Product Safety Assessment

**AMICAL™ and FUNGIBLOCK™ Antimicrobial Agents**


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**Names**

- CAS No. 20018-09-1
- Diidodomethyl-p-tolylsulfone
- Benzene, 1-(diidodomethyl)sulfonyl)-4-methyl
- AMICAL™ antimicrobial agents
- AMICAL™ preservatives
- AMICAL™ antifungal agents
- AMICAL™ Flowable antimicrobial agent
- AMICAL™ WP antimicrobial agent
- AMICAL™ 48 antimicrobial agent
- FUNGIBLOCK™ antimicrobial building material additives

**Product Overview**

- **AMICAL™ antimicrobial agents** and **FUNGIBLOCK™ antimicrobial building material additives** are antifungals based on the active ingredient diidodomethyl-p-tolylsulfone. They are extremely effective antimicrobial (antifungal) agents over a broad range of pH. The agents are marketed in various formulations, including but not limited to: AMICAL 48, AMICAL Flowable, AMICAL WP antimicrobial agents, and FUNGIBLOCK antimicrobial additives specifically designed for building materials. For further details, see [Product Description](#).

- These antimicrobial agents provide protection against mildew and algal formation for latex paint films, air-duct coatings, pigment dispersions, and latex caulks, adhesives and binders. They are also used in leather tanning solutions, inks, wood preservatives, rubber and plastic products, paper and paperboard products, and certain textile and nonwoven fabrics. For further details, see [Product Uses](#).

- Eye contact with powdered products may cause severe irritation with corneal injury, which may result in permanent impairment of vision, even blindness. Chemical burns may occur. The liquid product, in liquid or mist form, may cause eye irritation, but corneal injury is unlikely. Skin contact, inhalation, or ingestion are not likely to result in harmful effects. Inhalation of dust may cause irritation to the upper respiratory tract. For further details, see [Health Information](#).

- Those working with these products in manufacturing operations could be exposed during maintenance, sampling, testing, or other procedures. Exposure potential can be minimized through a thorough training program for employees and appropriate work processes, ventilation, and use of safety equipment. These products can be present at very low levels in products used by the public, such as latex paints, caulks, and adhesives; wood preservatives; and paper products. For further details, see [Exposure Potential](#).

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AMICAL™ and FUNGIBLOCK™ antimicrobial agents are stable under recommended storage conditions, but can decompose when exposed to elevated temperatures. Avoid contact with moisture, oxidizers, or strong bases. For further details, see Physical Hazard Information.

Manufacture of Product

- **Process** – The active ingredient of these antimicrobial agents, diiodomethyl-p-tolylsulfone, is produced using a complicated, proprietary series of reactions. The active ingredient is mixed with other materials to produce a formulation that performs well for specific uses and applications.

Product Description

AMICAL™ and FUNGIBLOCK™ antimicrobial agents are antifungals and preservatives marketed by Dow. They are based on the active ingredient diiodomethyl-p-tolylsulfone and are extremely effective antimicrobial agents over a broad range of pH. The preservatives are marketed as various formulations, including but not limited to:

- AMICAL 48 antimicrobial agent – a tan, finely divided powder that is 95% active
- AMICAL Flowable antimicrobial agent – a light-gray suspension in water that is 40% active and recommended for use in water-based formulations in which high-shear mixing is not used
- AMICAL WP antimicrobial agent is a tan-gray, wettable powder that is 48% active and designed to be used where dry blending of ingredients is desired
- FUNGIBLOCK antimicrobial additives specifically designed for building materials to prevent mold

Product Uses

AMICAL™ and FUNGIBLOCK™ antimicrobial agents are used to provide protection against mold, mildew and algal formation for latex paint films, air-duct coatings, pigment dispersions, and latex caulks, adhesives and binders. They also are added to leather tanning solutions, wood preservatives, rubber and plastic products, paper and paperboard products, inks, and certain textile and nonwoven fabrics. AMICAL and FUNGIBLOCK antimicrobial agents have been approved for several indirect food-contact applications by the U.S. Food and Drug Administration under 21CFR-175.105, 21CR-175.300 and 21CFR-177.2600. In Europe, these products should not be used for the preservation of materials that can be used to produce food packaging or other materials that come into contact with food.

Exposure Potential

AMICAL™ and FUNGIBLOCK™ antimicrobial agents 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 manufacturing facility for AMICAL and FUNGIBLOCK antimicrobial agents, or in the various industrial, formulation, or manufacturing facilities that use these products. 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 unnecessary exposure. See Health Information.

- **Consumer exposure to products containing AMICAL™ and FUNGIBLOCK™ antimicrobial agents** – These products can be present at very low levels in products used by the public, such as latex paints, caulks, and adhesives; wood preservatives; and paper products. Always read the product information before use and follow the label/use instructions. See Health Information.

