Product Safety Assessment

Tris(hydroxymethyl)nitromethane


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Names
- CAS No. 126-11-4
- Tris(hydroxymethyl)nitromethane
- 2-(Hydroxymethyl)-2-nitro-1,3-propanediol
- TRIS NITRO™ Antimicrobial
- AQUCAR™ TN 25 Water Treatment Microbiocide
- AQUCAR TN 50 Water Treatment Microbiocide
- AQUCAR TN 25 MUP Water Treatment Microbiocide
- AQUCAR TN 50 MUP Water Treatment Microbiocide

Product Overview

- Most tris(hydroxymethyl)nitromethane microbiocide products are colorless to yellow aqueous solutions that are nominally 25% or 50% active. The active is also available as a 97% solid. For further details, see Product Description.
- Tris(hydroxymethyl)nitromethane products are used as antimicrobial agents to control bacteria and slimes in industrial water-treatment and oil and gas treatment applications and to formulate other biocide or preservative products. For further details, see Product Uses and the relevant Product Label.
- Individuals working with tris(hydroxymethyl)nitromethane in manufacturing, industrial, or formulating operations could be exposed during maintenance, sampling, testing, use, or other procedures. Dow does not sell these products for direct consumer use. For further details, see Exposure Potential.
- These products may cause slight temporary eye irritation. Brief skin contact is essentially nonirritating; prolonged contact may cause slight skin irritation with local redness. These products may be harmful if swallowed. Prolonged excessive inhalation exposure may be harmful. Inhalation of dust or mist may cause irritation of upper respiratory tract (nose and throat). Aspiration into lungs may result in rapid absorption and injury to other body systems. These products contain components, formaldehyde, nitromethane, and tris(hydroxymethyl)nitromethane, which have been shown to cause cancer in humans and animals or to produce fetal effects in animals. For further details, see Health Information and the relevant Safety Data Sheet and Product Label.
- Tris(hydroxymethyl)nitromethane is moderately toxic to aquatic organisms on an acute basis. These products are biodegradable and unlikely to accumulate in the environment. For further details, see Environmental Information.
- These products are stable under recommended storage and normal use conditions. Avoid temperatures above 80°C (176°F). Toxic, flammable gases and heat may be released during decomposition. Avoid contact with amines, ammonia, bases, oxidizers, and high pH. For further details, see Physical Hazard Information.

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**Manufacture of Product**
- **Locations** – The Dow Chemical Company and its global affiliates produce tris(hydroxymethyl)nitromethane in facilities at several global sites.
- **Process** – Tris(hydroxymethyl)nitromethane is produced by reacting nitromethane and formaldehyde using proprietary processes and equipment. The chemical structure is shown below:

![Chemical Structure](image)

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**Product Description**
Most tris(hydroxymethyl)nitromethane microbiocide products are colorless to yellow aqueous solutions that are nominally 25% or 50% active. The active is also available as a 97% solid. Tris(hydroxymethyl)nitromethane microbiocide products are odorless and work by releasing trace amounts of formaldehyde.

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**Product Uses**
The principal use for tris(hydroxymethyl)nitromethane products is control of bacteria and slimes in industrial applications, typically at 50 to 1000 parts per million of the active ingredient. AUCAR™ TN 25 Microbiocide and AUCAR TN 50 Microbiocide are distributed for direct use in commercial/industrial cooling water systems and the gas and oil industries. Uses in the gas and oil industries include oil recovery drilling muds/packer fluids, secondary oil recovery injection waters, oilfield water systems, drilling muds, and recirculating water systems. AUCAR™ TN 25 MUP Microbiocide, AUCAR TN 50 MUP Microbiocide, and several TRIS NITRO™ Antimicrobial products are distributed primarily for use in formulating other antimicrobial and preservative products.

For further information regarding the approved uses for particular tris(hydroxymethyl)nitromethane microbiocide products, request the Product Label from the Dow Customer Information Group.

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**Exposure Potential**
Tris(hydroxymethyl)nitromethane products are used in commercial/industrial water-treatment systems and in the oil and gas industry to control bacteria and slime and in the formulation of industrial biocides and preservatives. Based on the uses for this product, individuals could be exposed through:
- **Workplace exposure** – Exposure can occur either in facilities that manufacture or use tris(hydroxymethyl)nitromethane microbiocide products. Those working with these products in manufacturing, industrial, or formulating operations could be exposed during maintenance, sampling, testing, use, or other procedures. Each facility should have a thorough training program for employees and appropriate work processes, ventilation, and safety equipment in place to limit exposure. See Health Information and Product Label available from the Dow Customer Information Group.
- **Consumer exposure to products containing tris(hydroxymethyl)nitromethane microbiocides** – Dow does not sell these products for direct consumer use. These products are used in industrial applications. Consumer exposure is unlikely. See Health Information.
- **Environmental releases** – Care should be taken to avoid releases of these products to the environment. In the event of a spill, the focus is on containing the spill to prevent these products from entering soil, surface water, or groundwater. Small spills should be absorbed with inert materials and collected in suitable and properly labeled containers. If released to the environment, tris(hydroxymethyl)nitromethane products will tend to dissolve and dilute and remain in water. These products are inherently biodegradable and are expected to be slowly removed from water and soil environments, including wastewater-treatment facilities. They are moderately toxic to aquatic organisms on an acute basis. See Environmental, Health, and Physical Hazard Information.

