Product Safety Assessment

*BIOBAN™ DXN Antimicrobial*

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. 828-00-2
- *BIOBAN™* DXN antimicrobial
- 2,6-Dimethyl-1,3-dioxan-4-yl acetate
- 6-Acetoxy-2,4-dimethyl-m-dioxane
- Dimethoxane

**Product Overview**

- *BIOBAN™* DXN antimicrobial is a yellow to orange liquid with a pungent odor. It contains the active ingredient 2,6-dimethyl-1,3-dioxan-4-yl acetate. The product is soluble in water and oil (hydrocarbons), effective over a wide pH range, and compatible with a wide range of anionic, cationic, and nonionic compounds. For further details, see *Product Description*.
- *BIOBAN DXN* antimicrobial is a broad-spectrum biocide providing bactericidal activity in water-containing systems and emulsions and in textile chemical systems. For further details, see *Product Uses*.
- Exposure to *BIOBAN DXN* antimicrobial can occur either in facilities that manufacture or formulate the product or in the various facilities that use this product. This product is not sold directly to consumers; however, goods used by consumers, such as paints, adhesives, and textiles, may incorporate these products. Contact with the finished product would not be expected to represent a risk. For further details, see *Exposure Potential*.
- Contact with liquid or mist may cause moderate eye irritation with slight corneal injury possible. Brief contact is essentially nonirritating to skin. This product has the potential to cause an allergic skin reaction. Excessive exposure to vapor may cause irritation of the nose, throat, and lungs. This product has low toxicity if swallowed. For further details, see *Health Information*.
- *BIOBAN DXN* antimicrobial will ultimately biodegrade in water and soil environments, including removal by biological wastewater-treatment facilities. The product has low potential to accumulate in the environment. *BIOBAN DXN* antimicrobial is moderately toxic to aquatic organisms on an acute basis. For further details, see *Environmental Information*.
- *BIOBAN DXN* antimicrobial is stable under recommended storage and normal use conditions. Avoid contact with oxidizing materials and strong acids. For further details, see *Physical Hazard Information*.

Back to top

®

™Trademark of The Dow Chemical Company (“Dow”) or an affiliated company of Dow

---

Created: December 10, 2012 The Dow Chemical Company Page 1 of 6
Manufacture of Product

- **Capacity** – The Dow Chemical Company is the only global manufacturer of BIOBAN™ DXN antimicrobial, with production capacity satisfying worldwide demand for this product.
- **Process** – The process for manufacturing BIOBAN DXN antimicrobial is proprietary. The chemical structure of active ingredient 2,6-dimethyl-1,3-dioxan-4-yl acetate is shown below:

```
H3C

O

O

O

CH3

CH3
```

Product Description

BIOBAN™ DXN antimicrobial is a yellow to orange liquid with a pungent odor. The active ingredient in this product is 2,6-dimethyl-1,3-dioxan-4-yl acetate, which typically constitutes 87% of the composition by weight. BIOBAN DXN antimicrobial is soluble in water and oil (hydrocarbons). It is effective over a wide pH range, and compatible with a wide range of anionic, cationic, and nonionic compounds.

Product Uses

BIOBAN™ DXN antimicrobial provides broad-spectrum bactericidal activity in water- and oil-based formulations and is effective over a wide pH range (3 to 8). BIOBAN DXN antimicrobial is not approved for use in food-contact applications. Typical applications include:

- Water-containing systems and emulsions – paints, coatings, specialty industrial products, industrial adhesives, leather processing liquors, and distillate fuels
- Textile chemical systems – antistatic lubricants, spinning emulsions, sizings, adhesives, glues, guar gums, dyestuffs (dye dispersions and print pastes), latex emulsions, and fabric softeners

Exposure Potential

BIOBAN™ DXN antimicrobial is used in the production of industrial and consumer products. Based on the uses for this product, the public could be exposed through:

- **Workplace exposure** – Exposure can occur either in facilities that manufacture or formulate BIOBAN DXN antimicrobial or in the various facilities that use this product. It is produced, distributed, and stored in closed systems. Those working with BIOBAN DXN antimicrobial in construction or manufacturing operations could be exposed during maintenance, sampling, testing, 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.
- **Consumer exposure to products containing BIOBAN DXN antimicrobial** – BIOBAN DXN antimicrobial is not sold directly to consumers; however, goods used by consumers, such as paints, adhesives, and textiles, may incorporate this product. Contact with the finished products is not considered to represent a risk. See Health Information.
- **Environmental releases** – In the event of a spill, the focus is on containing the spill to prevent contamination of soil, surface water, or ground water. If released directly to soil or water, this product will hydrolyze and degrade in water and soil environments, including removal by biological wastewater-treatment facilities. This product has a low bioaccumulation potential.

