

Pluronic® RPE types

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Pluronic® RPE 1050

Pluronic® RPE 1720

Pluronic® RPE 1740

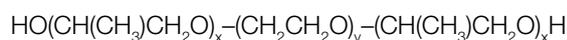
Pluronic® RPE 2520

Pluronic® RPE 3110

Low-foaming block copolymer

Chemical nature

The Pluronic® RPE types are nonionic surfactants. They consist of block copolymers in which the central polyethylene oxide block is flanked by two polypropylene oxide blocks, as shown by the following formula.

**Properties**

Pluronic®		RPE 1050	RPE 1720	RPE 1740
Physical form		Liquid	Liquid	Liquid
Average molar mass	g/mol	approx. 1950	approx. 2150	approx. 2650
Concentration	%	approx. 100	approx. 100	approx. 100
Cloud point (EN 1890)*				
Method A	°C	approx. 70	approx. 37	approx. 50
Method B	°C	approx. 57		
Method C	°C	approx. 45		
Method D	°C	approx. 66	approx. 42	approx. 53
Method E	°C	approx. 64	approx. 37	approx. 47
pH (EN 1262, Solution B)**		approx. 6	approx. 7	approx. 7
Density (DIN 51757, Method A, 23 °C)	g/cm ³	approx. 1.06	approx. 1.02	approx. 1.03
Viscosity (EN 12092, 23 °C, Brookfield, 60 rpm)	mPa·s	approx. 430	approx. 450	approx. 600
Setting point (DIN 51583)	°C	approx. 3	approx. -32	approx. 9
Wetting power (EN 1772, 23 °C, 2 g soda ash/l, 1 g surfactant/l)	s	>300	> 300	> 300
Surface tension*** (EN 14370, 1 g/l, 23 °C)	mN/m	approx. 47	approx. 38	approx. 41

* 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 the Pluronic® RPE types can fall slightly in storage, but this has no effect on their performance

*** Applying Harkins-Jordan correction factor

Pluronic®		RPE 2520	RPE 3110
Physical form		Liquid	Liquid
Average molar mass	g/mol	approx. 3100	approx. 3500
Concentration	%	approx. 100	approx. 100
Cloud point (EN 1890)*			
Method A	°C	approx. 28	approx. 21
Method B	°C		
Method C	°C		
Method D	°C	approx. 35	approx. 31
Method E	°C	approx. 31	approx. 25
pH (EN 1262, Solution B)**		approx. 7	approx. 7
Density (DIN 51757, Method A, 23 °C)	g/cm ³	approx. 1.02	approx. 1.02
Viscosity (EN 12092, 23 °C, Brookfield, 60 rpm)	mPa·s	approx. 600	approx. 600
Setting point (DIN 51583)	°C	approx. -20	approx. -30
Wetting power (EN 1772, 23 °C, 2 g soda ash/l, 1 g surfactant/l)	s	> 300	> 200
Surface tension*** (EN 14370, 1 g/l, 23 °C)	mN/m	approx. 40	approx. 38

Solubility

As a general rule, the solubility of the Pluronic® RPE types in water increases in step with the proportion of polyethylene oxide they contain. If their polyethylene oxide content is constant, their solubility decreases as the molar mass of the polypropylene oxide block increases.

Solubility in selected solvents (10% solution at 23 °C) .

Pluronic®	RPE 1050	RPE 1720	RPE 1740	RPE 2520	RPE 3110
Water	+	-	+	-	-
Caustic soda (5%)	-	-	-	-	-
Hydrochloric acid (5%)	+	+	+	-	-
Ethanol	+	+	+	+	+
Isopropanol	+	+	+	+	+
Toluene	+	+	+	+	+
Mineral spirits	-	+	+	+	+

+ = Clear solution

- = Insoluble or sparingly soluble

Foaming

The Pluronic® RPE types do not foam or, at worst, they are very low-foaming. The amount of foam formed decreases in line with their polyethylene oxide content.

Foam formation can be tested in a number of ways. One method, which closely simulates the conditions encountered in practice, is to measure the level of foam produced in a dishwasher. The rotating spray arm is slowed down by foam, and the rate of revolution corresponds to the amount of foam present. A high rate of revolution means that little foam is formed. Foam can be encouraged to form by adding protein. Foam formation is assessed by adding 5 parts of Pluronic® RPE to 95 parts of a builder mixture consisting of 50% sodium metasilicate, 45% pentasodium triphosphate and 5% soda ash. The mixture is then tested at a concentration of 20 g per 10 l of water in the presence of protein.

Compatibility

Because they are nonionic, the Pluronic® RPE types can be combined with nonionic (Lutensol®, Plurafac® and Pluronic® PE types), anionic (Lutensit®) and cationic surfactants. They are insensitive to cations such as Ca^{2+} , Mg^{2+} and other hardness ions, and they do not react with soluble alkali salts or with polyanionic compounds such as carboxymethyl cellulose.

The resistance of the Pluronic® RPE types to acids is virtually unlimited in conventional applications. These products are also resistant to alkalis to some extent.

Processing

It is advisable to stir the surfactant into the water when making up aqueous solutions. Solutions mixed in the reverse order have a much higher viscosity.

Storage

- a) The Pluronic® RPE types should be stored indoors in their original packaging, which should be kept tightly sealed. Storerooms must not be overheated.
- b) They are hygroscopic and readily soluble in water, with the result that they absorb moisture very quickly. Drums must be resealed each time they are opened.
- c) They must be protected from frost.
- d) The Pluronic® RPE types can become slightly cloudy if they are stored at low temperatures, but this has no effect on their performance.
This cloudiness can be dissipated by heating them to 25 – 30 °C.
- e) Liquid that has solidified or that shows signs of precipitation should be heated to ca. 50 °C and rehomogenized before it is processed.
- f) 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 50 °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.
- g) The Pluronic® RPE types must be blanketed with nitrogen if they are stored in heated tanks (at 40 – 50 °C) to prevent them from coming into contact with air. Constant, gentle stirring helps to prevent them being discoloured as a result of prolonged contact with electrical elements or external heating coils.

Materials

The following materials can be used for tanks and drums.

- a) AISI 316 Ti stainless steel (X6CrNiTi1810)
- b) AISI 321 stainless steel (X6CrNiMoTi17122)
- c) Iron lined with a phenolic resin

Shelf life

Provided they are stored properly and drums are kept tightly sealed, the Pluronic® RPE types have a shelf life of at least two years in their original packaging.

PRD-Nos.*

Pluronic® RPE 1050	30499570
Pluronic® RPE 1720	30044077
Pluronic® RPE 1740	30044136
Pluronic® RPE 2520	30044109
Pluronic® RPE 3110	30044110

*BASF's commercial product numbers.

Safety

We know of no ill effects that could have resulted from using the Pluronic® RPE types for the purposes for which they are intended and from processing them in accordance with current practice. According to the experience that we have gained over many years and other information at our disposal, the Pluronic® RPE types do not exert any harmful effects on health, provided they are used properly, due attention is given to the precautions necessary for handling chemicals, and the information and advice given in the Safety Data Sheets are observed.

Labelling

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

Note

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