Product Safety Assessment

TERGITOL™ 15-S Surfactants

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Select a Topic:
Names
Product Overview
Manufacture of Product
Product Description
Product Uses
Exposure Potential
Health Information
Environmental Information
Physical Hazard Information
Regulatory Information
Additional Information
References

Names

- CAS No. 84133-50-6
- TERGITOL™ 15-S-3 surfactant
- TERGITOL 15-S-5 surfactant
- TERGITOL 15-S-7 surfactant
- TERGITOL 15-S-9 surfactant
- TERGITOL 15-S-12 surfactant
- TERGITOL 15-S-12 (90%) surfactant
- CAS No. 68131-40-8
- Secondary alcohol ethoxylate
- TERGITOL 15-S-15 surfactant
- TERGITOL 15-S-20 surfactant
- TERGITOL 15-S-20 (80%) surfactant
- TERGITOL 15-S-30 surfactant
- TERGITOL 15-S-40 (70%) surfactant

Product Overview

- TERGITOL™ 15-S surfactants consist of amphiphilic molecules which combine a secondary-alcohol hydrophobe (oil soluble) with varying numbers of ethylene-oxide units as the hydrophile (water soluble). They are transparent, colorless liquids with a mild odor. For further details, see Product Description.

- TERGITOL 15-S surfactants are used in a variety of applications, including emulsion polymerization, paint and coatings, oil-field chemicals, paper and textile processing, cleaning products, agrochemicals, and metalworking fluids. For further details, see Product Uses.

- Worker exposure to TERGITOL 15-S surfactants is possible during manufacture, transport, or use. Exposure is minimized by engineering controls and personal protective equipment. Consumers may use cleaners, paints, or other products containing these surfactants. For further details, see Exposure Potential.

- TERGITOL 15-S surfactants can cause slight to severe eye burns and slight to moderate skin irritation. If inhaled the material may cause lung damage. For further details, see Health Information.

- These products are soluble and/or dispersible in water, and when introduced will have a tendency to remain in water. Because these surfactants are readily biodegradable, they will be removed from water and soil environments, including sewage treatment plants. These products are considered slightly toxic to aquatic organisms on an acute basis. For further details, see Environmental Information.

- TERGITOL 15-S surfactants are chemically stable, even in the presence of dilute acids, bases, and salts. Do not store in copper, copper alloys (brass, bronze), zinc, or galvanized®Trademark of The Dow Chemical Company (“Dow”) or an affiliated company of Dow
metals. Slow degradation will occur if these products are kept under air storage. For further details, see Physical Hazard Information.

Manufacture of Product

- **Capacity** – Dow manufactures TERGITOL™ 15-S surfactants at facilities in North America.
- **Process** – TERGITOL 15-S surfactants are manufactured by reacting an alcohol with ethylene oxide under basic conditions using proprietary methods, chemistries, and formulations.

Product Description

TERGITOL™ 15-S surfactants are secondary alcohol ethoxylates that provide a good combination of performance and cost when used in place of primary alcohol ethoxylates. They are transparent, colorless liquids with a mild odor. The series of amphiphilic molecules consists of a secondary alcohol hydrophobe (oil soluble) with varying numbers of ethylene-oxide (ethoxylate) units as the hydrophilic (water soluble). The water-soluble ethoxylate chain ranges from 3 to 40 ethylene oxide units. The final number in the product name indicates of how many ethylene oxide units are in the ethoxylate chain.

\[ \text{Alkyl carbon chain length} = 11 \text{ to } 15, \text{ } X = 3 \text{ to } 40 \]

The solubility or dispersibility of the TERGITOL 15-S surfactants increases with the degree of ethoxylation, where those prepared with three or five ethoxylate units (i.e., TERGITOL 15-S-3 and 15-S-5) are least soluble, while the product with 20 ethoxylate units is available as an 80% active aqueous blend. The product with 40 ethoxylate units is also available as a 70% active aqueous blend.

Product Uses

TERGITOL™ 15-S surfactants are used in a variety of applications, including:
- Cleaning products
- Emulsion polymerization
- Paints and coatings
- Paper and textile processing
- Agrochemicals
- Oil-field chemicals
- Defoamers
- Metalworking fluids

Exposure Potential

TERGITOL™ 15-S surfactants are used in the production of industrial and consumer products. Based on the uses for these products, the public could be exposed through:

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• **Workplace exposure** – Exposure can occur either in facilities that manufacture TERGITOL™ surfactants or in the various industrial or manufacturing facilities that formulate or use them. Those working with these products in manufacturing operations could be exposed during maintenance, sampling, testing, or other procedures. Each manufacturing facility should have a thorough training program for employees and appropriate work processes and safety equipment in place to limit exposure. See **Health Information**.