---

[^3]: Trademark of The Dow Chemical Company (“Dow”) or an affiliated company of Dow

---

Created: December 10, 2012 The Dow Chemical Company Page 2 of 6
potential and is unlikely to persist in the environment. It is moderately 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 captured, collected, and reprocessed or disposed of according to applicable governmental requirements. An approved respirator with an organic vapor cartridge is recommended for emergency work. See Environmental, Health, and Physical Hazard Information.

- **In the event of a fire** – Liquid and vapor are combustible. Deny any unnecessary entry into the area and consider the use of unmanned hose holders. Use water spray or fog, carbon-dioxide or dry-chemical extinguishers, or foam to fight the fire. Alcohol-resistant foams (ATC type) are preferred. Use of a direct water stream may spread the fire. During a fire, smoke may contain the original material in addition to combustion products that may be harmful or irritating. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Keep fire water out of waterways and sewers to minimize the potential for environmental damage. Contact with acidic materials can generate flammable gas. 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**

- **Eye contact** – Contact with the liquid or mist may cause moderate eye irritation with slight corneal injury possible.

- **Skin contact** – Brief contact is essentially nonirritating to the skin. Prolonged exposure is not likely to cause significant irritation or to result in absorption of harmful amounts. Laboratory studies have shown that this product has the potential to cause an allergic skin reaction.

- **Inhalation** – Excessive exposure to vapor may cause irritation of the nose, throat, and lungs.

- **Ingestion** – This product has low toxicity if swallowed. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

- **Repeated exposure** – In laboratory animals, repeated exposure has been shown to have adverse effects on the liver.

- **Other** – A minor component of this product, vinyl acetate, has been shown to cause tumors in the respiratory and gastrointestinal tract in animals exposed to high doses.

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

**Environmental Information**

BIOBAN™ DXN antimicrobial is water soluble. If introduced to water, it will remain in water and will not evaporate from water or soil to the air. Though not considered readily biodegradable, this product will ultimately biodegrade in water and soil environments, including removal by biological wastewater-treatment facilities.
BIOBAN™ DXN antimicrobial is not likely to accumulate in the food chain (bioconcentration potential is low). It is moderately toxic to aquatic organisms (LC₅₀ between 1 and 10 mg/L in the most sensitive species tested) on an acute basis.

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

Physical Hazard Information

BIOBAN™ DXN antimicrobial is stable under recommended storage and normal use conditions. Exposure to elevated temperatures can cause the product to decompose and generate gas, which can cause pressure build-up in closed systems. Decomposition products can include acetaldehyde and vinyl acetate.

Liquid and vapor are combustible. Avoid heat, sparks, and flame. Avoid contact with oxidizing materials. Contact with strong acids can generate flammable gas.

For more information, request the 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 BIOBAN™ DXN antimicrobial. 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.

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/index.htm)
- Dow Microbial Control web site (www.dow.com/microbial/)
- Dimethoxane, CASRN: 828-00-2, Hazardous Substances Data Bank (HSDB), U.S. National Library of Medicine, TOXNET (http://toxnet.nlm.nih.gov/cgi-bin/sis/search/r?dbs+hsdb:@term+@na+DIMETHOXANEx)

For more business information about BIOBAN™ DXN antimicrobial, visit the Dow Microbial Control website at www.dow.com/microbial/.

©™Trademark of The Dow Chemical Company (“Dow”) or an affiliated company of Dow

Created: December 10, 2012 The Dow Chemical Company Page 4 of 6
References


Back to top
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.

Nothing contained herein is to be construed as a recommendation to use any product, process, equipment or formulation in conflict with any patent, and Dow makes no representation or warranty, express or implied, that the use thereof will not infringe any patent.

NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREBUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

Dow makes no commitment to update or correct any information that appears on the Internet or on its World-Wide Web server. The information contained in this document is supplemental to the Internet Disclaimer, http://www.dow.com/homepage/disclosure.html

Back to top

Form No. 233-01037-MM-1212

© Trademark of The Dow Chemical Company (“Dow”) or an affiliated company of Dow