Technical Information

Lupasol® PS

Multifunctional cationic polyethyleneimine for the Detergents and Cleaners Industry.

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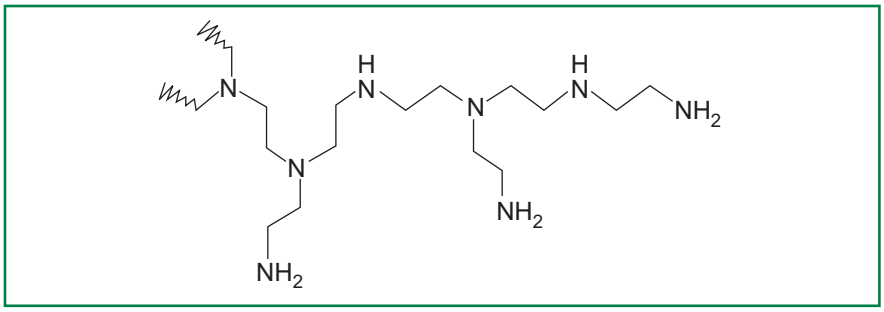
Nature

Lupasol® PS is a multifunctional cationic polyethyleneimine (PEI) with a branched polymer structure.



Its composition is expressed by the following general molecular formula:

$-(CH_2-CH_2-NH)_n-$
$10 < n < 10^5$

The nitrogen to carbon ratio in polyethyleneimines is 1:2, so that they have the largest possible amino group density of all known commercial polyamines. Polyethyleneimines have a definite ratio of primary, secondary and tertiary amino groups.

PRD-No.*

30048287

* BASF's commercial product numbers.

Appearance

Lupasol® PS is a clear, colorless till slightly yellowish liquid at room temperature and tends to separate or settlement of the polymer in the coldness (below +5 °C).

Handling and Storage

Handling

a) Lupasol® PS should be stored in a dry room that is not too hot (max. + 40 °C) in its original sealed packaging.

b) Lupasol® PS is frost sensitive! The storage temperature must be between min. +5 °C and max. + 40 °C. Storage temperatures below + 5 °C destroy the product properties. This is an irreversible process.

c) Lupasol® PS must be protected from sunlight and high temperatures to avoid discolaration and the formation of surface films.

d) For storage, Lupasol® PS must be blanketed with nitrogen to prevent it from coming into contact with air. Air contact can cause discolaration.

e) Please refer to the latest Safety Data Sheet for detailed information on product safety.

Shelf life

Lupasol® PS has a shelf life of at least 12 months, provided it is stored in its original packaging and kept tightly sealed.

Materials

The following materials can be used for tanks and drums:
a) Stainless steel 1.4306 – AISI 304 L (X2 CrNi 19-11)
b) Stainless steel 1.4541 – AISI 321 (X6 CrNiTi 18-10)
c) Stainless steel 1.4571 – AISI 316 Ti (X6 CrNiMoTi 17-12-2)
d) HDPE – high density polyethylene
e) LDPE – low density polyethylene

Containers of low alloy steel, copper or copper alloys cause discoloration and are therefore unsuitable.

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).

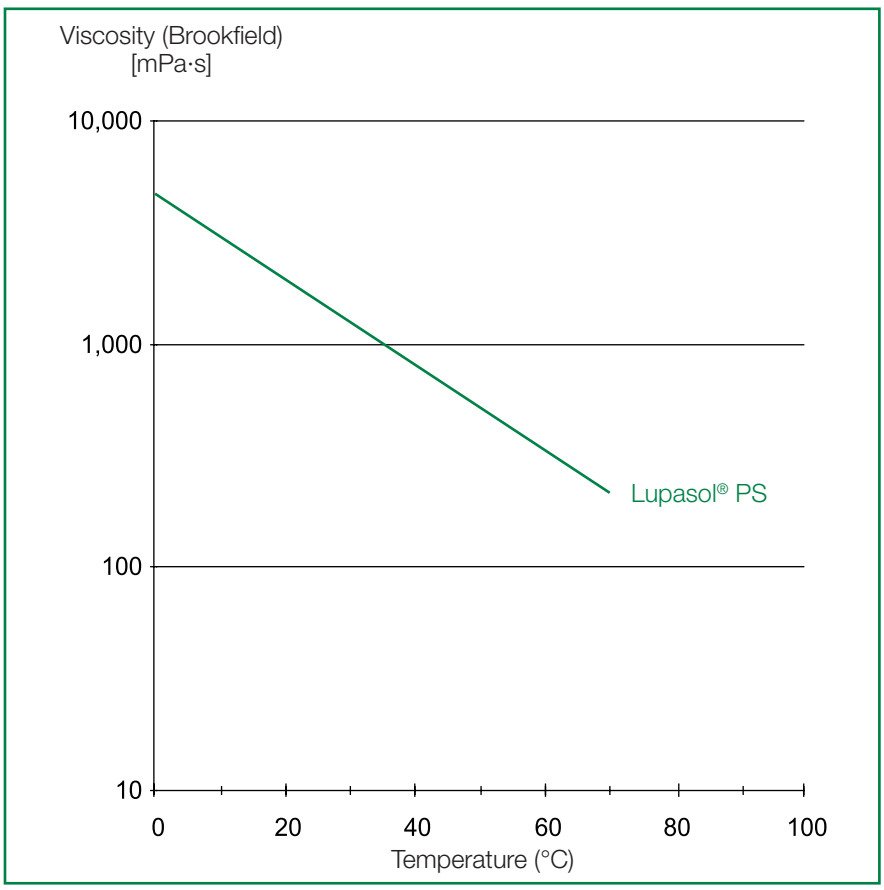
Lupasol® PS is a polyethyleneimine in aqueous solutionand is miscible with water in all proportions.

