

### Sodium Lauryl Sulfate (SLS)

Category: Primary Surfactants

Description: A widely used and effective surfactant, known for its strong cleansing and foaming properties. However, it can be harsh on sensitive skin and hair, leading to irritation and dryness in some individuals.

Usage: Foaming, cleansing

### Sodium Laureth Sulfate (SLES)

Category: Primary Surfactants

Description: A milder alternative to SLS, SLES provides good cleansing and foaming properties while being less irritating to the skin and hair. SLES is currently the most widely and largely used surfactant in shampoos.

Usage: Foaming, cleansing

### Ammonium Laureth Sulfate (ALES)

Category: Primary Surfactants

Description: It has similar foaming and cleaning capabilities to SLES but has superior water solubility. This leads to two benefits

Usage: Foaming, cleansing

### Sodium Cocoyl Isethionate (SCI)

Category: Primary Surfactants

Description: A mild, sulfate-free surfactant derived from coconut oil, SCI is known for its gentle cleansing properties and is suitable for sensitive skin and hair types.

Usage: Foaming, cleansing

### Sodium Lauroyl Methyl Isethionate (SLMI)

Category: Primary Surfactants

Description: Another sulfate-free surfactant that can be used individually as a primary surfactant or as a co-surfactant. It creates a rich, creamy foam and provides gentle cleansing. It can be easily rinsed off and has a slightly conditioning effect, leaving a pleasant sensation on the skin.

Usage: Foaming, cleansing

### Cocamidopropyl betaine (CAPB)

Category: Secondary Surfactants

Description: A mild, amphoteric surfactant derived from coconut oil that enhances foam production, provides conditioning benefits, and improves the overall mildness of the shampoo. It's currently the most widely used secondary surfactant in shampoos, with SLES being the primary surfactant.

Usage: Foam enhancing, cleansing, thickening, reducing irritation

### Cocamidopropylamine Oxide (CAO)

Category: Secondary Surfactants

Description: Another widely used versatile co-surfactant in shampoos. It can act as a thickener, stabilizer, and foam booster. It also provides some conditioning properties, leaving the hair feeling soft and silky.

Usage: Foam enhancing, cleansing, thickening, reducing irritation

### Alkyl Polyglycoside

Category: Secondary Surfactants

Description: This non-ionic surfactant is derived from renewable resources and is readily biodegradable, making it an environmentally friendly choice. It is known for its superior mildness on the hair and scalp while still providing good foaming and cleansing properties.

Usage: Foam enhancing, cleansing, thickening, reducing irritation

#### Cocamide DEA (CDEA)

Category: Secondary Surfactants

Description: This non-ionic surfactant acts as a thickener and foam stabilizer, improving the shampoo's viscosity and foam stability when used as a co-surfactant. It can also contribute to the conditioning properties of the formulation. CDEA was once a very common secondary surfactant in shampoos.

However, due to its potential carcinogenicity, it has been under strict use restrictions in recent years in shampoo and other personal care products. Cocamide MEA (CMEA) has taken some of its market shares.

Usage: Foam enhancing, cleansing, thickening, reducing irritation

#### Cocamide MEA (CMEA)

Category: Secondary Surfactants

Description: Similar to Cocamide DEA, CMEA is a non-ionic surfactant that can improve the viscosity, foam stability, and conditioning properties of the shampoo. It is often used in conjunction with Cocamide DEA for a more balanced formulation.

Usage: Foam enhancing, cleansing, thickening, reducing irritation

#### Various Amino Acid Surfactants

Category: Secondary Surfactants

Description: These surfactants are mild and gentle cleansing agents derived from amino acids, which are the building blocks of proteins. These surfactants are often used in shampoos and other personal care products for their ability to effectively clean without stripping the natural oils and causing drying or irritation. Amino acid surfactants are particularly suitable for sensitive or delicate hair and scalp types.

Although amino acid surfactants, as anionic surfactants, have the cleaning and foaming properties to work as the primary surfactants, currently, they are expensive and less accessible. So they are used more as a co-surfactant. Some examples of amino acid surfactants include Sodium Cocoyl Glutamate, Sodium Lauroyl Sarcosinate, and Disodium Lauryl Sulfosuccinate.

