

TECHNICAL BULLETIN



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CLEAN AIR

General:

CLEAN AIR, is a 32.5 % urea solution. It has the capability to reduce NO_x emissions from heavy duty trucks in on-the-road operation. It also finds application to stationary applications, waste incinerators, power plants and to mobile Diesel engines in applications such as ships and locomotives.

Reactions:

The basic chemical reaction of the urea is as follows:

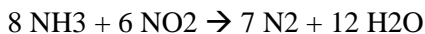
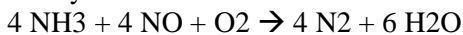
It is injected into the hot exhaust gas and is hydrolysed above approx. 180°C forming ammonia (NH₃) according the following reaction equation:

Hydrolysis reaction:



At the homogeneous extruded, base metal catalyst the following reaction takes place to convert NO_x with NH₃ from the hydrolysis reaction to nitrogen and water.

Catalytic reaction:



Catalysts:

The catalysts used in the after-treatment system consist of catalytically active transition metal compounds, which are fixed onto ceramic carriers. The ability of the after-treatment system to convert NO_x into N₂ and H₂O depends to a large extent on the actual activity of these active centres, and on the width of the pores in the ceramic carrier. Pore size influences the diffusion rate of the exhaust gases into the catalyst.

To ensure a high activity of the SCR after-treatment system over a long period of time the quality of CLEAN AIR has to be controlled very strictly, as many of the components will irreversibly harm the catalyst system by physical blocking of the pores, or deactivation of the reactive centres. Poor activity of the catalytic after-treatment system due to inactive catalysts may 1) result in an increase in NO_x emission, and 2) cause secondary damage in the engine itself due to an exhaust gas pressure increase.

Quality Controls

To avoid any impairment of quality of CLEAN AIR during storage and transportation the following physical conditions have to be met:

- Storage temperature below 30 °C is recommended to maintain shelf life.
- Storage temperature above minus 11 °C is recommended to avoid crystallisation, which starts at minus 11.5 °C
- Sun light protection (to avoid growth of algae)
- Well closed containments to protect the containment as well as the solution from any contamination.
- Prolonged storage above 30 °C will cause hydrolysis to occur, with the consequent formation of ammonia and pressure rise, and will reduce shelf life.

Because of this tendency to hydrolyze CLEAN AIR has a shelf life of approximately 12 months

provided the above mentioned storage conditions are obeyed. After expiration of the shelf life the batch has to be tested for a decision about further use.

All materials in contact with CLEAN AIR have to be free from foreign matter such as fuel, oil, greases, detergents, dust, and any chemicals and natural products.

Prior to the first use with CLEAN AIR any material has to be cleaned and finally rinsed with demineralised water – don't use tap water ! – or CLEAN AIR until a representative sample of the used rinsing water used for the cleaning shows that the system is clean. In case of storage and transportation facilities this has to be verified analytically according to attachment 2. The use of any detergent is forbidden for cleaning because of contamination.

The use of non-dedicated equipment has to be regarded as the first use.

Compartments filled with CLEAN AIR have to be sealed.

Information on Urea

CAS number 57-13-6

Molecular formula CH₄N₂O

Molar mass 60.06 g mol⁻¹

Appearance White solid

Density 1.32 g/cm³

Melting point 133–135 °C

Solubility in water 51.8 g/100 ml (20 °C)

54.5 g/100ml (25 °C)

71.7 g/100 ml (60 °C)

95.0 g/100 ml (120 °C)

Basicity (pK_b) pK_{BH+} = 0.18[1]

EU Index Not listed

Flash point Non-flammable

CAUTION

Avoid contact with skin and eyes and avoid breathing vapour or spray mist.

CLEAN AIR is not described as a Dangerous Good, nor as a scheduled poison, nor as hazardous according to SafeWork Australia

PACKAGING

1000L IBC of CLEAN AIR

IMPORTANT NOTICE TO CUSTOMER

*Since the use of this product is beyond the control of either seller or manufacturer, their only obligation shall be to replace any quantity of product which is proven defective. They cannot assume any risk or liability in excess of the purchase price of the product itself, which does not include labour or any consequential damages resulting from the use of this product. Determining the suitability of this product for any intended use shall be solely the responsibility of the user. **ALWAYS TEST FIRST.***

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