Product Safety Assessment

1,2-Benisothiazol-3(2H)-one (BIT)

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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. 2634-33-5
- 1,2-Benisothiazol-3(2H)-one
- 1,2-Benisothiazolin-3-one
- 1,2-Benzisothiazolone
- BIT
- ROCIMA™ BT biocides
- ROCIMA™ MBX microbicides
- CANGUARD™ BIT preservatives
- BIOBAN™ BT antimicrobials
- BIOBAN™ ULTRA BIT antimicrobials

Product Overview
- 1,2-Benzisothiazol-3(2H)-one (BIT) is a white to off-white fine, crystalline powder. It is the active ingredient in a series of broad-spectrum biocide formulations marketed by The Dow Chemical Company and its global affiliates.1,2,3,4 For further details, see Product Description.
- BIT is active against bacteria and fungi, especially in highly alkaline environments. It is used for in-can preservation of manufactured products. It is also used to preserve a variety of process liquids.5,6,7 For further details, see Product Uses.
- Those working with BIT in manufacturing or formulating operations could be exposed during maintenance, sampling, testing, or other procedures. Dow does not sell BIT for direct consumer use, but it may be present at low levels in products used by consumers.8 For further details, see Exposure Potential.
- Eye contact may cause a chemical burn or severe irritation with corneal injury, which may result in permanent impairment of vision, even blindness. Brief skin contact may cause severe irritation with pain and local redness. Prolonged skin contact is unlikely to result in absorption of harmful amounts. BIT has caused allergic skin reactions in humans and is a potential skin sensitizer. Inhalation exposure is minimal due to low volatility, but mist may cause severe irritation to the upper respiratory tract (nose and throat) and lungs. BIT is harmful if swallowed and may result in burns to the mouth and throat.9,10 For further details, see Health Information.
- BIT is degradable and will not persist in the environment. BIT has a low potential to accumulate in the food chain and is considered highly toxic to aquatic organisms on an acute basis.11,12 For further details, see Environmental Information.
- BIT is stable under recommended storage and use conditions.13,14 For further details, see Physical Hazard Information.
Manufacture of Product
- **Locations** – The Dow Chemical Company and its global affiliates produce 1,2-benzisothiazol-3(2H)-one (BIT) in facilities at several global sites.
- **Process** – BIT is produced by a complex and proprietary series of chemical reactions and separations. The chemical structure is shown below.

**Back to top**

Product Description\(^{15,16,17,18,19}\)
1,2-Benzisothiazol-3(2H)-one (BIT) is a white to off-white fine, crystalline powder. It is the active ingredient in a series of biocide formulations marketed by The Dow Chemical Company and its global affiliates. BIT is marketed under the trade names ROCIMA™ microbicides, CANGUARD™ preservatives, and BIOBAN™ antimicrobials. These formulations typically contain 10 to 20% active ingredient, while use concentrations are typically less than 0.1%. BIT is also marketed as a mixture with other isothiazolinone-based biocides.

**Back to top**

Product Uses\(^{20,21,22,23}\)
1,2-Benzisothiazol-3(2H)-one (BIT) is active against bacteria and fungi, especially in highly alkaline environments. It is used for in-can preservation of manufactured products, such as latex paints and adhesives. It is also used to preserve a variety of water-based process liquids, including metal-working fluids, oil-field fluids and injection water, textile solutions, pesticide emulsions, and mineral slurries and coatings used in paper mills.

**Back to top**

Exposure Potential\(^{24,25}\)
1,2-Benzisothiazol-3(2H)-one (BIT) is used in the production of industrial and consumer products. Based on the uses for BIT, individuals could be exposed through:
- **Workplace exposure** – Exposure can occur in a facility that manufactures or formulates BIT or in the various industrial or manufacturing facilities that formulate or use it. It is produced, distributed, and stored in closed systems. Those working with BIT in manufacturing and formulating operations could be exposed during maintenance, sampling, testing, or other procedures. The greatest potential for exposure is via skin contact. Handlers must wear appropriate personal protective equipment and follow label instructions carefully. Each manufacturing facility should have a thorough training program for employees and appropriate work processes, ventilation, and safety equipment in place to limit exposure. BIT containing formulations are supplied for use by trained professionals only, and not for amateur use. See [Health Information](#).
- **Consumer exposure to products containing BIT** – Dow does not sell formulations of this product for direct consumer use, but they are used at very low levels in household cleaners and aqueous products such as paints, adhesives and building materials that may be used by consumers. Always read the product information before use and carefully follow label and use instructions. See [Health Information](#).
- **Environmental releases** – Small quantities of BIT may be released into the environment if products that contain them are spilled or discarded. In the event of a spill, the focus is on containing the spill to prevent contamination of soil, surface water, or groundwater. Small spills

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should be absorbed with materials such as sand. If released into the environment, BIT will degrade in water or soil, including removal by biological wastewater-treatment facilities. BIT has a low potential to accumulate in the food chain and is considered highly 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 product should be contained, collected, and reprocessed or disposed of according to all applicable governmental requirements. An approved respirator is recommended for emergency work. See Environmental, Health, and Physical Hazard Information.

- **In case of fire** – Isolate the fire and deny unnecessary entry into the area. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing and avoid contact with this material during firefighting operations. Use water fog or fire spray, dry-chemical or carbon-dioxide extinguishers, or foam. Alcohol-based foam is preferred. Use of a direct water stream may spread the fire. If possible, contain fire-water run-off to minimize the potential for environmental damage. 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.

**Health Information**

Health information for products containing 1,2-benzisothiazol-3(2H)-one (BIT) 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. BIT formulations may contain minor components or additives that have additional health risks. The Safety Data Sheet is the preferred source for specific health information. The health information that appears below focuses on the active ingredient.

