

TECHNICAL DATA SHEET

Product Name: Polysorbate 20

INCI Name: Polysorbate 20

CAS: 9005-64-5

Chemical Classification: Sorbitan Derivative

Functional Category: Surfactant ~ Emulsifier, Solubilizer

IUPAC Name: Polyoxyethylene (20) sorbitan monolaurate

Chemical-Physical Properties: Polysorbate 20 is a nonionic surfactant composed of sorbitan, lauric acid, and ethoxylated chains. Sorbitan forms the central part of the molecule, linked with lauric acid, imparting lipophilic characteristics, allowing it to mix well with oils and other non-polar substances. Additionally, the molecule is surrounded by long ethylene oxide chains, enabling it to dissolve well in water. This combination of hydrophilic and lipophilic parts allows Polysorbate 20 to effectively blend oil and water, creating stable emulsions. Polysorbate 20 is a viscous liquid with a density of about 1.10 g/cm³ at room temperature. Its consistency resembles syrup, with a viscosity between 300 and 500 milliPascal seconds, facilitating easy mixing with other liquids. When cooled to around -2°C, it may thicken or solidify, while it can degrade around 100°C. Its pH value in a 5% aqueous solution ranges from 5 to 7, making it slightly acidic to neutral. Polysorbate 20 dissolves easily in water, ethanol, methanol, and ethylene glycol, but is less soluble in oils and fatty acids. It appears as a colorless to slightly yellowish liquid with a mild sweet odor, making it suitable for various formulations where stability and a neutral odor are important. HLB value of 16.7 (providing oil-in-water emulsions).

Benefits:

- **Emulsification:** Polysorbate 20 is an excellent emulsifier that helps mix oil and water, creating stable emulsions. This is crucial for formulations such as creams, lotions, and serums, where it is essential to prevent oil and water separation.
- **Texture Enhancement:** Adding Polysorbate 20 improves the texture of products, particularly important for skin-applied products like creams and lotions.

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• **Solubilization of Active Ingredients:** Polysorbate 20 aids in dissolving various active ingredients that are otherwise poorly soluble in water. This is important for formulations containing ingredients like essential oils or vitamins, allowing them to evenly distribute within the product.

• **Formulation Stabilization:** As a stabilizer, Polysorbate 20 helps prevent ingredient separation over time, extending the shelf life of the product and maintaining its consistency.

• **Improved Rinse-off:** As a surfactant, Polysorbate 20 assists in removing dirt and oils from skin and hair, making it useful in cleansing products such as shampoos and facial cleansers.

• **Reduced Irritation:** Polysorbate 20 is known for its mild and non-irritating properties on the skin, making it suitable for use in formulations for sensitive skin.

• **Enhanced Penetration:** Polysorbate 20 can enhance the penetration of active ingredients through the skin, increasing their effectiveness.

• **Compatibility with Various Ingredients:** Polysorbate 20 is compatible with a wide range of other ingredients, including various oils, extracts, and preservatives, making it highly flexible for use in different formulations.

Conclusion: Using Polysorbate 20 in cosmetic products enables the creation of high-quality formulations that are stable, effective, and pleasant to use, making it a key ingredient in modern cosmetics.

Usage: Recommended concentrations of Polysorbate 20 vary depending on specific application and product formulation. For making creams and lotions, Polysorbate 20 is typically used at concentrations of 2% to 10%. For serums, the concentration of Polysorbate 20 may be lower, around 1% to 2%. This amount is sufficient to achieve solubility of active ingredients while maintaining a lightweight serum texture. In facial and body cleansers, Polysorbate 20 is often used at concentrations of 0.5% to 2%. In this application, Polysorbate 20 helps dissolve oils and other impurities, enabling effective cleansing without irritation. In shampoos and hair conditioners, Polysorbate 20 is used at concentrations between 1% and 3%. Here, it serves as a solubilizer for essential oils and other hydrophobic ingredients, ensuring even distribution throughout the product. In sprays and tonics, the concentration of Polysorbate 20 may range from 0.5% to 1%. These low concentrations facilitate the solubilization of essential oils or fragrance components, ensuring even application and quick absorption. In face masks, the concentration of Polysorbate 20 can range from 1% to 3%, depending on other ingredients in

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the formulation. During formulation, it is important to test different concentrations of Polysorbate 20 to find the optimal amount for desired texture and product stability. Consider the interaction of Polysorbate 20 with other ingredients and adjust the formulation according to specific product needs. Experimentation and adjustment of concentrations are key steps in developing formulations that are effective and stable, and Polysorbate 20 provides the flexibility to achieve these goals.

Applications: Used in creams, ointments, balms, skin protective creams, lip balms, mascaras.

Raw Materials: Sorbitol, vegetable oils, ethylene oxide

Method of Production: Polysorbate 20 is produced by combining raw materials derived from plant sources and petrochemical processes. One of the key components of Polysorbate 20 is lauric acid, obtained from coconut or palm oil. Sorbitol is a sugar alcohol derived from plant sources such as corn and wheat. It is dehydrated to obtain sorbitan, which forms the central part of the Polysorbate 20 molecule. The petrochemical raw material, ethylene oxide, is used for the ethoxylation of sorbitan.

Animal Testing: Substance not tested on animals

GMO: Not GMO

Vegan: Does not contain animal-derived components