- **Environmental releases** – 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 of solid product should be collected by mechanical means with attention to limit inhalation of dust. Residual liquid or solid can be treated with dilute solutions of sodium bisulfite, sodium metabisulfite, or sodium sulfite mixed with water and propylene glycol. This material is considered highly toxic according to U.S. classification and very toxic according to European Union classification 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. Residual liquid or solid should be treated with dilute solutions of sodium bisulfite, sodium metabisulfite, or sodium sulfite mixed with water and propylene glycol. See Environmental and Health Information.

- **In case of fire** – Keep people away. Isolate the fire and deny any unnecessary entry. Fight the fire from a safe distance or consider the use of unmanned hose holders. Use of a direct water stream may spread the fire. Use water fog or fine spray, dry-chemical or carbon-dioxide fire extinguishers, or foam to extinguish the fire. Alcohol-resistant foam is preferred. Contain fire water run-off if possible to minimize the potential for environmental damage. Dust suspended in air can pose an explosion hazard. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) with a full-face mask approved by NIOSH and protective firefighting clothing. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

For more information, see the relevant Safety Data Sheet.

**Health Information**

- **Eye contact** – Powdered AMICAL™ antimicrobial agents may cause severe irritation with corneal injury, which may result in permanent impairment of vision, even blindness. Chemical burns may occur. AMICAL and FUNGIBLOCK™ antimicrobial products in liquid or mist form may cause eye irritation, but corneal injury is unlikely.

- **Skin contact** – Brief contact with these antimicrobial products is essentially nonirritating to the skin. Prolonged contact with the powdered products may cause slight skin irritation with local redness. The powdered products are not likely to be absorbed through the skin in harmful amounts. Repeated contact with the liquid formulation may cause flaking and softening of the skin.

- **Inhalation** – No adverse effects are anticipated from a single exposure to vapors from AMICAL and FUNGIBLOCK antimicrobial agents. Dust from the powdered products or mist from the liquid product may cause irritation to upper respiratory tract.

- **Ingestion** – These products have very low toxicity if swallowed. Harmful effects are not anticipated from swallowing small amounts.
Repeated exposure – In animals, effects have been reported on the following organs after ingestion: gastrointestinal tract, salivary glands, thyroid gland, and liver. Effects on the kidney have also been reported for the liquid product. In rare cases, repeated exposure to propylene glycol in the liquid product may cause effects on the central nervous system.

Birth/developmental effects – The active ingredient has been toxic to the fetus in laboratory animals at doses that are toxic to the mother. These effects have been shown to be associated with iodine toxicity, and similar effects are unlikely in humans. Iodine levels due to use of this product are expected to be much lower than the maximum tolerable upper intake limits in humans for iodine as recommended by the World Health Organization.

Reproductive effects – For the active ingredient in laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. These effects have been shown to be associated with iodine toxicity, and similar effects are unlikely in humans. Iodine levels due to use of this product are expected to be much lower than the maximum tolerable upper intake limits in humans for iodine as recommended by the World Health Organization.

For more information, see the relevant Safety Data Sheet.

Environmental Information

The bioconcentration potential (tendency to accumulate in the food chain) for the active ingredient is low. The potential for mobility in the soil is medium. The active ingredient is expected to degrade only very slowly in the environment.

The active ingredient is highly toxic according to U.S. classification and very toxic according to European Union classification to aquatic organisms on an acute basis. It is practically nontoxic to birds on an acute or dietary basis.

For more information, see the relevant Safety Data Sheet.

Physical Hazard Information

AMICAL™ and FUNGIBLOCK™ antimicrobial agents are stable under recommended storage conditions, but can decompose when exposed to elevated temperatures. Generation of gas during decomposition can cause pressure build-up in closed systems. Decomposition products can include organic iodides and iodine.

Avoid contact with moisture, oxidizers, or strong bases.

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 AMICAL™ and FUNGIBLOCK™ antimicrobial agents. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Safety Data Sheet.
Additional Information

- Safety Data Sheet (http://www.dow.com/webapps/msds/msdssearch.aspx)
- Contact Us (http://www.dow.com/biocides/tech/index.htm)
- DOW Microbial web site: FUNGIBLOCK (http://www.dow.com/microbial/)

For more business information about AMICAL™ antimicrobial agents, visit Dow’s Biocides web site at http://www.dow.com/microbial/.

References

1 AMICAL™ Preservatives: EPA-Registered Fungicide for Industrial Products and Process Systems, Product Information, The Dow Chemical Company, Form No. 253-01212-10/01/06PS
2 Dow Microbial website: FUNGIBLOCK (http://www.dow.com/microbial/)
4 AMICAL 48 Antimicrobial Material Safety Data Sheet, The Dow Chemical Company
5 AMICAL Flowable Antimicrobial Material Safety Data Sheet, The Dow Chemical Company
6 2008 estimates by The Dow Chemical Company.
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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