Product Safety Assessment

*DOW™ Methylisothiazolinone (MIT) Antimicrobial Products*


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**Names**
- CAS No. 2682-20-4
- DOW™ MIT antimicrobial products
- KORDEK™ biocides
- KORDEK LX5000 biocide
- KORDEK 573F biocide
- KORDEK 573T biocide
- KORDEK MLX biocide
- KORDEK MTC biocide
- KORDEK 50C biocide
- BIOBAN™ MT20 antimicrobials
- PROCLIN™ 950
- PROCLIN 5000
- Methylisothiazolinone (MIT)
- NEOLONE™ 950 preservative
- NEOLONE M-10 preservative
- NEOLONE M-50 preservative
- NEOLONE 50A preservative
- ROCIMA™ 550 preservative
- 2-Methyl-2H-isothiazol-3-one
- 2-Methyl-4-isothiazolin-3-one
- 3(2H)-Isothiazolone, 2-methyl-
- Methylisothiazolone

**Product Overview**
- DOW™ MIT-based antimicrobial products are a series of broad-spectrum, formaldehyde-free products. They are marketed by The Dow Chemical Company and its wholly owned subsidiary, the Rohm and Haas Company, under the trade names BIOBAN™ antimicrobials, KORDEK™ biocides and NEOLONE™ preservatives. They are based on the active substance 2-methyl-4-isothiazolin-3-one (MIT) and used in water-based adhesives, paints and coatings, polymer emulsions, personal-care products, paper-coating materials, and metalworking fluids.\(^1\)\(^2\)\(^3\)\(^4\)\(^5\) For further details, see **Product Description** and **Product Uses**.
- DOW MIT-based antimicrobial products are produced, distributed, and stored in closed systems. Personnel working with these products in manufacturing operations could be exposed during maintenance, sampling, testing, or other procedures. Consumers could be exposed to very low levels in formulated products such as paints or personal-care products.\(^1\) For further details, see **Exposure Potential**.
- Eye contact may cause severe irritation or chemical burns, which may result in permanent eye injury. Skin contact may cause severe burns. Prolonged or widespread skin contact may result in allergic skin reactions. These products can be toxic if swallowed. Heated vapor or mist may cause irritation of the upper respiratory tract and lungs.\(^1\) For further details, see **Health Information**.

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Product Safety Assessment: DOW™ MIT-Based Antimicrobial Products

- The active ingredient in DOW™ MIT-based antimicrobial products is unlikely to accumulate in the food chain (low bioconcentration potential). It is completely soluble in water and does not bind to soil. Therefore, in the environment this biocide will tend to partition to water where it will degrade. It is also removed by biological wastewater-treatment processes. This material is very toxic to aquatic organisms on an acute basis. For further details, see Environmental Information.
- DOW MIT-based antimicrobial products are stable at recommended storage and use temperatures. Avoid contact with amines, mercaptans, oxidizing agents, and reducing agents. For further details, see Physical Hazard Information.

Manufacture of Product
- **Capacity** – Dow and its strategic partners produce the active ingredient, 2-methyl-4-isothiazolin-3-one, and DOW™ MIT-based antimicrobial products at various global sites.
- **Process** – 2-Methyl-4-isothiazolin-3-one is produced via a series of proprietary reactions and purification steps. The structure of the active ingredient is shown below.

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2-methyl-4-isothiazolin-3-one

Product Description
DOW™ MIT-based antimicrobial products are a series of broad-spectrum, formaldehyde-free antimicrobial products based on the active compound 2-methyl-4-isothiazolin-3-one (MIT). This compound inhibits the growth of bacteria, yeasts, and molds.

MIT-based antimicrobial products are marketed by The Dow Chemical Company and its subsidiary, the Rohm and Haas Company, under the trade names BIOBAN™ antimicrobials, KORDEK™ biocides and NEOLONE™ preservatives. DOW MIT-based antimicrobial products contain up to 50% of the active substance. They are compatible with a wide range of formulation ingredients.

Product Uses
DOW™ MIT-based antimicrobial products are often formulated as “in-can” preservatives at concentrations of 25 to 250 parts per million (ppm) active ingredient, with a 100 ppm maximum concentration in personal care products. They are used in water-based products such as:
- Adhesives and sealants
- Paints and coatings
- Polymer emulsions and latexes
- Personal-care products – cosmetics, lotions, moisturizers, shampoos, conditioners
- Medical Devices – Diagnostic Reagents
- Paper-coating materials – starch- and casein-based coatings and rosin dispersions
- Mineral and pigment slurries
- Household products and detergents
- Processing auxiliary chemicals

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BIOBAN™ MT antimicrobials can also be used as process fluid preservatives in systems such as metalworking fluids. BIOBAN MT and NEOLONE™ M biocides can also be used effectively in combination with other antimicrobial agents to broaden protection.

