

TECHNICAL DATA SHEET

Product Name: Sodium Stearate

Raw Material Name: Sodium Stearate

INCI Name: Sodium Stearate

CAS: 822-16-2

Synonyms: Sodium Octadecanoate; Stearic Acid Sodium Salt; Octadecanoic Acid Sodium Salt; Sodium Salt of Stearic Acid

Chemical Classification: Sodium salt of a saturated fatty acid; anionic surfactant; soap.

Functional Category: Surfactant - cleansing agent; surfactant - emulsifier; viscosity modifier; thickener.

IUPAC Name: Sodium octadecanoate

Molecular Formula: C₁₈H₃₅NaO₂

Molecular Weight: 306.47 g/mol

Chemical Nature and Structure: Sodium Stearate is the sodium salt of stearic acid, a saturated fatty acid containing 18 carbon atoms. The molecule consists of a long hydrophobic hydrocarbon chain and a polar carboxylate group associated with a sodium ion. Due to this amphiphilic structure, it belongs to the class of anionic surfactants and exhibits characteristic soap-like properties. It may be obtained by neutralization of stearic acid with sodium hydroxide or by saponification of suitable triglycerides.

Description: Sodium Stearate is a solid surface-active substance used in cosmetic formulations primarily as a cleansing agent, surfactant - emulsifier and viscosity modifier. It reduces surface and interfacial tension and contributes to the dispersion of lipid impurities in an aqueous medium. Due to its ability to form structured soap systems, it is particularly important in solid and gel-stick formulations, where it contributes to product consistency and mechanical stability. In emulsions, it may have an auxiliary emulsifying function, but its use must be adjusted to the pH value and the complete composition of the formulation. Standardly listed cosmetic functions of Sodium Stearate include cleansing, surfactant cleansing, surfactant emulsifying and viscosity control. Sodium Stearate is typically a white to almost white solid substance in powder or crystalline form. It is sparingly soluble in water at room temperature; its behavior in a formulation depends on temperature, pH, solvent system and the presence of other components.

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Mechanism of Action: Sodium Stearate acts as an anionic surfactant due to its structure, which contains a hydrophobic hydrocarbon chain and a hydrophilic carboxylate group. At the interface between the aqueous and lipid phases, the molecules orient so that the hydrophobic portion shows affinity for lipids, while the ionic portion remains in contact with the aqueous phase. In this way, interfacial tension is reduced and dispersion of lipid components is facilitated. In suitable polar systems, Sodium Stearate may form structured aggregates and a network that increases viscosity and enables the formation of solid or semi-solid gel-stick products. Its behavior depends on concentration, temperature, solvent type, presence of electrolytes and the pH of the formulation.

Benefits:

- **Viscosity increase:** contributes to formation of a firm and stable product structure.
- **Gel-stick systems:** enables formation of structured solid and semi-solid gel-stick formulations.
- **Cleansing:** acts as an anionic surfactant and contributes to dispersion of lipid impurities.
- **Auxiliary emulsification:** may provide an auxiliary emulsifying function in suitable systems.
- **Texture:** contributes to a smooth and uniform structure of the finished product.

Properties: Sodium Stearate is a white to almost white solid substance in powder or crystalline form. It is sparingly soluble in water at room temperature. Its molecular weight is 306.47 g/mol. The physical characteristics of technical and cosmetic grades may vary depending on purity, hydration and the composition of the specific product.

Usage: Sodium Stearate is used as an anionic surfactant, surfactant - emulsifier and viscosity modifier. In gel-stick formulations, it is most commonly dispersed or dissolved in a suitably heated polar phase such as water and/or glycols, after which a firm gel structure develops during controlled cooling. The processing temperature depends on the complete formulation composition and must be sufficient to enable homogeneous distribution of Sodium Stearate. In deodorants and other stick products, it may be used at higher concentrations, often in the approximate range of 3.5-10%, depending on the desired firmness, solvent composition and other formulation components. This range should be regarded as formulation practice rather than a universal rule for all product types. In formulations containing free acids, compatibility must be considered carefully, because lowering the pH may convert stearate into poorly soluble stearic acid and alter the structure of the system. The final pH should be adjusted according to the product

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type, other ingredients and skin-safety requirements. Sodium Stearate is not a universal stand-alone emulsifier for all types of creams and lotions. When used in emulsion systems, stability of the finished product should be confirmed by appropriate testing. For external use only.

Applications: Used in solid and gel deodorants, soaps, cleansing products, shaving preparations, certain emulsion systems and other cosmetic formulations where surfactant action, viscosity increase or formation of a solid structure is required.

Safety of Use: Sodium Stearate belongs to the group of fatty acids and their salts with a long history of use in cosmetic products. Cosmetic Ingredient Review has assessed the safety of fatty acids and their salts within a group safety assessment. The safety of a specific formulation depends on concentration, pH, product type, site of application and the complete formulation composition. Particular attention should be paid to systems with more pronounced alkalinity and high levels of soap components, as such systems may contribute to skin dryness or irritation.

Natural or Synthetic Ingredient: Sodium Stearate is obtained by chemical neutralization of stearic acid with a sodium base or by saponification of suitable lipid raw materials. Stearic acid may be of plant or animal origin, so the origin of a specific Sodium Stearate cannot be determined from the INCI name alone. COSMILE lists Sodium Stearate as animal/synthetic in origin, while noting that origin may depend on the manufacturing process and raw materials used. A plant origin may be stated for products manufactured from plant-derived stearic acid only when confirmed by manufacturer documentation.

Animal Testing: Animal-testing status should be stated according to documentation from the specific manufacturer. Compliance of the finished cosmetic product with Regulation (EC) No. 1223/2009 does not in itself prove that a particular chemical substance has never been subject to animal testing.

GMO: Non-GMO, provided this status is confirmed by manufacturer documentation.

Vegan: Contains no animal-derived components only if it is confirmed that the fatty raw materials used in production are of plant origin.

Country of Origin: EU