• **Consumer exposure to products containing TERGITOL™ 15-S surfactants** – TERGITOL 15-S surfactants are not sold for direct consumer use. However, they are formulated into hard-surface cleaners, laundry detergents, paints, and other products used by consumers. Always read product information before use and follow the label/use instructions. See **Health Information**.

• **Environmental releases** – Small quantities of these materials may be released into the environment if products that contain them are discarded. In the event of a spill, the focus is on containing the spill to prevent contamination of soil and surface or ground water. Small spills should be absorbed with materials such as sand or soil. These products are soluble and/or dispersible in water, and if released to the environment would tend to dissolve and remain in water. Because these compounds are readily biodegradable, they will be removed from water and soil environments, including sewage treatment plants. However, surfactants can cause foaming problems in biological wastewater-treatment facilities and other high-shear operations. Therefore, their disposal or use in such operations must be carefully controlled. These products are considered slightly toxic to aquatic organisms on an acute basis. See **Environmental**, **Health**, and **Physical Hazard Information**.

• **Large release** – Industrial spills or releases are infrequent and generally contained. If a large spill does occur, the material should be captured, collected, and reprocessed or disposed of according to applicable governmental requirements. See **Environmental**, **Health**, and **Physical Hazard Information**.

• **In case of fire** – Deny any unnecessary entry into the area and consider the use of unmanned hose holders. Extinguish fires with water spray or apply alcohol-based or all-purpose foam for large fires. Use of a direct water stream may spread the fire. Use carbon-dioxide or dry-chemical extinguishers for small fires. Follow emergency procedures carefully. See **Environmental**, **Health**, and **Physical Hazard Information**.

For more information, request the Safety Data Sheet from the Dow Customer Information Group.

**Back to top**

**Health Information**

Health information for TERGITOL™ 15-S surfactants is summarized on the relevant Safety Data Sheets. It is important to note that health risks associated with individual products may vary based on their formulation or intended use. These materials may contain minor components or additives that have additional health risks. The Safety Data Sheet is the preferred source for specific health information. An overview of health information for TERGITOL 15-S surfactants appears below.

**Eye contact** – Contact may cause moderate to severe irritation experienced as discomfort or pain, and excessive blinking and tear production with marked redness and swelling of the conjunctiva. Corneal injury may occur. TERGITOL15-S-9 may cause chemical burns.

**Skin contact** – Contact may cause slight to moderate skin irritation with local redness. Drying, flaking and/or itching of the skin is possible.

**Inhalation** – Harmful health effects are not expected from inhalation of vapor generated at ambient temperature. Aerosols containing these materials can be hazardous if inhaled.

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Ingestion – Materials are moderately toxic if swallowed.

For more information, request the Safety Data Sheet from the Dow Customer Information Group.

Environmental Information

TERGITOL™ 15-S surfactants are soluble and/or dispersible in water, and if released to the environment would dissolve and remain in water. These products are non-volatile and readily biodegradable, and as such will be removed from water and soil environments, including sewage treatment plants. Biodegradation is rapid and complete. Surfactants can cause foaming problems in biological wastewater-treatment facilities and other high-shear operations, therefore their disposal or use in such operations must be carefully controlled.

The TERGITOL 15-S surfactants vary in acute aquatic toxicity classifications, ranging from “toxic” to “practically non-toxic.” The toxicity to aquatic organisms such as fish and algae depends on the degree of ethoxylation. Refer to the specific product Safety Data Sheet for information. Because of their high molecular weight and water solubility, these products would not be expected to bioconcentrate (accumulate in the food chain).

For more information, request the Safety Data Sheet from the Dow Customer Information Group.

Physical Hazard Information

TERGITOL™ 15-S surfactants are chemically stable even in the presence of dilute acids, bases, and salts. To avoid discoloration, do not store in copper, copper alloys (brass, bronze), zinc, or galvanized metals. Liquid in tanks should be stored under nitrogen to avoid degradation, which causes undesirable color and odor. Slow degradation will occur if product is kept under air storage.

For more information, request the Safety Data Sheet from the Dow Customer Information Group.

Regulatory Information

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of TERGITOL™ 15-S surfactants. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Safety Data Sheet or Contact Us.

Additional Information

- Safety Data Sheet (www.dow.com/assistance/dowcig.htm)
- Contact Us (www.dow.com/surfactants/contact/index.htm)
- TERGITOL™ 15-S Surfactants: High Detergency, Biodegradable SAEs, The Dow Chemical Company, Form No. 119-02204-0706 AMS, July 2006


For more business information about TERGITOL™ 15-S surfactants, visit the Dow Surfactants web site at www.dow.com/surfactants/.

References


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Created: April 5, 2011 The Dow Chemical Company Page 5 of 6
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Back to top

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