Exposure Potential

DOW™ MIT-based antimicrobial products are used in the production of industrial and consumer products. Based on the uses for these products, the public could be exposed through:

- **Workplace exposure** – Exposure can occur either in a facility that manufactures DOW MIT-based antimicrobial products or in the various industrial or manufacturing facilities that use these products. These products are produced in closed systems. Personnel 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, ventilation, and safety equipment in place to limit exposure. See Health Information.

- **Consumer exposure to products containing DOW MIT-based antimicrobial products** – Dow does not sell these products for direct consumer use, but they are used at very low levels to formulate paints and personal-care products that may be used by consumers. At the dilute use concentrations, no adverse risk is expected. Always read the product information before use and follow the label/use instructions. See Health Information.

- **Environmental releases** – Very small quantities of these materials may be released into the environment if consumer products that contain them are spilled or poured down a drain. For small spills, DOW MIT-based antimicrobial products should be absorbed with inert materials such as sand or clay. The active ingredient in these products is nonvolatile, has high water solubility, and high mobility in soil. In the environment, it will partition to water and biodegrade. It is also removed by common wastewater-treatment processes. This material is very toxic to aquatic organisms on an acute basis (exposure to a large amount). See Environmental, Health, and Physical Hazard Information.

- **Large release** – Industrial spills or releases are infrequent and generally contained. In the event of an industrial spill, the focus is on containing the spill to prevent contamination of soil and surface or ground water. The material should be captured, collected, and reprocessed or disposed of according to applicable governmental requirements. Keep unprotected personnel from entering spill area. An approved respirator is recommended for emergency work. Keep upwind of the spill and ventilate the area. Rinse down the spill area with a 5% bleach/5% sodium bicarbonate in water “deactivation solution.” Let stand for 30 minutes and then rinse with water into a chemical sewer. See Environmental, Health, and Physical Hazard Information.

- **In case of fire** – These materials will not burn until the water has evaporated. The residue is combustible. Deny unnecessary entry into the area and consider the use of unmanned hose holders. Use extinguishing equipment suitable for surrounding materials. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Contain fire-water run-off if possible to minimize the potential for environmental damage. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

For more information, see the relevant Safety Data Sheet.
formulation, concentration, or intended use. These products may contain minor components or additives that have additional health risks. The Safety Data Sheet is the preferred source for specific health information.

The information below is based on data from concentrated 2-methyl-4-isothiazolin-3-one (MIT) products. Harmful effects decrease as the concentration of active ingredient MIT decreases. Therefore the health risks associated with dilute, parts per million (ppm) concentrations of MIT (the active ingredient) in consumer products are very low compared to concentrated DOW MIT antimicrobial products.

**Eye contact** – Contact may cause severe eye irritation or chemical burns, which may result in permanent eye injury.

**Skin contact** – Contact may cause severe burns with symptoms of pain, local redness, swelling, and tissue damage. Prolonged or widespread contact may result in allergic skin reactions.

**Ingestion** – These products can be toxic if swallowed. Large amounts may cause serious injury, even death.

**Inhalation** – Heated vapor or mist may cause irritation of the upper respiratory tract (nose and throat) and lungs.

**Other** – Similar materials have not caused cancer, birth defects, or fetal effects in animal testing.

For more information, see the relevant Safety Data Sheet.

**Environmental Information**

2-Methyl-4-isothiazolin-3-one, the active ingredient in DOW™ MIT antimicrobial products, has low volatility (does not readily evaporate) and is completely soluble in water. It does not bind to soil or sediment. It is biodegradable in water and soil, and rapidly degrades to non-toxic, non-persistent substances. 2-Methyl-4-isothiazolin-3-one will be removed by common (biological) wastewater treatment facilities.

2-Methyl-4-isothiazolin-3-one is not expected to accumulate in the food chain (has low bioconcentration potential). It is very toxic to aquatic organisms on an acute basis (exposure to a large amount).

For more information, see the relevant Safety Data Sheet.

**Physical Hazard Information**

DOW™ MIT-based antimicrobial products are stable at recommended storage and use temperatures. Avoid contact with amines, mercaptans, oxidizing agents, and reducing agents.

For more information, see the relevant Safety Data Sheet.
Regulatory Information

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of DOW™ MIT antimicrobial products. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Safety Data Sheet, Technical Data Sheet, or Contact Us.

Additional Information

- Safety Data Sheet (request from the Dow Customer Information Group www.dow.com/assistance/dowcig.htm)
- Contact Us (www.dow.com/microbial/contact/)

For more business information about DOW™ MIT antimicrobial products, visit the visit the Dow Microbial Control web site at www.dow.com/microbial/.

Reference

1 KORDEK™ LX5000 Industrial Microbiocide Material Safety Data Sheet, Rohm and Haas Company. Error! Bookmark not defined. Error! Bookmark not defined.
3 KORDEK LX5000 Biocide for Metalworking Fluid Concentrates and Tankside Additions, Technical Data Sheet, Rohm and Haas Company, Form No. BIO.KORDEK LX5000.PDS.E.04/2008.
NOTICES:

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