Usage: Foam enhancing, cleansing, thickening, reducing irritation

#### Sodium chloride (Salt)

Category: Thickeners

Description: Sodium chloride is often used as a simple and cost-effective thickener. However, it can be drying for the hair and scalp and may not be suitable for all hair types.

Usage: Viscosity building

#### Guar gum

Category: Thickeners

Description: Derived from guar beans, guar gum is a natural thickening agent that provides excellent slip and conditioning properties. It is often used in sulfate-free and natural shampoos.

Usage: Viscosity building

#### Xanthan gum

Category: Suspending agents

Description: Xanthan gum, a naturally occurring polysaccharide, is often used as a suspending agent in shampoo formulations. It forms a gel-like network that entraps insoluble ingredients, preventing them from settling or separating, while also providing additional thickening and stabilizing benefits.

Usage: Suspending insoluble ingredients

#### Hydroxyethylcellulose (HEC)

Category: Suspending agents

Description: HEC is a non-ionic, water-soluble polymer derived from cellulose that can be used as a suspending agent in shampoo formulations. It forms a gel-like network that effectively suspends and stabilizes insoluble ingredients while also providing additional thickening and stabilizing benefits.

Usage: Suspending insoluble ingredients

#### Carbomer

Category: Suspending agents

Description: Carbomers are synthetic polymers that can be used as suspending agents in shampoo formulations. They can create a gel structure that can suspend and stabilize various ingredients, including particles, pigments, and oils.

Usage: Suspending insoluble ingredients

#### Cetyl alcohol and stearyl alcohol

Category: Thickeners

Description: These fatty alcohols are derived from natural oils and fats and are often used as thickeners, emollients, and emulsifiers in shampoo formulations.

Usage: Viscosity building

#### PEG-150 distearate

Category: Thickeners

Description: This polyethylene glycol derivative is used as a thickening agent and emulsifier in shampoo formulations. It is compatible with both anionic and non-ionic surfactants.

Usage: Viscosity building

#### Foam boosters

Category: Foam Boosters/ Stabilizers

Description: These ingredients increase the amount and density of foam by reducing the surface tension of water, allowing for a better interaction between shampoo and water. Secondary surfactants are often working as foam boosters in shampoo. Low concentrations (1-2%) of secondary surfactants such as betaine, lactylates, glutamates, taurates, sulfosuccinates, sarcosinates, and amine oxides can effectively boost foam.

Usage: Foam boosting & stabilizing

#### Foam stabilizers

Category: Foam Boosters/ Stabilizers

Description: A voluminous, quick-breaking foam is less desirable than a stable, long-lasting one. Foam stabilizers help maintain the structure and stability of the foam by slowing the breakage of foam bubbles. This can be achieved by incorporating materials that strengthen the foam bubble wall:

Usage: Foam boosting & stabilizing

#### - Gums

Category: Foam Boosters/ Stabilizers

Description: Natural or synthetic thickening agents such as cellulose, guar, and xanthan gum can be added at concentrations of 0.05-0.15%. They increase the viscosity of the shampoo formulation, which in turn helps to stabilize the foam bubbles.

Usage: Foam boosting & stabilizing

- Surfactants forming a liquid crystal layer

Category: Foam Boosters/ Stabilizers

Description: Certain surfactants (APGs, Betaines, Sorbitan esters, etc) can create a liquid crystal layer at the foam bubble wall, slowing down bubble breakage and enhancing foam stability. These surfactants contribute to improved shampoo performance and a more enjoyable user experience.

Usage: Foam boosting & stabilizing

Cationic polymers

Category: Conditioners

Description: These positively charged polymers, such as polyquaterniums (PQ-7, PQ-10), adhere to the negatively charged hair shaft, offering conditioning benefits like detangling, static control, and improved combability without interacting negatively with the anionic surfactants in shampoos.

Usage: Hair conditioning

Silicones

Category: Conditioners

Description: These ingredients impart smoothness, shine, and manageability to hair by forming a thin layer around the hair shaft, reducing friction and providing protection against environmental stressors. The most widely used silicone in Shampoo is Dimethicone.

