

AdBlue®

Very pure NO_x-reduction agent for Diesel engines equipped with SCR catalysts.

AdBlue fulfills the quality requirements drafted in the international standard ISO 22241-1:2019(E).

April 2019 | Data Sheet | Replaced Version November 2010

T/EVO 6221e / Page 1 of 2

® = registered trademark of
Verband der Automobilindustrie

Chemical nature	Urea, carbamide, in ultra pure water
CAS No.	57-13-6
EINECS-No.	200-315-5
Physical form and packaging	AdBlue is supplied in road tankers, IBC's and cans.
Shelf life	At product temperatures between -11 and 25 °C AdBlue has a shelf life of 18 months after production (maximum product temperature 30 °C, average product temperature 25 °C).

Properties

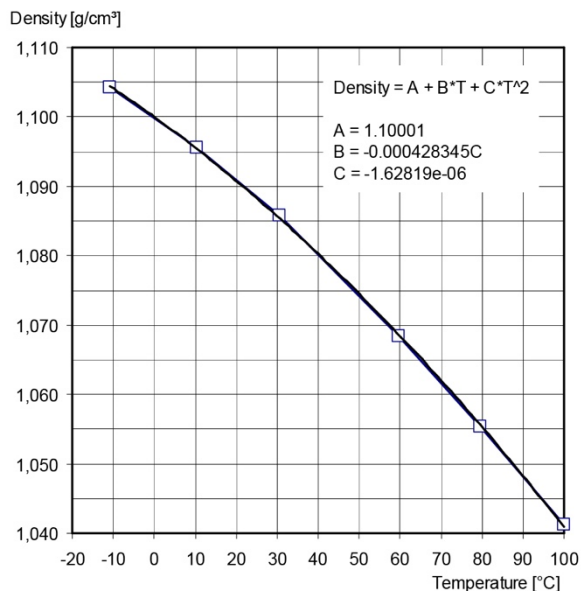
Delivery specification

Test Item	Unit	Limits	Test method
Urea content	% (m/m)	31.8 – 33.2	ISO 22241-2 Ann. C
Refractive index at 20 °C	–	1.3814 – 1.3843	ISO 22241-2 Ann. C
Alkalinity as NH3	% w/w	0.2 max.	ISO 22241-2 Ann. D
Biuret	% w/w	0.3 max.	ISO 22241-2 Ann. E
Aldehydes	mg/kg	5 max.	ISO 22241-2 Ann. F
Insolubles	mg/kg	20 max.	ISO 22241-2 Ann. G
Phosphate	mg/kg	0.5 max.	ISO 22241-2 Ann. H
Calcium	mg/kg	0.5 max.	
Iron	mg/kg	0.5 max.	
Copper	mg/kg	0.2 max.	
Zinc	mg/kg	0.2 max.	
Chromium	mg/kg	0.2 max.	ISO 22241-2 Ann. I
Nickel	mg/kg	0.2 max.	
Aluminium	mg/kg	0.5 max.	
Magnesium	mg/kg	0.5 max.	
Sodium	mg/kg	0.5 max.	
Potassium	mg/kg	0.5 max.	
Identity	–	Identical to reference	ISO 22241-2 Ann. J

These specification will be amended as soon as there are changes in the standards ISO 22241-1:2019(E) and ISO 22241-2:2019(E) to maintain compliance with the most actual standard.

Physical properties

Density ρ(T)



Source: Exp. data, BASF

Density of frozen AdBlue

approx. 1,03 g/cm³ Source: Exp. data, BASF

Melting enthalpy of frozen AdBlue

Melting enthalpy: +270 J/g
 Melting range (2 K/min): -20 °C – -6 °C
 Source: Exp. data, BASF

Specific heat capacity Cp(T) of liquid AdBlue

T [°C]	Cp. exp. [J/g*K]
25.04	3.51
45.04	3.57
65.02	3.64

$$Cp(T) = 8E-06 * T^2 + 0.0027 * T + 3.4345$$

Source: Exp. data, BASF

Specific heat capacity Cp(T) of frozen AdBlue

T [°C]	J/(g*T)
- 42.0	1.49
- 36.0	1.53
- 30.0	1.59

Source: Exp. data, BASF

Vapour pressure above liquid AdBlue

T [°C]	Pressure _{exp.} [hPa]
20.08	23.0
30.26	41.1
40.19	70.6
55.18	150.3
70.26	306.9
85.21	609.8
100.21	1182.2

$$\ln(p/\text{bar}) = 13.9461 - 5198.36 / (273.15 + T)$$

T [Celsius]