Lupasol® PS	**Unit**	**Value**
Average molar mass (GPC, BASF method)	g/mol	approx. 750 000
Viscosity (ISO 2555, Brookfield, 25 °C)	mPa·s	approx. 1 700
Concentration (ISO 3251)	%	approx. 33
Water content (EN 13267)	%	approx. 67
Refractive index (DIN 51423, 20 °C)		approx. 1.41
pH value (DIN 19268, as is)		approx. 11
Density (DIN 51757, 20 °C)	g/cm^3	approx. 1.08
Charge density (cationic)[1)]	meq/g DS	approx. 17
Monomeric Ethyleneimine (BASF method)	ppm	<0.1
Pour point (ISO 3016)	°C	approx. -5
Ratio of prim./sec./tert. amine (BASF method, ^{13}C NMR)		approx. 1/1/0.7
Amine value (BASF method)	mmol/g DS	approx. 18

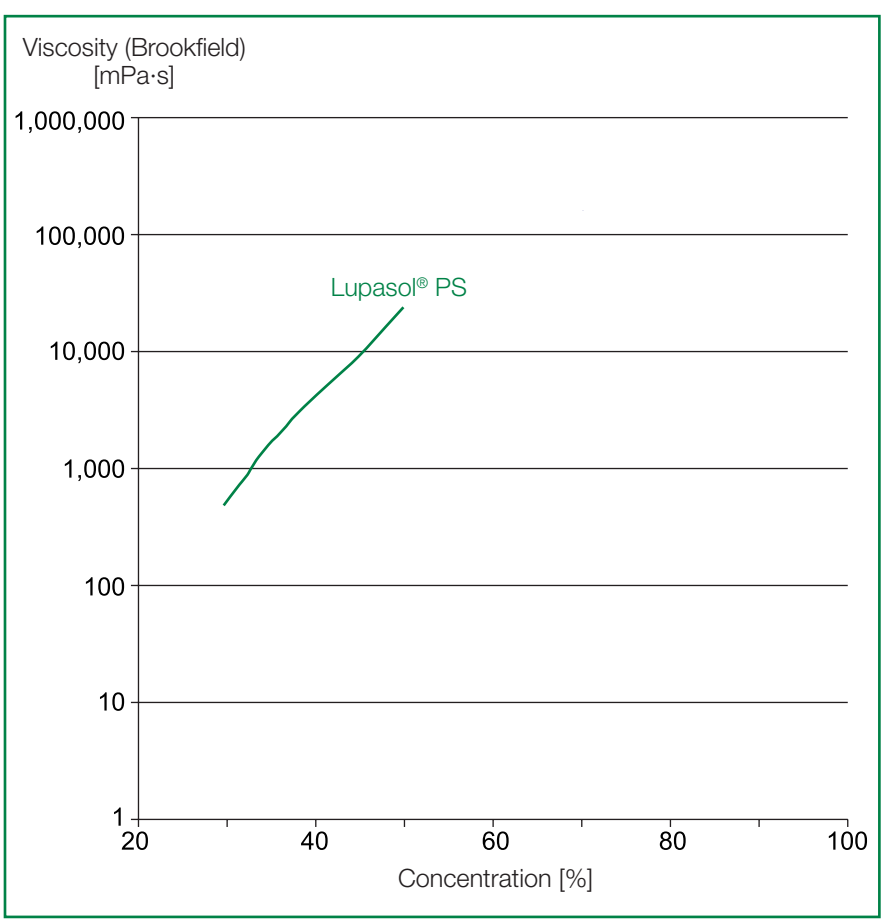
1) BASF method, 100% dry substance at pH 4.5

Viscosity

It is important for the transport, storage and processing of Lupasol® PS to know how its viscosity changes with temperature and concentration. The graph below shows the viscosity of Lupasol® PS as a function of temperature.



The following graph shows how the viscosity of Lupasol® PS, depending on the water content.



Solubility

Lupasol® PS is soluble in water and polar solvents.

The following solubility data are of a general nature only and can vary according to the amount of Lupasol® PS to be dissolved. Aldehydes, ketones and chlorinated hydrocarbons are unsuitable as solvents, since they are likely to react with Lupasol® PS. With acids, typical neutralization reactions occur.

Distilled water	+
Methanol ethanol, n-propanol isopropanol	+
n-Hexane	–
Ethyl acetate	–
Toluol Xylol	–

+ = *soluble*
– = *insoluble*
O = *partially soluble*

Compatibility

Lupasol® PS is compatible with cationic and nonionic systems. In anionic systems, the addition of Lupasol® PS can result in incompatibilities (gelatinization, precipitation). The compatibility can generally be improved by selecting the appropriate molecular weight or by adding ammonia.

Lupasol® PS may change the coloristic properties of dyes and pigments.

Safety and Labelling

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

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