Usage: Hair conditioning

Fatty alcohols

Category: Conditioners

Description: Fatty alcohols, such as cetyl, stearyl, and cetearyl alcohols, improve the texture and spreadability of shampoo formulations while providing conditioning and emollient properties.

Usage: Hair conditioning

Natural oils and butters

Category: Conditioners

Description: Ingredients like argan oil, coconut oil, shea butter, and jojoba oil help replenish lost lipids in the hair shaft, nourish, hydrate, and improve overall hair health.

Usage: Hair conditioning

Acrylates Copolymer

Category: Suspending agents

Description: Acrylates copolymer is a synthetic polymer that provides excellent suspending and thickening properties. It is commonly used in shampoo formulations to suspend and stabilize insoluble ingredients, such as pigments and conditioning agents, while also offering additional benefits like improved viscosity and stability.

Usage: Suspending insoluble ingredients

Cellulose gum

Category: Suspending agents

Description: Derived from plant fibers, cellulose gum is a natural suspending agent that can be used in shampoo formulations. It forms a gel-like network that entraps and suspends insoluble ingredients, preventing them from settling or separating and providing additional thickening and stabilizing benefits.

Usage: Suspending insoluble ingredients

Bentonite and Hectorite clays

Category: Suspending agents

Description: These natural clay minerals can be used as suspending agents in shampoo formulations due to their ability to form a gel-like structure when hydrated. This structure can suspend and stabilize a wide range of insoluble ingredients, preventing them from settling or separating.

Usage: Suspending insoluble ingredients

Ethylene Glycol Distearate (EGDS)

Category: Opacifiers/ Pearlizers

Description: EGDS is a widely used pearlizing agent that forms crystalline structures when added to shampoo formulations, giving the product a pearlescent sheen. It also acts as an emulsifier and can contribute to the product's overall stability.

Usage: Providing pearlescent effect

Mica and titanium dioxide

Category: Opacifiers/ Pearlizers

Description: These inorganic minerals can be used to create a pearlescent effect in shampoos. Mica provides a shimmering appearance, while titanium dioxide adds opacity and brightness to the formulation.

Usage: Providing pearlescent effect

Sodium polyacrylate

Category: Opacifiers/ Pearlizers

Description: This synthetic polymer can be used to opacify shampoo formulations, providing a creamy and luxurious appearance.

Usage: Providing pearlescent effect

Glycerin

Category: Humectants

Description: This widely-used humectant is a natural byproduct of the soap-making process. It is effective in attracting moisture from the air and retaining it within the hair shaft.

Usage: Moisturizing

Propylene Glycol

Category: Humectants

Description: This synthetic humectant is used in a variety of personal care products due to its ability to absorb and retain moisture. It also helps improve the product's texture and spreadability.

Usage: Moisturizing

Sorbitol

Category: Humectants

Description: Derived from natural sources like fruits and berries, sorbitol is a sugar alcohol that works as an effective humectant in shampoo formulations.

Usage: Moisturizing

EDTA salts

Category: Chelating agents

Description: EDTA salts are commonly used chelating agents that bind to metal ions present in hard water, preventing them from reacting with other components of the shampoo and allowing the surfactants and other active ingredients to function properly.

Usage: Surfactant stabilizing, Preservative enhancing

Citric acid

Category: pH adjuster

Description: Citric acid is a commonly used pH adjuster that can lower the pH of the shampoo to the desired range.

Usage: Adjusting pH level

Phytic acid

Category: Chelating agents

Description: Phytic acid is another natural chelating agent that can bind to metal ions and improve the effectiveness of the shampoo formulation.

Usage: Surfactant stabilizing, Preservative enhancing

Lactic acid

Category: pH adjuster

Description: Lactic acid is another pH adjuster that can be used to lower the pH of the shampoo.

Usage: Adjusting pH level

Phosphoric acid

Category: pH adjuster

Description: Phosphoric acid can also be used to adjust the pH of the shampoo.

Usage: Adjusting pH level

Sodium hydroxide

Category: pH adjuster

Description: Sodium hydroxide is a pH adjuster that can be used to increase the pH of the shampoo.

Usage: Adjusting pH level