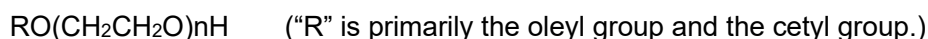

Nonionic Surfactants Derived from Natural Higher Alcohols

EMULMIN No. Products

Preface

EMULMIN No. products are nonionic surfactants of a polyoxyethylene alkyl ether type. These products are formed by adding polymerizations of ethylene oxide to natural higher alcohols (primarily, oleyl alcohol and cetyl alcohol). The structural formula is shown below.

Structural Formula



These products are nonionic surfactants which can be mixed with other surfactants in any ratio. They are applicable not only as base materials for household detergents, but also emulsifiers, dispersants, wetting agents, detergents, etc. for various industries such as the cosmetic industries, metal industries, synthetic resin industries, agricultural industries and textile industries. Moreover, these products can be used as raw materials for other chemical substances. For example, these products are changed into anionic surfactants by sulfation or phosphation. We offer a wide range of EMULMIN No. products which have various numbers of moles of ethylene oxide adducts.

Typical Properties

1. Typical Properties

Table 1 shows the typical properties of EMULMIN No. products. The values are representative. Each of the number symbols that are written next to EMULMIN as product names indicates ten times the approximate average number of moles of ethylene oxide adducts.

Table 1. Typical Properties

Product Name	Appearance	HLB	pH *	Hydroxyl Value	Solubility
EMULMIN 40	Pale yellow liquid	8.0	7.0	136	Disperses finely in water. Soluble in almost all organic solvents.
EMULMIN 50	Straw-colored liquid	9.0	7.0	116	
EMULMIN 70	Pale straw-colored liquid	10.8	5.0	104	
EMULMIN 110	Pale yellow paste	13.2	7.0	77	Soluble in water to form transparent liquid. Soluble in almost all organic solvents excluding paraffin hydrocarbons.
EMULMIN 140		14.2	7.0	70	
EMULMIN 180	White to pale yellow paste	15.1	7.0	55	
EMULMIN 200	White to pale yellow solid	15.5	7.0	49	
EMULMIN 240		16.1	7.0	45	

* 1 wt % aqueous solution

NOTICE: There is a possibility that these products may form deposits under certain conditions. In that case, they should be used after being heated between 30 and 60 °C and agitated until mixed uniformly.

Performance

1. Surface Tension Lowering Properties

Figure 1 shows surface tension of 1 wt % aqueous solutions of EMULMIN No. products. Each of these products are excellent at lowering the surface tension of water.

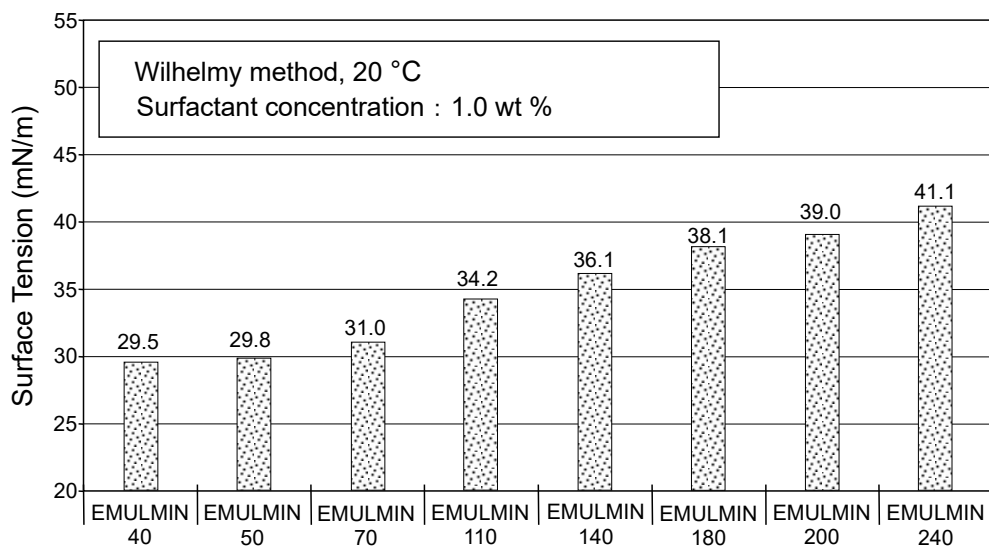


Figure 1. Surface Tension Lowering Properties of Aqueous Solutions of EMULMIN No. Products

2. Foaming Properties

Figure 2 shows foaming properties of 0.5 wt % aqueous solutions of EMULMIN No. products. All foam produced by these products exhibit high stability.

