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## Technical Information

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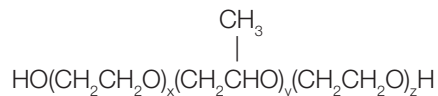
# Pluronic® PE 10500

® = Registered trademark of BASF

**Low-foaming block copolymer for a wide variety of applications**

**Chemical nature**

Pluronic® PE 10500 is a low-foaming, nonionic surfactant. It is a block copolymer in which the central polypropylene glycol group is flanked by two polyethylene glycol groups. It conforms to the following structural formula.

**PRD-No.\***

30044121

\* BASF's commercial product numbers.

**Appearance**

Pluronic® PE 10500 is a white, waxy solid.

**Handling and Storage****Handling**

- Pluronic® PE 10500 should be kept tightly sealed in a dry place in its tightly sealed original packaging. Storerooms must not be overheated.
- Pluronic® PE 10500 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.
- Pluronic® PE 10500 should not be stored at temperatures substantially below 20 °C.
- Drums that have solidified or that have begun to precipitate should be reconstituted by gentle heating, preferably in a heating cabinet. The temperature must not be allowed to exceed 70 °C. This also applies if drums are heated by external electrical elements. Internal electrical elements should not be used because of the localized anomalies in temperature that they cause.
- Pluronic® PE 10500 must be blanketed with nitrogen if it is stored in heated tanks (at approx. 50 °C) to prevent it from coming into contact with air. Constant, gentle stirring helps to prevent it from being discolored as a result of prolonged contact with electrical elements or external heating coils.
- Please refer to the latest Safety Data Sheet for detailed information on product safety.

**Materials**

Pluronic® PE 10500 should be stored in tanks made from the following materials.

- Stainless steel 1.4541 – AISI 321 stainless steel (X6 CrNiTi 1810)
- Stainless steel 1.4571 – AISI 316 Ti stainless steel (X6 CrNiMoTi 17122)

**Shelf life**

Pluronic® PE 10500 has a shelf life of at least two years, provided it is stored in its original packaging and kept tightly sealed.

## Nomenclature

Pluronic® PE 10500 is designated by a five-figure code. The first two digits are a guide to the molar mass of the hydrophobe, in this case polypropylene glycol. The third digit is the percentage of polyethylene glycol in the molecule, multiplied by 10.

### Nomenclature of Pluronic® PE 10500

Pluronic® PE 10500	Unit	Value
Code		10
Molar mass of polypropylene glycol block	g/mol	3250
Code		5
Percentage of polyethylene glycol in molecule	%	50

## 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).

Pluronic® PE 10500	Unit	Value
Physical form (23 °C)		waxy solid
Molar mass, calculated from OH number	g/mol	approx. 6500
Concentration	%	approx. 100
Cloud point (EN 1890)* Method A Method B	°C °C	>100 approx. 75
pH (EN 1262, Solution B)**		approx. 7
Density (DIN 51757, Method A, 60 °C)	g/cm <sup>3</sup>	approx. 1.03
Melting point	°C	approx. 44
Wetting (EN 1772, 23 °C, 2 g/l soda ash, 1 g/l surfactant)	s	approx. 300
Surface tension*** (EN 14370, 1 g/l, 23 °C)	mN/m	approx. 39

\* Cloud point according to EN 1890:  
 Method A: 1 g surfactant + 100 g distilled water  
 Method B: 1 g surfactant + 100 g NaCl solution (c = 50 g/l)  
 Method C: 1 g surfactant + 100 g NaCl solution (c = 100 g/l)  
 Method D: 5 g surfactant + 45 g ethylene glycol monobutyl ether solution (c = 250 g/l)  
 Method E: 5 g surfactant + 25 g ethylene glycol monobutyl ether solution (c = 250 g/l)

\*\* The pH of Pluronic® PE 10500 can fall slightly in storage, but this has no effect on its performance.

\*\*\* Applying Harkins-Jordan correction

**Application**

Pluronic® PE 10500 is an excellent dispersing additive for flowables e.g. SC and FS formulations for a variety of active ingredients. Typically used at 2.5% without additional wetting agent for the grinding step, it gives suspensions in the lower  $\mu\text{m}$  range which remain stable when tested according to CIPAC methods even after freeze/thaw cycles with actives such as Azoxystrobin and Chlorothalonil.

**Solubility**

Pluronic® PE 10500 is more soluble in cold water than in hot water. As in all alkoxyates, the oxygen atoms in the ether groups form hydrogen bonds with water. The molecules gradually dissociate as the solution warms up. It is for this reason that alkoxyates have a cloud point at which they form a separate phase. Pluronic® PE 10500 has its own characteristic cloud point.

The solubility of Pluronic® PE 10500 in different solvents is shown below.

**Solubility of Pluronic® PE 10500 at 23 °C (10% solutions)**

Distilled water	+
Caustic soda, 10%	-
Hydrochloric acid, 10%	+
Ethanol	+
Isopropanol	+
Toluene	+ opalescent
White mineral spirits	-

+ = *clear soluble*

± = *sparingly soluble (insoluble sediment)*

o = *insoluble (phase separation)*

- = *forms an opaque soluble, homogeneous emulsion*

**Wetting**

The most effective wetting agents contain a low proportion of polyethylene glycol, and their central polypropylene glycol block has a high molar mass.

**Compatibility**

Pluronic® PE 10500 is nonionic and therefore miscible with anionic, cationic and other nonionic surfactants. It does not react with cations such as  $\text{Ca}^{2+}$  or  $\text{Mg}^{2+}$ , which means that it can be used in hard water. It is also compatible with soluble polyanionic substances such as our Sokalan® CP types, Sokalan® PA types and carboxymethyl cellulose.

Pluronic® PE 10500 is fully resistant to non-oxidizing acids at the concentrations at which it is normally employed in applications such as those described below but, although it is resistant to alkalis, it is not resistant to alkalis to quite the same extent.

## Processing

It is advisable to stir the surfactant into water when preparing aqueous solutions, because solutions made up in the reverse order can have a very high viscosity. Products with a high molar mass also form gels in water at certain concentrations. The relationship between viscosity and concentration is shown in the table below.

**The viscosities of aqueous solutions of Pluronic® PE 10500 (approx.) (the values below were measured at 25 °C with a Brookfield viscometer)**

Water content (%)	Viscosity (mPa·s)
0	>10 <sup>5</sup>
10	>10 <sup>5</sup>
20	>10 <sup>5</sup>
30	>10 <sup>5</sup>
40	>10 <sup>5</sup>
50	>10 <sup>5</sup>
60	>10 <sup>5</sup>
70	>10 <sup>5</sup>
80	3200
90	10

**The relationship between the viscosities of Pluronic® PE 10500 (approx.) and temperature is shown in the following table.**

Temperature (°C)	Viscosity (mPa·s)
0	>10 <sup>5</sup>
10	>10 <sup>5</sup>
20	>10 <sup>5</sup>
30	>10 <sup>5</sup>
40	>10 <sup>5</sup>
50	800
60	500

**Safety**

We are not aware of any ill effect that can result from using Pluronic® PE 10500 for the purpose for which it is intended and from processing it in accordance with current practices.

According to the experience that we have gained over many years and other information at our disposal, Pluronic® PE 10500 does not exert harmful effects on health, provided it is used properly, due attention is given to the precautions necessary for handling chemicals, and the information and advice given in our Safety Data Sheets are observed.

**Labelling**

Please consult the current Safety Data Sheets for information on the classification and labelling of our products and other information relevant to safety.

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