Technical Information

Lutensol® A 3 N

$C_{12}C_{14}$ - Fatty alcohol + 3 EO.

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Chemical nature

Lutensol® A 3 N is a nonionic surfactant. It is an alkyl polyethylene glycol made from a saturated, 100% linear $C_{12}C_{14}$ fatty alcohol of vegetable origin.

It conforms to the following structural formula.

$$RO(CH_2CH_2O)_xH$$

R = $C_{12}C_{14}$ - fatty alcohol
x = 3

PRD-No.*

30044949

* BASF's commercial product numbers.

Appearance

Lutensol® A 3 N is a cloudy almost colorless liquid at 23 °C.

Handling and Storage

Handling

a) Lutensol® A 3 N should be stored indoor in its original packaging, which should be kept tightly sealed.
b) Lutensol® A 3 N is hygroscopic and soluble in water, with the result that it absorbs moisture very quickly. Drums should be tightly resealed each time material is taken from them.
c) The storage temperature should not be allowed to fall substantially below 20 ºC, and storerooms must not be overheated.
d) Lutensol® A 3 N can become cloudy if it is stored at low temperatures, but this has no effect on its preformance. The cloudiness can be dissipated by heating it to 40 – 50 ºC.
e) Liquid that has solidified or that shows signs of precipitation should be heated to approx. 50 ºC before it is processed.
f) Drums that have solidified or that have begun to precipitate should be re-constituted by gentle heating, preferably in a heating cabinet. the temperature must not be allowed to exceed 60 ºC. This also applies if drums are heated by external electrical elements.
Internal electrical elements should not be used beacuse of the localized anomalies in temperature that they cause.
g) Lutensol® A 3 N must be blanketed with nitrogen if it is stored in heated tanks (at 50 – 60 ºC) to prevent them from coming into contact with air. Constant, gentle stirring helps to prevent it being discolored as a result of prolonged contact with electrical elements of external heating coils.
h) Please refer to the latest Safety Data Sheet for detailed information on product safety.

Shelf life

Lutensol® A 3 N has a shelf life of at least two years in its original packaging, provided it is stored properly and drums are kept tightly sealed.

Materials

The following materials can be used for tanks and drums:
a) Stainless steel 1.4541 – AISI 321 (X6 CrNiTi 18-10)
b) Stainless steel 1.4571 – AISI 316 Ti (X6 CrNiMoTi 17-12-2)
c) Iron coated with a phenolic resin

Properties

Some physical properties are listed in the table below. These are typical values only and not all of them are monitored on a regular basis. They are correct at the time of publication and do not necessarily form part of the product specification. A detailed product specification is available on request or via BASF's WorldAccount: https://worldaccount.basf.com (registered access).

Lutensol® A 3 N	**Unit**	**Value**
Physical form (23 °C)		cloudy, almost colorless liquid
Degree of ethoxylation		approx. 3
Concentration	%	approx. 100
Cloud point (EN 1890)*		
method D	°C	approx. 61
method E	°C	approx. 52
Molar mass (calculated from hydroxyl number)	g/mol	approx. 320
pH value (EN 1262, solution B)**		approx. 6.5
Density (DIN 51757, 23 °C)	g/cm^3	approx. 0.92
Dropping point (DIN 51801)	°C	approx. 5
Congealing point (ISO 2207)	°C	<5
Viscosity (EN 12092, 23 °C, Brookfield, 60 rpm)	mPa·s	approx. 35
Hydroxyl number (DIN 53240)	mg KOH/g	approx. 175
Hydrophilic-lipophilic balance		approx. 8.5
Flash point (DIN 51376)	°C	>150
Wetting power (EN 1772, in distilled water, 23 °C, 2 g Soda ash/L, after 30 s)		
1.0 g/L	s	approx. 100
2.0 g/L	s	approx. 80
Foam volume (EN 12728,10 °C, 2 g/L, 40 °C)	ml	approx. 20
Surface tension*** (EN 14370, 1 g/L in distilled water at 23 °C)	mN/m	approx. 27

* *Cloud point EN 1890:*
method A : 1 g of surfactant + 100 g of distilled water
method B : 1 g of surfactant + 100 g of NaCl solution (c = 50 g/L)
method C : 1 g of surfactant + 100 g of NaCl solution (c = 100 g/L)
method D : 5 g of surfactant + 45 g of butyldiglycol solution (c = 250 g/L)
method E : 5 g of surfactant + 25 g of butyldiglycol solution (c = 250 g/L)

** *The pH of Lutensol® A 3 N can decrease during storage, but this does not have any effect on its performance.*

*** *Applying Harkins-Jordan correction*

Solubility

Details on the solubility of Lutensol® A 3 N in various solvents are given in the table below.

Solubility of Lutensol® A 3 N (10% solution at 25 °C)

Distilled water	–
Drinking water	–
NaOH - sol. (5% w/w)	–
HCL - sol. (5% w/w)	–
NaCL - sol. (5% w/w)	–
White spirit	+
Acid oil	+
Ethanol	+
Isopropanol	+
Toluene	+

\+ = *solved*
± = *partially soluble*
– = *not solved*
o = *opaque soluble*

** separated, 50/50 // turbid/clear -> homogenized: turbid*

Viscosity

The relationship between viscosity and temperature is always an important point to consider as far as storage and shipping are concerned. This is shown in the following diagram (Brookfield LVT).

Temperature (°C)	Viscosity (mPa·s)
0	$>10^5$
10	approx. 60
20	approx. 40
23	approx. 35
30	approx. 20
50	approx. 60

The viscosity of Lutensol® A 3 N as a function of concentration

Dist. water content (%)	Viscosity (mPa·s)
10	approx. 50
20	approx. 900
30	$>10^5$
40	$>10^5$
50	$>10^5$
60	$>10^5$
70	$>10^5$
80	approx. 60000
90	approx. 30

Safety and Labeling

Please refer to the safety data sheet for information on classification & labeling, safe use, handling and transport.

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August 2019