
® Arkopal N 100

Nonionic surfactant for the chemical industry

Composition

Nonylphenolpolyglycoether with 10 Mol EO

Product properties ^{*)}

Active substance content

about 100 %

Appearance at 20 °C

viscous, slightly yellow liquid

pH value (DIN EN 1262), 1 % in water

about 6 – 8

Solubility at 20 °C in water

clear

Density (DIN 51757) at 50 °C

about 0.9 – 1.0 g/cm³

Viscosity (DIN 53015) at 50 °C

about 40 mPas

Cloud point (EN 1890)

about 62 – 65 °C (1 % in water)

Pour point (DIN/ISO 3016)

about 10°C

Flash point (DIN/ISO 2592)

> 200 °C

Lime-soap dispersion action (DIN 53903)

3-4 %

Surface tension (DIN 53914) at 20 °C

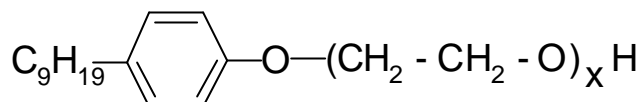
30.4 mN/m (1 g/l)

Further Arkopal N grades

Arkopal N 040
Arkopal N 060
Arkopal N 080
Arkopal N 090
Arkopal N 110
Arkopal N 130
Arkopal N 150
Arkopal N 230
Arkopal N 238
Arkopal N 300
Arkopal N 307
Arkopal N 308
Arkopal N 1000

^{*)} These characteristics are for guidance only and are not to be taken as product specifications. The tolerances are given in the product specification sheet. For further information on product properties, toxicological, ecological and safety data, please refer to the safety data sheet.

Structure



Nonylphenolpolyglycoether

(x = number of added-on molecules of ethylene oxide)

The first two digits indicate the approximate number of molecules of ethylene oxide forming the hydrophilic polyglycoether chains. The third digit indicates the concentration of the products (0 = approximately 100 % active ingredient).

Characteristics

Both the physico-chemical and processing characteristics of the Arkopal N grades depend largely on the ratio of hydrophobic molecules (nonylphenol) to the hydrophilic – i.e. water solubilizing – polyglycoether chain (number of ethylene oxide molecules).

Compatibility

Being nonionic, the Arkopal N grades are compatible with all other nonionic, anionic or cationic substances.

Electrolytes, for example neutral salts, alkalis and – to a lesser extent – acids, reduce the water solubility of the Arkopal N grades and may lead to their salting out, especially at high concentrations and temperatures. Decomposition of the products does not occur. For solutions containing high amounts of electrolytes, Arkopal N grades with long polyglycoether chains may be used since, being more hydrophilic, they are not so easily salted out.

Stability

The Arkopal N grades have excellent resistance to compounds that cause hard water, to metal salts, including those of heavy metals, acids, alkalis, reductive agents and oxidative agents based on peroxide. With regard to oxidative agents giving off chlorine, the stability, as in the case of all polyglycoether derivatives, is limited to the use of dilute solutions. The preparation of highly concentrated mixtures of oxidative or reductive agents and polyglycoether derivatives is not possible.

Solubility

a) in water

The solubility in water increases with the length of the polyglycoether chain. Arkopal N 040 is practically water insoluble. Arkopal N 060, on the other hand, gives cloudy solutions. The other Arkopal N grades form clear, aqueous solutions at 20 °C.

Dilution of the Arkopal N grades with water initially results in a significant increase in viscosity. With the mean ethoxilation stages (Arkopal N 080 to Arkopal N 150), this increase in viscosity leads, in certain concentration ranges

(45-70 %) to the formation of fairly stiff gels that are not readily diluted with cold water. To avoid this gel formation, dilution and dissolving are best carried out by stirring the Arkopal N grades into warm or hot water.

Gel formation can also be overcome by the addition of alcohols, glycols and other solubilizing agents as well as by additions of salt.

