

Product Stewardship Summary

Hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine

General Statement

Hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine is a light-yellow liquid. It is a formaldehyde condensate product that is used as an antimicrobial agent in metal working fluids.

Ashland both purchases and produces this chemical. Hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine is a low to moderate hazard material and the risk of adverse health effects associated with both occupational and consumer use of this chemical is anticipated to be low to moderate. Exposure controls in the workplace serve to prevent adverse health effects to workers. This material is not directly sold to consumers and has no known intended use in consumer products. Therefore, consumer exposure and subsequent risk associated with such exposure is unlikely.

Chemical Identity

Name: Hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine

Brand Names: Not applicable

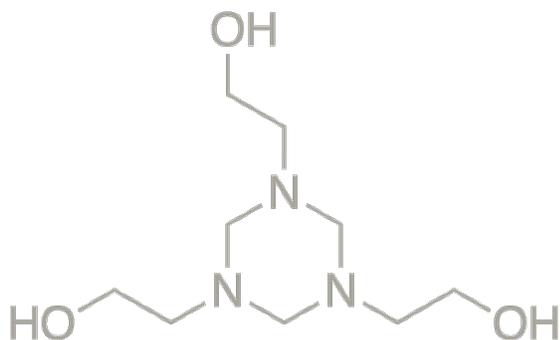
Chemical name (IUPAC): 2,2',2''-(1,3,5-triazinane-1,3,5-triyl)triethanol

CAS number(s): 4719-04-4

EC number: 225-208-0

Molecular formula: C₉H₂₁N₃O₃

Structure:



Uses and Applications

Hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine is a product that is used for the formulation of antimicrobial products for use in metalworking cutting fluids, gas/oil drilling muds/packer fluids and industrial adhesives.



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Physical/Chemical Properties

Phys/Chem Safety Assessment

Property	Value
Form	Light yellow liquid
Physical state	Liquid
Color	Light yellow
Odor	Ammonia-like
Density	1.15 g/cm ³ @ 20°C
Melting / boiling point	-79 / 110.1 °C
Flammability	No data available
Explosive properties	No data available
Self-ignition temperature	No data available
Vapor pressure	0 hPa @ 25°C
Mol weight	219.28 g/mol
Water solubility	Soluble
Flash point	> 100°C
Octanol-water partition coefficient (Log _{k_{ow}})	-2.0 @24°C

Exposure, Hazard and Safety Assessment

The following section describes possible exposure scenarios and hazards associated with hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine. The exposure assessment describes both the amount of and the frequency with which a chemical substance reaches a person, a population of people, or the environment. Hazard refers to the inherent properties of a substance that make it capable of causing harm to human health or the environment. The safety assessment reports the possibility of a harmful event arising from exposure to a chemical or physical agent under specific conditions. Just because a substance may possess potentially harmful properties does not mean that it automatically poses a risk. It is not possible to make that determination without understanding the exposure.

Human Health Effects

Human Exposure Assessment

Consumer: Hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine is widely used as an antimicrobial agent in metal working fluids. This material is not directly sold to consumers and has no known intended use in consumer products. Therefore, consumer exposure is considered to be negligible.

Worker: In industrial settings, hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine is manufactured and handled in closed processes as much as possible, which ensures that worker exposure is minimized. When there is potential for exposure, such as during loading, unloading, sampling or maintenance operations, exposure to hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine can be further minimized by the proper use of personal protective equipment.

Human Hazard Assessment

Hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine presents moderate acute toxicity if ingested, low acute toxicity via the dermal route and high acute toxicity if inhaled. Hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine may cause serious eye irritation. This substance may cause allergic skin reactions upon contact with skin. This substance is not anticipated to cause damage to internal organs or systems through prolonged or repeated exposure to low doses. Exposures to this substance are not associated with reproductive and developmental effects. This substance is neither mutagenic nor carcinogenic. Further, this substance is not anticipated to cause

an aspiration hazard.

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	Moderate acute toxicity if ingested. Low acute toxicity via dermal route. High acute toxicity if inhaled.
Irritation / corrosion Skin / eye / respiratory test	Does not cause irritation to skin. Causes serious eye damage. Not anticipated to cause irritation to respiratory
Sensitization	May cause an allergic skin reaction upon contact with skin
Toxicity after repeated exposure Oral / inhalation / dermal	Not anticipated to cause damage to internal organs or systems through prolonged or repeated exposure to low doses
Genotoxicity / Mutagenicity	Does not affect genetic system.
Carcinogenicity	Not considered as carcinogen
Reproductive/Developmental Toxicity	Not anticipated to cause reproductive toxicity, nor damage to unborn children
Aspiration hazard	Not anticipated to cause aspiration toxicity if accidentally enters airways

Human Health Safety Assessment

Consumer: Hexahydro-1,3,5-tris-(2-hydroxyethyl)-s-triazine is widely used as an antimicrobial agent in metal working fluids. This material is not directly sold to consumers and has no known intended use in consumer products. Therefore, consumer exposure and subsequent risk associated with such exposure is unlikely.