Mean dev., est.: 3%

$$\ln(p/\text{Pa}) = 25.45899 - 5198.351/T$$

Mean dev., est.: 3%

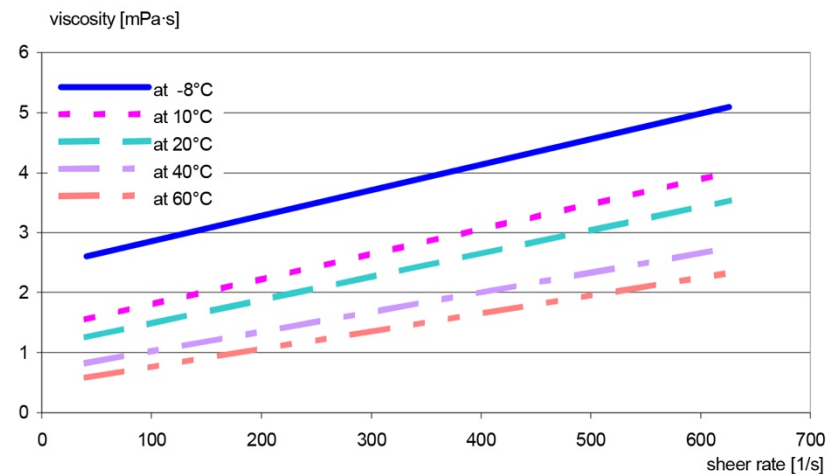
Source: Exp. data, BASF

Thermal conductivity

approx. 0.570 W/m·K at 25 °C

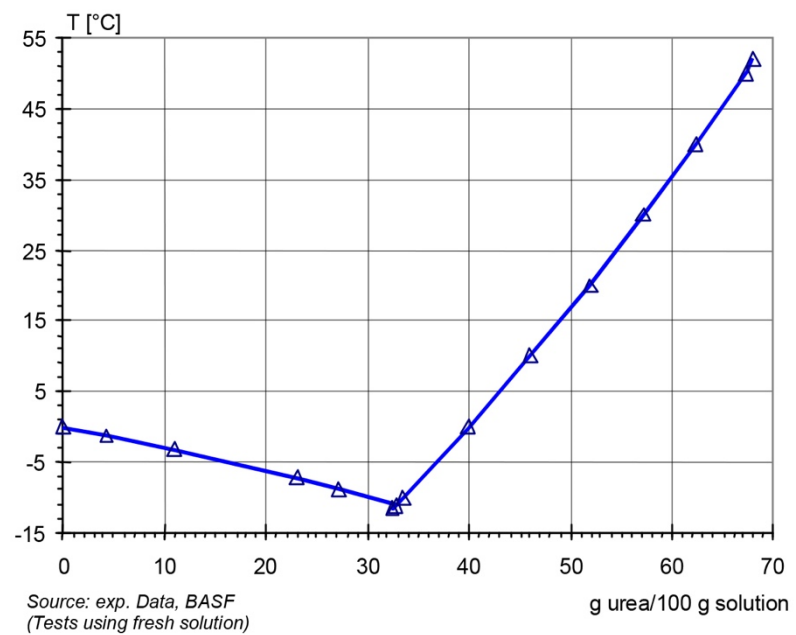
Viscosity

approx. 1.4 mPa·s at 25 °C



Surface tension

min. 65 mN/m at 20 °C

**Freezing point f (T, m)
of urea solution****Chemical properties**

AdBlue has a faint alkaline reaction. The pH of a freshly prepared solution is of the order of 9.0 to 9.5. During storage a pH value of approx. 10 might be reached.

The dissolved urea decomposes slowly even at room temperature, generating ammonia and carbon dioxide. The rate of this reaction increases if the solution is heated. Above approx. 70 °C biuret is formed additionally at a significant rate.

Materials resistance

Equipment coming into contact with AdBlue can be made of alloyed austenitic Cr-Ni-steels or Cr-Ni-Mo-steels according to EN 10088-1 to -3 (e.g. 1.4541 and 1.4571). Steels of an equivalent quality (e.g. according to US standards) can be used without any restriction.

Non alloyed steels, zinc coated steels, copper, and alloys containing copper are not suitable due to their poor resistance towards urea, urea solution, or the ammonia dissolved therein.

Polymers, e.g. polyethylene, polypropylene and polyoxymethylene are suitable at temperatures up to 60 °C.

For sealings e.g. PTFE is suited.

However, the properties of parts made of polymeric materials depend to a considerable extent on blending and processing during the manufacturing process. Therefore, for material made from polymers the supplier should be requested to submit written resistance data towards AdBlue for both mechanical and chemical properties, which are tailored for the intended use as well as for the intended operating temperature.

Any other material not cited above must be tested regarding corrosion resistance and possible influences on the product specification given in ISO 22241-1:2019(E).

Safety**Physiological data**

AdBlue is not a hazardous substance in the sense of the German Gefahrstoffverordnung

Handling

When using this product, the information and advice given in our **Safety Data Sheet** should be observed. Due attention should also be given to the **precautions** necessary for handling chemicals.

**Storage and
Transportation**

AdBlue is not a dangerous substance for transportation. Owing to its chemical nature, however, it must be transported and stored separately from nitrites. Transportation should be made in insulated tanks or on plastic tank pallets (IBC).

Note

The data contained in this publication are based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, these data do not relieve processors from carrying out their own investigations and tests; neither do these data imply any guarantee of certain properties, nor the suitability of the product for a specific purpose. Any descriptions, drawings, photographs, data, proportions, weights etc. given herein may change without prior information and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed.

April 2019