**Eye contact** – Contact may cause severe irritation with corneal injury, which may result in permanent impairment of vision, even blindness. Chemical burns to the eye may occur. The low concentrations of BIT in commercial applications and products are unlikely to pose a risk of serious eye injury.

**Skin contact** – Brief contact may cause severe irritation with pain and local redness. Prolonged contact is unlikely to result in absorption of harmful amounts. BIT has caused allergic skin reactions in humans and is a potential skin sensitizer. The low concentrations of BIT in commercial applications and products are unlikely to pose a risk of dermal irritation or serious health effects in humans.

**Inhalation** – At room temperature, exposure to vapor is minimal due to low volatility. A single exposure is unlikely to be hazardous. Mist may cause severe irritation to the upper respiratory tract (nose and throat) and lungs.

**Ingestion** – BIT is harmful if swallowed. Swallowing may result in burns of the mouth and throat. Aspiration into the lungs may occur during ingestion or vomiting, causing tissue damage or lung injury.

**Repeated exposure** – Not anticipated to cause any additional significant adverse effects.

**Other** – Based on its characteristics, BIT is unlikely to demonstrate a carcinogenic potential. In vitro and in vivo genetic toxicity assays were negative, and BIT did not cause birth defects in animal testing.

For more information, request the Safety Data Sheet from the Dow Customer Information Group.
Environmental Information$^{28,29,30}$
1,2-Benzisothiazolin-3(2H)-one (BIT) has a low volatility and is slightly soluble in water. Once introduced into the aquatic environment, BIT will have a tendency to remain in water. It has moderate tendency to bind to soil or sediment.

BIT is considered degradable and will not persist in the environment. Although the product is hydrolytically stable in water, it is susceptible to photodegradation in aquatic environments. BIT will be removed from water by biological wastewater-treatment facilities.

BIT has low potential to accumulate in the food chain and is considered highly toxic to aquatic organisms on an acute basis.

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

Back to top

Physical Hazard Information$^{31,32}$
1,2-Benzisothiazolin-3(2H)-one (BIT) is stable under recommended storage and use conditions. It can decompose at temperatures greater than 150°C (302°F). Generation of gas during decomposition can cause pressure build-up in closed systems.

Avoid contact with strong acids, strong bases, strong oxidizers, and metals such as aluminum, brass, copper, copper alloys, and mild steel.

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

Back to top

Regulatory Information
Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of 1,2-benzisothiazolin-3(2H)-one (BIT). Additionally, these products may have to comply with regulations for biocides in some geographic regions. 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.

Back to top

Additional Information
- Request the Safety Data Sheet from the Dow Customer Information Group (www.dow.com/assistance/dowcig.htm)
- Contact Us (www.dow.com/microbial/contact/)
- ROCIMA™ BT 1S Biocide, Technical Data Sheet, Rohm and Haas Company, 2007 (www.dow.com/assets/attachments/business/biocides/rocima_for_in-can_preservation/rocima_bt-1s/tds/rocima_bt-1s.pdf)

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• **BIOBAN™ ULTRA BIT 20 Antimicrobial**, Technical Data Sheet, The Dow Chemical Company, Form No. 253-02336 (request from www.dow.com/microbial/contact/)


• HSN0 Chemical Classification Information Database, Environmental Protection Authority, New Zealand, (http://www.epa.govt.nz/search-databases/Pages/ccid-details.aspx?SubstanceID=1956)


For more business information about 1,2-benzisothiazolin-3(2H)-one (BIT) formulations, visit the [Dow Microbial Control](http://www.dow.com/microbial/about/) web site at www.dow.com/microbial/about/.

**Back to top**

**References**

1. Document II-A: Study Summary–Dossier for Active Substance 1,2-Benzisothiazol-3(2H)-one (BIT), Product type 6, In-can preservation, Product Type 13, Metal working fluids, RMS: Spain, Rohm and Haas Company, November 2009, page 2.


9. Document II-A: Study Summary–Dossier for Active Substance 1,2-Benzisothiazol-3(2H)-one (BIT), Product type 6, In-can preservation, Product Type 13, Metal working fluids, RMS: Spain, Rohm and Haas Company, November 2009, page 2 and Section 3.


11. Document II-A: Study Summary–Dossier for Active Substance 1,2-Benzisothiazol-3(2H)-one (BIT), Product type 6, In-can preservation, Product Type 13, Metal working fluids, RMS: Spain, Rohm and Haas Company, November 2009, Section 4.


13. Document II-A: Study Summary–Dossier for Active Substance 1,2-Benzisothiazol-3(2H)-one (BIT), Product type 6, In-can preservation, Product Type 13, Metal working fluids, RMS: Spain, Rohm and Haas Company, November 2009, Section 5.

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Product Safety Assessment: 1,2-Benzisothiazol-3(2H)-one (BIT)

15 Document II-A: Study Summary–Dossier for Active Substance 1,2-Benzisothiazol-3(2H)-one (BIT), Product type 6, In-can preservation, Product Type 13, Metal working fluids, RMS: Spain, Rohm and Haas Company, November 2009, page 2.
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29 CAS No. 2634-33-5, HSNO Chemical Classification Information Database, Environmental Protection Authority, New Zealand.
31 Document II-A Study Summary Dossier for Active Substance 1,2-Benzisothiazol-3(2H)-one (BIT), Product type 6, In-can preservation, Product Type 13, Metal working fluids, RMS: Spain, Rohm and Haas Company November 2009, Section 5.

Back to top

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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.

The information herein is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Dow be responsible for damages of any nature whatsoever resulting from the use of or reliance upon the information herein or the product to which that information refers. Use biocides safely. Always read the product information before use and follow the label/use instructions.

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Back to top

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