Worker: In industrial settings, hexahydro-1,3,5-tris-(2-hydroxyethyl)-s-triazine is manufactured and handled primarily in closed processes which limit exposure. Based on the implementation of good manufacturing processes and industrial hygiene practices, the occupational health risk associated with hexahydro-1,3,5-tris-(2-hydroxyethyl)-s-triazine is anticipated to be low.

Environmental Effects

Environmental Exposures

Environmental exposure to hexahydro-1,3,5-tris-(2-hydroxyethyl)-s-triazine is possible via the manufacturing process of this substance or when the substance is used into formulation in industrial settings or during re-packing.

Environmental Hazard Assessment

Hexahydro-1,3,5-tris-(2-hydroxyethyl)-s-triazine is soluble in water. If released into the aquatic environment, the compound is anticipated to be quickly removed through biodegradation.

Effect Assessment	Result
Aquatic Toxicity	Harmful to aquatic life with long-lasting effects.

Fate and behavior	Result
Biodegradation	Readily biodegradable.
Bioaccumulation potential	Not potentially bioaccumulative (log Kow = -2.0)
PBT / vPvB conclusion	This substance is not considered to be persistent, bioaccumulating and toxic (PBT) or very persistent and very bioaccumulating (vPvB)

Environmental Safety Assessment

Based on the available data, hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine is considered harmful to aquatic life with long lasting effects. Even acute exposure is considered dangerous to aquatic life. If released to surface waters, significant risk to the aquatic environment is not anticipated as the compound is readily biodegradable and has a low potential for bioaccumulation. Overall, this substance is not considered to be PBT or vPvB.

Risk Management Recommendations

Exposure to hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine in the workplace can be controlled with sufficient ventilation, proper handling and storage techniques, and the use of appropriate personal protective equipment as recommended in the SDS for this substance. Industrial products that contain significant levels of this material should include necessary safety labeling and provide appropriate handling and disposal methods.

A selection of occupational exposure limits is provided, below.

- Romania. Annex No. 31: Occupational Exposure Limits (Short term exposure limit): 3 mg/m³

Regulatory Agency Review

Hexahydro-1,3,5-tris-(-2-hydroxyethyl)-s-triazine is on the following lists:

Taiwan Chemical Substance Inventory (TCSI)
Australia Inventory of Chemical Substances (AICS)
Canadian Domestic Substances List (DSL)
China. Inventory of Existing Chemical Substances in China (IECSC)
ECHA List of Publishable Substances Registered
European Inventory of Existing Commercial Chemical Substances (EINECS)
Japan. ENCS - Existing and New Chemical Substances Inventory
Japan. ENCS - Existing and New Chemical Substances Inventory
Korea. Korean Existing Chemicals Inventory (KECI)
New Zealand. Inventory of Chemical Substances
Philippines Inventory of Chemicals and Chemical Substances (PICCS)
United States TSCA Inventory
New Zealand. Inventory of Chemical Substances
Japan. ISHL - Inventory of Chemical Substances
Japan. ISHL - Inventory of Chemical Substances

Regulatory Information / Classification and Labeling

Under the Globally Harmonized System for classification and labeling (GHS), substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the (Extended) SDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use.

GHS Classification:

Acute toxicity (Oral) - Category 4
Acute toxicity (Inhalation) - Category 2
Acute toxicity (Dermal) - Category 5
Serious eye damage - Category 1
Skin sensitization - Category 1
Acute aquatic toxicity - Category 3
Chronic aquatic toxicity - Category 3

Hazard Statements:

H302: Harmful if swallowed.
H313: May be harmful in contact with skin.
H317: May cause an allergic skin reaction.
H318: Causes serious eye damage.
H330: Fatal if inhaled.
H412: Harmful to aquatic life with long lasting effects.

Signal Word: Danger

Precautionary Statements:

P260: Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264: Wash skin thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P272: Contaminated work clothing should not be allowed out of the workplace.
P273: Avoid release to the environment.
P280: Wear eye protection/ face protection.
P280: Wear protective gloves.
P284: Wear respiratory protection.

Hazard Pictograms:



Conclusion

Hexahydro-1,3,5-tris-(2-hydroxyethyl)-s-triazine is widely used as an antimicrobial agent in metal working fluids. This material is not directly sold to consumers and has no known intended use in consumer products. Industrial products that contain significant levels of this material should include necessary safety labeling and provide appropriate handling and disposal methods. When handled responsibly, the potential for toxicity can be minimized, allowing workers to use materials containing hexahydro-1,3,5-tris-(2-hydroxyethyl)-s-triazine safely.

Contact Information with Company

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Additional Information

For more information on GHS, visit <http://www.osha.gov/dsg/hazcom/ghsguideoct05.pdf> or http://live.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html.
Ashland product stewardship summaries are located at <http://www.ashland.com/sustainability/product/product-stewardship>

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REACH registration is specific to Importers/Manufacturers that place the chemical on the EU market, and is specific to registered uses. Inclusion on the list of REACH Registered Substances does not automatically imply registration by Ashland.

Inclusion on the New Zealand Inventory of Chemicals applies only to the pure substance listed. The importer of record must determine whether or not their substances are in compliance.