Stable dilutions of Arkopal N 060, which gives cloudy solutions with water, cannot be prepared with water alone with less than 40 % active substance. By using solubilizing agents, for example isopropyl alcohol, glycols or suitable anionic compounds, it is, however, possible to obtain clear, stable dilutions at low concentrations.

b) in organic solvents and oils

In non-aqueous media, the solubility of the Arkopal N grades also depends on the degree of ethoxilation. In aliphatic hydrocarbons, the solubility quickly decreases with increasing length of the polyglycoether chain. In mineral oil, petroleum and paraffinic hydrocarbons, therefore, only the slightly hydrophilic products Arkopal N 040 and Arkopal N 060 are soluble.

In aromatic hydrocarbons, in alcohols, ketones and similar polar solvents, and in chlorinated hydrocarbons all Arkopal N grades are soluble.

Physico-chemical data

Cloud point

In contrast to the anionic compounds, the water solubility of the nonionic Arkopal N grades decreases with increasing temperature. Aqueous solutions that are clear at room temperature become cloudy as soon as the temperature is raised to the so-called cloud point.

The cloud point increases with the length of the polyglycoether chain and with the different Arkopal N grades. Products with a high degree of ethoxilation, such as Arkopal N 230 and Arkopal N 300 do not show a cloud point in water up to boiling point. By the addition of salts, such as sodium chloride, it is possible to depress the cloud point so that its determination is possible.

Clouding is a reversible physical process; the solutions clear as they cool. The action of the Arkopal N grades is not adversely influenced, with a few exceptions, by the cloud point. They can, therefore, in most cases be used even at temperatures above cloud point.

The cloud point is determined in water, 25 % aqueous butyldiglycol solution and in 10 % sodium chloride solution.

Butyldiglycol serves as solubilizer and permits the determination of cloud points of products with low degree of ethoxilation which are either insoluble in water or give cloudy solutions.

Surface-active characteristics

Like solubility, surface-active characteristics vary with the degree of ethoxilation.

a) Surface tension

The maximum reduction in surface tension is achieved with Arkopal N 060. As the degree of ethoxilation increases, so the action on the surface tension of water is reduced.

b) Dispersing action

The values for lime-soap dispersion power established according to DIN 53903 indicate the excellent dispersing action of the Arkopal N grades. They have, however, only limited application for other materials to be dispersed.

c) Wetting action

The wetting action of the Arkopal N grades also greatly depends on the degree of ethoxilation. The most effective grades are Arkopal N 090 and Arkopal N 100.

d) Foaming power

Being ethylene oxide derivatives, the Arkopal N grades are characterized by moderate to low foaming action. Their foaming increases with the degree of ethoxilation but at no time reaches the foaming of other anionic compounds such as the alkylsulphates, alkylarylsulfonates etc.

e) Emulsifying action

The excellent emulsifying action of a number of Arkopal N grades allows the preparation of stable emulsions. The selection of the most suitable degree of ethoxilation depends on the type of oil or organic solvent to be emulsified and on any other components that may be dissolved in the oil or solvent.

The following Arkopal N grades are the most suitable for the various oils and solvents:

Arkopal N 040 to Arkopal N 080 for mineral oils, petroleum and similar aliphatic hydrocarbons.

Arkopal N 080 to Arkopal N 130 for aromatic hydrocarbons.

Arkopal N 090 to Arkopal N 150 for chlorinated hydrocarbons

Arkopal N 230 and Arkopal N 300 for fatty acids (olein) and waxes.

By combining various Arkopal N grades, emulsifier mixtures for particular conditions can easily be prepared. Mixtures of products whose degrees of ethoxilation vary greatly are frequently particularly effective. Combinations with anionic or cationic products are also possible and are of advantage in many cases.

This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should not therefore be construed as guaranteeing specific properties of the products described on their suitability for a particular application. Any existing industrial property rights must be observed. The quality of our products is guaranteed under our General Conditions of Sale.

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