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TECHNICAL DATA SHEET

Product Name: Polysorbate 80

INCI Name: Polysorbate 80

CAS: 9005-65-6

Synonyms: Polyethoxylated Sorbitan Monooleate; Tween 80

Functional Category: Surfactant ~ Emulsifier, Solubilizer

Chemical Classification: Sorbitan Derivative

IUPAC Name: Polyoxyethylene (20) sorbitan monooleate

Chemical-Physical Properties: Polysorbate 80 is a complex molecule consisting of both hydrophilic and hydrophobic parts, enabling it to function as an effective surfactant. The central part of the molecule is sorbitan, a derivative of the sugar sorbitol. Sorbitan has several hydroxyl groups that increase hydrophilicity and enable hydrogen bonding with the aqueous phase. The polyoxyethylene chain is composed of ethylene oxide units and is also the hydrophilic part of the molecule. The fatty acid esterified with sorbitan is oleic acid. This unsaturated fatty acid represents the hydrophobic part of the molecule and allows for hydrophobic interaction with the fatty components of the emulsion. The functional groups in the Polysorbate 80 molecule act synergistically to reduce the surface tension between oil and water, stabilize the emulsion, and help disperse oil components in water. Besides stabilizing emulsions, Polysorbate 80 is used to enhance the bioavailability of active ingredients in pharmaceutical preparations and to reduce skin irritation in cosmetic products. Polysorbate 80 is a viscous liquid of light yellow color. Its slightly yellowish hue is subtle enough not to affect the appearance of most formulations. Viscosity varies depending on the temperature, but under standard conditions, it remains sufficiently viscous to be easily dosed and mixed with other ingredients. One of the key properties of Polysorbate 80 is its high solubility in water. Besides water, it is also soluble in alcohol, which further increases its application in various solutions and formulations. Polysorbate 80 is stable over a wide pH range, typically between 3 and 10. This stability allows its use in diverse products, from acidic to basic formulations. It is also thermally stable, meaning it can withstand high temperatures without degradation or loss of functionality. Additionally, Polysorbate 80 is resistant to

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oxidation and degradation, giving it a long shelf life. This stability is crucial for products that need to be stored for extended periods without quality loss. Its chemical stability means it will retain its properties during storage, even under unfavorable conditions.

Benefits:

• ***Emulsion Stabilization:*** Polysorbate 80 is an extremely effective emulsifier that allows for stable and homogeneous mixtures of oil and water. Stable emulsions ensure that active ingredients are evenly distributed on the skin, enhancing their effectiveness. The emulsifying efficiency increases when combined with cetyl alcohol or sorbitan stearate. It is very useful as a solubilizer and stabilizer of essential oils. HLB value 15 (forms oil-in-water (O/W) emulsions).

• ***Improved Texture and Skin Feel:*** Polysorbate 80 improves the texture of cosmetic products, making them smooth and pleasant to apply. It helps reduce the greasy feel that can occur with oil-based products.

• ***Solubilization of Active Ingredients:*** Polysorbate 80 helps dissolve and disperse active ingredients that are otherwise insoluble in water, such as essential oils and vitamins. This improves the bioavailability of these ingredients, making them more effective in the formulation.

• ***Reduction of Irritation:*** As a non-ionic surfactant, Polysorbate 80 is gentle on the skin and helps reduce potential irritation caused by other, more aggressive emulsifiers or surfactants. This is particularly important for products intended for sensitive skin.

• ***Compatibility with a Wide Range of pH Values:*** Polysorbate 80 is stable over a wide pH range, making it suitable for different types of cosmetic formulations, from acidic to basic products.

• ***Extended Shelf Life:*** Due to its resistance to oxidation and degradation, Polysorbate 80 helps extend the shelf life of cosmetic products. This ensures that products retain their properties and effectiveness throughout their usage period.

• ***Versatility in Use:*** Polysorbate 80 can be used in various cosmetic products, including moisturizers, shampoos, conditioners, facial cleansers, and body care products. Its ability to blend well with other ingredients and enhance the overall formulation makes it a valuable addition to many cosmetic products.

Usage Instructions: Commonly used in concentrations from 1% to 10%. Can be added to the formulation in its basic form. For external use only.

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Applications: Used in the production of baths, shampoos, lotions, creams, and bath oils. It can be useful as an additive in hair growth products.

Source Raw Materials: Sorbitol, vegetable oils

Production Method: Polysorbate 80 is obtained by esterification of sorbitol with one or three molecules of fatty acids (stearic, lauric, oleic, or palmitic acid).

Animal Testing: Substance has not been tested on animals

GMO: Not GMO

Vegan: Contains no animal-derived components