (AUS 32) for NOx reduction in diesel engines

SCR: The Leading Technology to Meet Diesel Emission Regulations

Q. What is Selective Catalytic Reduction (SCR)?

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

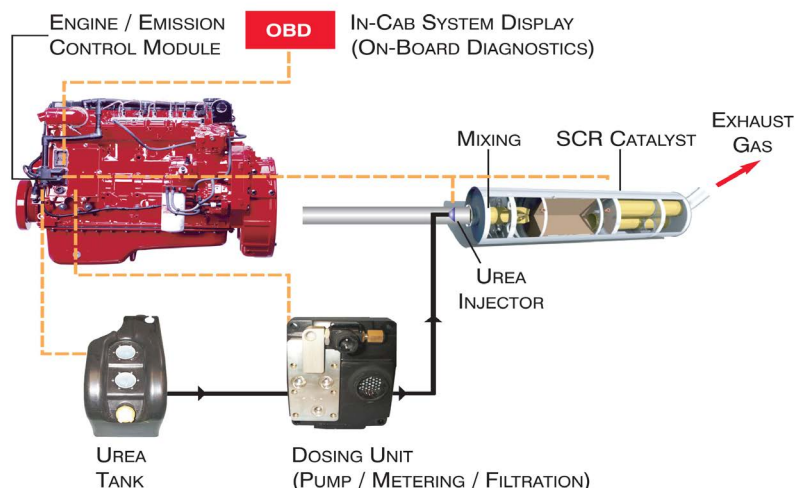
Q. Is now a good time to invest in SCR technology?

A. All major engine manufacturers have stated they will ultimately use Selective

Catalytic Reduction (SCR) to increasingly stringent engine emission regulations.

Q. How does an SCR system work?

A. The purpose of the SCR system is to reduce levels of NOx (oxides of nitrogen emitted from engine) that are harmful to our health and the environment. SCR is an integrated system that combines the SCR catalyst unit, the engine / emission control module, the on board diagnostics unit (OBD) as well as an AdBlue dosing unit and AdBlue storage tank. The system components are integrated to ensure that the required emissions reductions are always being achieved.



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Q. What are the advantages for the fleet in using SCR technology?

A. Cummins SCR applied engines will deliver what customers need in these challenging economic times. Cummins engines utilizing SCR can also provide fuel economy improvements. SCR catalyst technology allows much greater NOx conversion efficiency, thereby allowing the engine to be fully optimized, which contributes to improved fuel economy.

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. Since then, Cummins Emission Solutions has become a global leader in SCR catalyst technology.

Q. How does AdBlue work within an SCR system?

A. 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 AdBlue are injected into the exhaust upstream of a catalyst. This converts to ammonia in the exhaust stream and reacts with NOx over the catalyst to form harmless nitrogen gas and water.

AdBlue: Properties and Handling Guidelines

Q. What is AdBlue?

A. AdBlue 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 AdBlue a toxic solution?

A. AdBlue is a non-toxic, non-polluting and non-flammable 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 AdBlue product I purchase will work?

A. The AdBlue you purchase should be fully compliant with International Standards Organization standards, ISO 22241-1 and be certified to the German Association of the Automotive Industry (VDA) for AdBlue manufacture and quality systems.

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 the 32.5%, so that optimum NOx will be reduced during operation.

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Q. What is the freeze point of AdBlue?

A. A 32.5% solution of AdBlue will begin to crystallize and freeze at -11 deg 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 deg C, what happens to the operation of the vehicle if the AdBlue freezes?

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

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

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

Q. Will there be special equipment to ensure the AdBlue does not freeze, or can be thawed if it does freeze?

A. The installation of an SCR system will provide for the heating of the AdBlue tank and supply lines.

Q. Are there special storage requirements for AdBlue?

A. AdBlue should be stored in a cool, dry, well-ventilated area, out of direct sunlight. While the optimum storage temperature is up to 30 deg C, temporary exposure to higher temperatures has little to no impact on the quality of AdBlue.

Q. Is AdBlue corrosive?

A. AdBlue 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 AdBlue is corrosive to aluminium, what will the AdBlue tanks be made of?

A. AdBlue tanks (on vehicle) will be made from non-corroding, highly durable materials such as stainless Steel and High Density Polyethylene. Tank, packaging and dispensing equipment suppliers take all this into account and only use approved materials for their products...

Q. What AdBlue package sizes are available?

A. Cummins Filtration offers AdBlue in 10, 15 20, 205 and 1000 litre packs as well as bulk supply from 4,000 litres to 20,000 litres.

Q. Where will AdBlue be available?

A. At all Cummins Filtration and Fleetguard® distributors and dealers in the South Pacific region.

Q. What is the shelf life of AdBlue?

A. The shelf life is AdBlue defined in the ISO 22241-3 standards. At constant temperatures up to 30 deg C the product will last a minimum of 12 months; at constant temperatures up to 35 deg C the shelf life is reduced to a minimum of 6 months. It is recommended that AdBlue be stored out of the direct sunlight and below 35 deg C. Where higher ambient temperatures are experienced, tanks should be insulated or stored in a shaded area.

Q. How much AdBlue will a vehicle consume?

A. AdBlue consumption is expected to be approximately 4-6% of fuel consumption, depending on vehicle operation, duty cycle, geography, load ratings, etc.

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Q. On SCR equipped vehicles, what changes will be expected for lube 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.

Q. Who owns the AdBlue trademark?

A. AdBlue is the registered trade name of the German Association of the Automotive Industry - Verband der Automobilindustrie e. V. (VDA) and may only be used under a VDA official license agreement.

Q. How can I calculate expected AdBlue consumption for my fleet?

A. AdBlue consumption will be around 5% of the diesel fuel consumed (4-6% range dependent on the conditions of each application). At 5% of the diesel fuel consumed, the fuel to AdBlue ratio is 20 to 1. So for every 100 litres of diesel fuel burned, approximately 5 litres of AdBlue will be consumed. If the average fuel consumption of a vehicle is known, then the consumption of AdBlue can be easily calculated. Typical examples below:

HEAVY DUTY (LONG HAUL B-DOUBLE)

Average DISTANCE (km) per vehicle per month	Fuel economy per vehicle (km per litre)	No. of vehicles in the fleet	Fuel consumption per vehicle per month (litres)	Fuel fleet consumption per month (litres)	Typical AdBlue consumption rate %	AdBlue consumption per vehicle per month	AdBlue fleet consumption per month
20000	1.7	30	11765	352941	5%	588	17647

MEDIUM DUTY (LONG HAUL SINGLE TRAILER)

Average DISTANCE (km) per vehicle per month	Fuel economy per vehicle (km per litre)	No. of vehicles in the fleet	Fuel consumption per vehicle per month (litres)	Fuel fleet consumption per month (litres)	Typical AdBlue consumption rate %	AdBlue consumption per vehicle per month	AdBlue fleet consumption per month
10000	2.3	30	4348	130435	5%	217	6522

LIGHT-MEDIUM DUTY (STOP-START OPERATION)

Average HOURS per vehicle per month	Fuel consumption per vehicle per hour (litres per hour)	No. of vehicles in the fleet	Fuel consumption per vehicle per month (litres)	Fuel fleet consumption per month (litres)	Typical AdBlue consumption rate %	AdBlue consumption per vehicle per month	AdBlue fleet consumption per month
150	14	30	2100	63000	4%	84	2520

"Note: These above tables are examples of typical results only. Results will vary according to the specific circumstances for each application in the field."

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