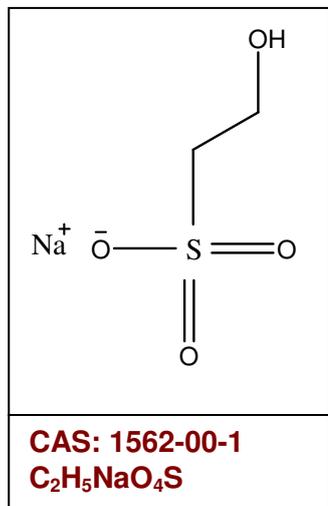


SODIUM ISETHIONATE

- AN ECO-FRIENDLY SURFACTANT FOR INDUSTRIAL APPLICATIONS

SI

(Sodium Isethionate) is primarily used in synthetic and combination detergent bar soaps and most of the production of SI is used as an intermediate in the production of SCI (Sodium Cocoyl Isethionate) for use directly in personal wash products and as such is primarily for uses regulated by the US Food and Drug Administration (FDA). Other uses of SI include skin cleansing and personal washing agents, cosmetics, intermediates, and ingredients in shampoo and bubble baths. SI and SCI are milder on the skin than soap and are non-drying. They offer a dense lather in addition to the lather made by the soap. SI works equally well in both hard and soft water.



SI is highly soluble in water and has a very low affinity for bioaccumulation. SI is readily biodegradable, exhibiting 63-100% degradation in 10-28 days. SI is also non-toxic to aquatic organisms and exhibits no apparent toxicity in mammalian studies. Therefore, SI is considered as an eco-friendly surfactant and gradually adopted into many industrial applications.

APPLICATION

SI

Isethionates

Taurates

Surfactant Products

SI is used as an amphoteric detergent ingredient in moisturizing soap bars, and other skin cleansers and skin detergents, at levels ranging from 0 to 15%. SI is much milder than soap to the skin, and is rinsed off immediately in the act of washing. It makes a dense lather in addition to the lather made by the soap. SI works equally well in soft or hard water. It is also an anti-static agent in shampoos.

Taurates and Isethionates (fatty acid sulfoalkyl amides and esters, respectively), originally developed in the 1930s for textile processing, both types are produced from Sodium Isethionate. The Isethionates (acyl isethionate, R-COO-C₂H₄SO₃Na) is obtained by reaction of SI with a fatty acid ('direct process'), or fatty acid chloride ('indirect process'). These surfactants are used increasingly in the cosmetic field, particularly those derived from coconut fatty acid. The Taurates (N-methyl-N-acyltaurate, R-CON(R₁)C₂H₄SO₃Na) is obtained by Schotten-Baumann reaction of a fatty acid chloride with N-methyltaurine, which is derived from Sodium Isethionate via methylamine.

Taurates and Isethionates retain the benefits of the soaps to which they are structurally similar, but chemical modifications have eliminated many undesirable features. Thus they combine good detergency and wetting with high foaming, and maintain their performance in hard or salt water. Taurates are stable to hydrolysis over the whole pH range. Isethionates are prone to hydrolysis at high (>8) or low (<5) pH, but this does not normally present a problem in cosmetic formulations.

The Isethionates and Taurates surfactants are characterized by their extreme mildness to skin. Syndet and soap bars based on Isethionates can be formulated at neutral pH ('Dove type' bars) instead of the alkaline pH of soap, and have been shown in various studies to be milder than soap and better tolerated by the young, the old and those with sensitive skins. Similarly, Isethionates have been shown to be less irritating than other anionic or amphoteric surfactants used in cosmetics. The difference has been related to the negligible effect of Isethionates on the water-binding capacity of stratum corneum.

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Taurine Bio-Buffer

Pharmaceutical

Taurine is widely used as nutritional supplement for human and in animal feeds, and its annual consumption is anticipated to be over 15,000Mts. SI is the key intermediate for Taurine synthesis with advantage of shorter reaction time and safer condition without explosion risk while handling Ethylene oxide.

SI also serves as starting material for manufacturing bio-buffers such as MES, BES, TES, HEPES, PIPES, TAPS, CHES, MOPS, MOPSO, ACES, CAPS, CAPSO, DIPSO, HEPPSO, HEPPS, POPSO and TAPSO...etc. These Bio-buffers are essential material in research works and practices of biotech, pharmaceutical and hospitals, with annual consumption of 100Mts.

Others

SI, Isethionates and Taurates are used as surfactants in electroplating bath for increasing the plating range such that solution could be worked at much higher current densities and run at great speeds.

Electroplating Electropolishing Cosmetics Personal Care

SI has been approved to be oxidized and form sulfonic acetate in desired concentration in electroplating bath. One patent by Technic addressed SI plays as a substitute of methane sulfonic acid in plating bath for cost reduction purpose, and the maximum 66% replaced by SI is acceptable.

Other cosmetic applications besides toilet bars include shampoos (excellent cleaning, mild to scalp, some hair conditioning effects), liquid soaps (mild for all-over body use), bubble baths (copious stable foam, efficient lime soap dispersal, low irritancy), skin creams and lotions (emulsification, alleviation of 'dry skin'), baby care products (ultra-mild cleansing bars and milks, impregnated baby wipes) and oral products (foaming agents with low toxicity for toothpastes and mouthwashes).

For further information, please contact your OUCC representative or leave your message at our website www.oucc.com.tw

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PRODUCT PROPERTIES

Sodium Isethionate (SI) is the sodium salt of isethionic acid and functions as a surfactant and lathering agent in synthetic cleansing bars and detergents. Physical-chemical property data of Sodium Isethionate from US EPA website are summarized in Table 1,

Table 1. Physical-Chemical Properties

Item	Value	Source
Melting Point	214.41 °C	EPI Suite
	193-196 °C	IUCLID 2000
	191-194 °C	Chemfinder.com
Boiling Point	>230 °C	IUCLID 2000
	503.88 °C	EPI Suite
Density	800-1000 kg/m ³	IUCLID 2000
Vapor Pressure	1.37 x 10 ⁻¹² mm Hg at 25 °C	EPI Suite
Partition Coefficient (Log Kow)	-5.50 at 25 °C	EPI Suite
Water Solubility	1000 g/L at 25 °C	EPI Suite
	650 g/L at 20 °C	IUCLID 2000

PRODUCTION

SI is prepared in one relative simple step process at our Linyuan plant. Sodium isethionate (HO-CH₂-CH₂-SO₃Na) is prepared by the reaction of ethylene oxide with sodium bisulfite solution. SI is normally provided with a nominal active content of 57.0% in water to manufacturers of sodium cocoyl isethionate (SCI). 57.0% SI may also be concentrated or diluted further for other applications. Our multi-product EOD unit can annually provide kilo-tons of 57% SI to customers.

Sample is available upon request.

SPECIFICATION

OUCC is regularly supplying Liquid Sodium Isethionate in 57% and 43% solution. The special grade SI and Powder SI (98%) are also supplied on order-made basis.

Table 2. Specification of liquid sodium isethionate 57% (Product code: LSI)

Appearance	Transparent Liquid
Purity (wt%)	57~60%
Sodium Sulfite (wt%)	NMT 0.1%
Ethylene glycol (wt%)	NMT 0.5%

Additional test item and different purity products are available upon request.

SHIPPING DATA AND STORAGE

Liquid Sodium Isethionate is available in tank and plastic drums of 250kgs net weight. Sodium Isethionate is recommended to be storage at room temperature with two years shelf life. Colored solid sediment may form under condition of standing with long term exposure to light.