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- **Large release** – Industrial spills or releases are infrequent and generally contained. If a large spill does occur, these products should be captured, collected, and reprocessed or disposed of according to applicable governmental requirements. Prevent products from entering soil, ditches, sewers, waterways and/or groundwater. Evacuate unnecessary personnel to safe areas. Ventilate the area. Remove any sources of heat. Wear appropriate protective equipment. Keep spills and cleaning runoff out of sewers, waterways, and open bodies of water. Collect clean-up materials in suitable and properly labeled containers. See Environmental, Health, and Physical Hazard Information.

- **In case of fire** – Liquid products will not burn until evaporated to dryness. The residue is combustible. Deny any unnecessary entry into the area and consider the use of unmanned hose holders. Use water fog, dry-chemical or carbon-dioxide extinguishers, or alcohol-resistant foam to fight the fire. Irritating and toxic gases and/or fumes may be generated during combustion or decomposition. Firefighters should wear self-contained breathing apparatus (SCBA) and protective firefighting clothing. Move containers out of fire zone promptly. If removal is impossible, cool containers with water spray. Immediately withdraw all personnel from the area in the case of rising sounds from venting safety devices or discoloration of containers. Remain upwind, avoid breathing smoke, and contain any run-off. Keep fire water out of waterways and sewers to minimize the potential for environmental damage. Follow emergency procedures outlined in the Safety Data Sheet carefully. See Environmental, Health, and Physical Hazard Information.

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

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#### Health Information

Health information for tris(hydroxymethyl)nitromethane microbiocide products and materials containing these products is summarized on the relevant Safety Data Sheets. These products may also contain minor components or additives that have additional health risks. It is important to note that health risks associated with individual products may vary based on their formulation or intended use. The Safety Data Sheet is the preferred source for specific health information. An overview of health information for tris(hydroxymethyl)nitromethane microbiocide products appears below.

**Eye contact** – Contact may cause slight temporary eye irritation.

**Skin contact** – Brief contact is essentially nonirritating. Prolonged contact may cause slight irritation with local redness.

**Inhalation** – Prolonged excessive exposure may cause adverse effects. Dust or mist may cause irritation of upper respiratory tract (nose and throat).

**Ingestion** – Small amounts swallowed incidentally as a result of normal handling are not likely to cause injury; however, swallowing larger amounts may cause injury. Aspiration into lungs may occur during ingestion or vomiting, resulting in rapid absorption and injury to other body systems.

**Other** – These products contain components (formaldehyde and nitromethane) that can cause or are suspected to cause cancer in humans and/or laboratory animals. The component tris(hydroxymethyl)nitromethane has been shown to produce fetal effects in laboratory animals.

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

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#### Environmental Information

Tris(hydroxymethyl)nitromethane microbiocide products are soluble in water and have low volatility. Once introduced into the aquatic environment, these products will dissolve and dilute and tend to remain in water. They are inherently biodegradable and unlikely to persist in the environment, suggesting they will likely be slowly removed in biological wastewater-treatment facilities as well as other water and soil environments. Tris(hydroxymethyl)nitromethane microbiocide products are moderately toxic to aquatic organisms (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

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

Tris(hydroxymethyl)nitromethane microbiocide products are stable under recommended storage and normal use conditions. Avoid use and/or storage temperatures above 80°C (176°F). Potentially violent decomposition may occur at temperatures above 100°C (212°F). Generation of gas during decomposition can cause pressure build-up in closed containers or systems. Decomposition products depend upon temperature, air supply, and the presence of other materials, but may include formaldehyde, nitrogen, and nitrogen oxides.

Avoid contact with amines, ammonia, bases, basic (high) pH, and oxidizers. These products can decompose in the presence of alkaline materials.

For more information, request the relevant 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 tris(hydroxymethyl)nitromethane microbiocide products or materials containing these products. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Product Label, Technical Data Sheet, or Safety Data Sheet.

Additional Information

- Request the relevant Safety Data Sheet from the Dow Customer Information Group (www.dow.com/assistance/dowcig.htm)
- Request the relevant Product Label from the Dow Customer Information Group (www.dow.com/assistance/dowcig.htm)

For more business information about tris(hydroxymethyl)nitromethane-based microbiocides, visit the Dow Microbial Control web site at www.dow.com/microbial/applications/aqucar.htm.

References

1 The Dow Chemical Company. TRIS NITRO™ Antimicrobial, 50%, Safety Data Sheet.
2 The Dow Chemical Company. AQUCAR™ TN 50 Water Treatment Microicide, Technical Data Sheet. Form No. 253-02841.
NOTICES

As part of its 2015 Sustainability Goals, Dow has committed to make publicly available safety assessments for its products globally. This product safety assessment is intended to give general information about the chemical (or categories of chemicals) addressed. It is not intended to provide an in-depth discussion of health and safety information. Additional information is available through the relevant Safety Data Sheet, which should be consulted before use of the chemical. This product safety assessment does not replace required communication documents such as the Safety Data Sheet.

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