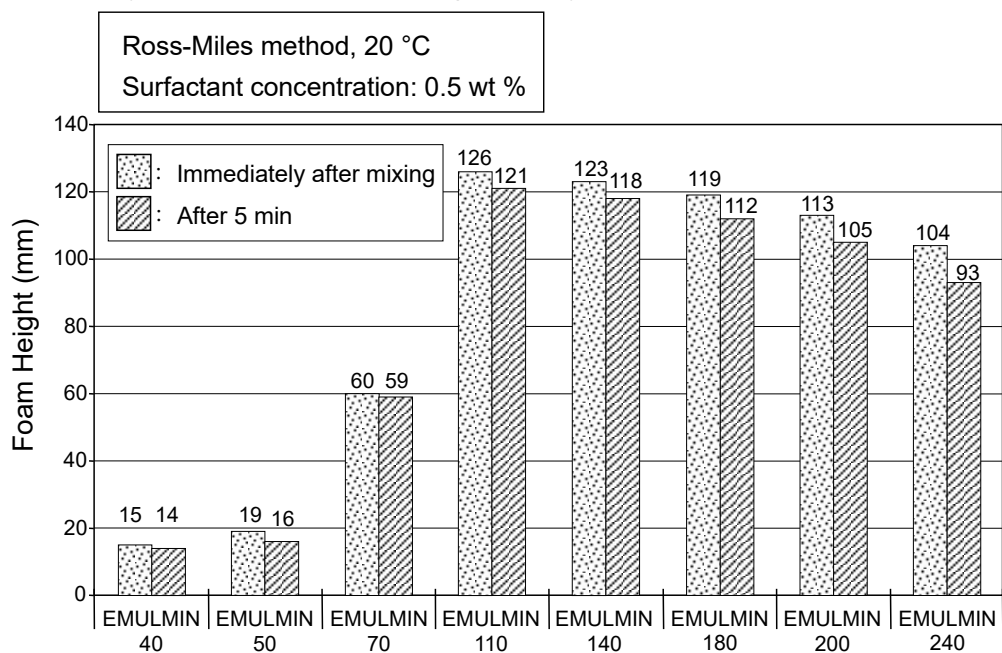


Figure 2. Foaming Properties of Aqueous Solutions of EMULMIN No. Products

3. Penetrating Properties

Figure 3 shows penetrating properties of 0.5 wt % aqueous solutions of EMULMIN No. products into felt fabric.

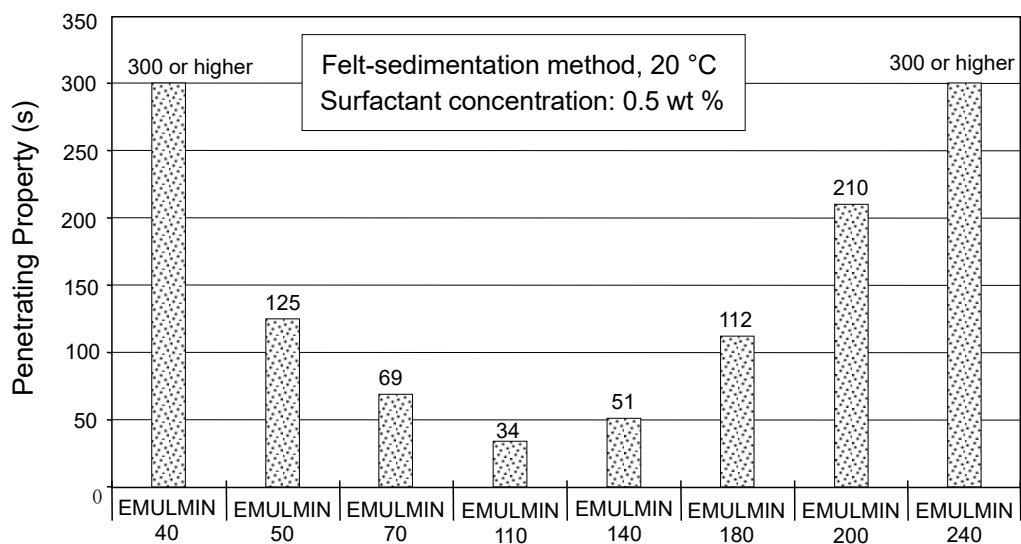


Figure 3. Penetrating Properties of Aqueous Solutions of EMULMIN No. Products

Materials and Methods:

Material:

Each 0.5 wt % aqueous solution containing one of these products was used as a sample.

Method:

A piece of 15 mm-square felt was floated on the surface of each sample solution (adjusted to 20 °C). The time required for the felt to begin to sink was measured in seconds.

The lower the value, the higher the penetrating property.

Applications

EMULMIN No. products are applicable to a wide range of fields due to the following useful features.

1. Main Features of EMULMIN No. Products

- The hydrophobic group is primarily the oleyl group and the cetyl group, and these products excel in emulsifiability, dispersability and wettability.
- These products have various HLB values, and any combination of EMULMIN No. Products can be mixed together.
(Generally, EMULMIN 50 to 70 can be used as emulsifiers for mineral oils, EMULMIN 70 to 140 can be used as emulsifiers for fats and oils, and EMULMIN 240 can be used as emulsifiers for vinyl acetate type emulsion polymerizations)
- These products exhibit surface activity even in acidic, alkaline, or electrolytic solutions because they are of a polyether type and are chemically stable. Also, these products can be generally mixed together with other surfactants in any ratio because they are nonionic.
- These products have lubricating properties and reduce the coefficient of friction of mineral oils.
- These products minimally erode metals for practical purposes.

2. Practical Examples of Applications

2-1) Metal industry

EMULMIN No. products can be used as;

- Ingredients for acid and alkali cleaning agents for metals.
- Emulsifiers or oiliness improvers for rolling oils and cutting oils.

2-2) Synthetic Resin Industry

- EMULMIN 240 can be primarily used as an emulsifier for emulsion polymerizations.

<Formula for emulsion polymerization of a vinyl chloride paste>

	wt %
Vinyl chloride monomer:	20
EMULMIN 240:	0.7
Ammonium persulfate:	0.1
Water:	Balance
<hr/>	
Total:	100

2-3) Agrichemical Industry

- EMULMIN No. products can be used as emulsifiers for machine oils

2-4) Textile Industry

- EMULMIN No. products can be used as emulsifiers for spin finish, solubilizing agents for dyes, dispersant for disperse dyes, leveling agents and soaping agents.

Hazards Description

EMULMIN No. products are nonionic surfactants.

These products are combustible having flash points of 210 to 260 °C (COC).

These products may cause mild or moderate irritation to the skin and eyes.

These products are for industrial use only.

Important :

Before handling these products, refer to the Safety Data Sheet for recommended protective equipment, and detailed precautionary and hazards information.

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