**BIOBAN™ Bronopol PC**
**BIOBAN Bronopol PC 30**
Preservative For Cosmetics And Personal Care Products
CAS Reg. No. 52-51-7
EINECS No. 200-143-0
CFTA/INCI Adopted Name: 2-bromo-2-nitropropane-1,3-diol

**General**

BIOBAN™ Bronopol PC preservative (a crystalline solid) and BIOBAN Bronopol PC 30 preservative (a 30% active liquid) are broad-spectrum antimicrobial agents for topical cosmetics and toiletries.

BIOBAN Bronopol PC and BIOBAN Bronopol PC 30 provide the following benefits:

- Broad-spectrum bactericide
- Excellent efficacy against *Pseudomonas sp.*
- Low toxicity profile
- Excellent in combination with other preservatives, particularly isothiazolinone based preservatives

![Chemical Structure]

**Physical Properties**
The following are typical properties of BIOBAN Bronopol PC and BIOBAN Bronopol PC 30; they are not to be considered product specifications.

**BIOBAN Bronopol PC**
- Description: White or off-white crystals
- Purity, % by weight: 99-100
- Water content: Less than 0.5%
- Melting Point °C: ~130

**BIOBAN Bronopol PC 30**
- Appearance: Pale yellow to colorless liquid
- Active, % by wt.: ~29.1-30.9
- Propylene Glycol, % by wt.: ~60
- Water, % by wt.: ~10
- pH (as is): 4.5 Max.
- Specific Gravity @ 20°C: 1.19-1.21
- Flash Point: Does not have a flash point as measured by SETAFLASH Closed Cup.

**Antimicrobial Activity**

BIOBAN Bronopol PC and BIOBAN Bronopol PC 30 effectively inhibit the growth of most bacteria and show the greatest long-term chemical stability at pH levels between about 4 to 8. Its effectiveness against a representative group of microorganisms is illustrated by the minimum inhibitory concentrations (MIC) listed below for organisms as determined by agar dilution. These data are intended only as an indication of the broad spectrum of activity of BIOBAN Bronopol PC and should not be interpreted as having relevance to the effectiveness or dosage against specific microorganisms in formulated products.
BIOBAN™ Bronopol PC, in contrast to the majority of other antibacterial agents, is markedly inhibitory to Pseudomonas aeruginosa. This organism is difficult to control with most antimicrobial agents and can develop resistance to preservatives. To date, no strains of microorganisms with acquired resistance to BIOBAN Bronopol PC have been reported.

In general, BIOBAN Bronopol PC preservative and BIOBAN Bronopol PC 30 preservative provide effective microbial control at concentrations of 0.01% to 0.1% by weight active ingredient in cosmetic formulations depending on the choice of other ingredients and the degree of protection required. A typical use concentration is 300 ppm when used alone. BIOBAN Bronopol PC and BIOBAN Bronopol PC 30 are particularly useful as preservatives for creams and lotions, especially those containing aloe, lanolin, jojoba, and other natural products.

BIOBAN Bronopol PC and BIOBAN Bronopol PC 30 are recommended for use in products with acidic, neutral, or slightly alkaline pH. They are soluble in water, alcohols, glycols and other polyols. BIOBAN Bronopol PC and BIOBAN Bronopol PC 30, unlike many preservatives, retain activity in the presence of most commonly used cosmetics and toiletry surfactants.

The addition of BIOBAN Bronopol PC or BIOBAN Bronopol PC 30 to formulations containing reducing agents, aluminum, cysteine, or sulfydryl compounds is not recommended, as such compounds can result in inactivation.

The effectiveness of BIOBAN Bronopol PC and BIOBAN Bronopol PC 30 can be enhanced by use in combination with other cosmetic preservatives. Especially effective combinations with greatly enhanced antifungal activity are obtained by using BIOBAN Bronopol PC or BIOBAN Bronopol PC 30 in combination with parabens, EDTA salts, or isothiazolinones. The most popular combination is with 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (CMIT/MIT). A typical use rate when used in combination is 100 ppm active bronopol with 7.5 ppm CMIT/MIT.

The benefits of the combination of BIOBAN Bronopol PC products and isothiazolines are as follows:

- Synergistic activity has been reported between bronopol and isothiazolinones in both the USA and Japan.
- Pseudomonas efficacy – BIOBAN Bronopol PC and BIOBAN Bronopol PC 30 have extremely good efficacy against Pseudomonas, a weakness of isothiazolinone chemistry.
- BIOBAN Bronopol PC and BIOBAN Bronopol PC 30 are more effective in the presence of reducing agents as compared to isothiazolinones. In addition, BIOBAN Bronopol PC and BIOBAN Bronopol PC 30 can improve the stability of CMIT/MIT in the presence of reducing agents.
- BIOBAN Bronopol PC and BIOBAN Bronopol PC 30 can be used to lower the levels of isothiazolinones.

Toxicity

For all toxicological and eco-toxicological information on Dow Biocides products, please refer directly to the Safety Data Sheet (SDS) available from your local Dow representative or the Dow Customer Information Group (CIG).
**First Aid**

In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. Flush skin with water.

If swallowed, do not induce vomiting. Drink egg whites or gelatin solution. If these are not available, drink large amounts of water (do not administer liquids to an unconscious person). Call a physician.

If inhaled, remove person to fresh air.

If on skin, immediately flush skin with plenty of water for 15 minutes.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage.

FOR INDUSTRY USE ONLY

**Precautionary Labeling**

Labels for BIOBAN™ Bronopol PC preservative bear the following precautionary statements:

WARNING!

CAUSES IRRITATION.

HARMFUL IF SWALLOWED.

Avoid contact with skin, eyes, clothing.

Avoid breathing dust.

Wash thoroughly after handling.

Store at temperatures below 25°C.

Keep container closed.

Avoid contact with metal equipment.

Do not use before reading the Safety Data Sheet (SDS).

Labels for BIOBAN Bronopol PC 30 preservative bear the following precautionary statements:

DANGER!

CORROSIVE: CAUSES EYE AND SKIN DAMAGE

HARMFUL IF SWALLOWED.

Do not get in eyes, on skin or clothing.

Wash thoroughly with soap and water after handling.

Wear goggles or face shield and rubber gloves when handling.
Handling and Storage

Remove contaminated clothing and wash before reuse.

Do not use before reading the Safety Data Sheet (SDS).

BIOBAN™ Bronopol PC is stable almost indefinitely if stored at temperatures below 25°C and protected from moisture. Keep BIOBAN Bronopol PC sealed in its polyethylene liner except when in use. Because they tend to cause discoloration of BIOBAN Bronopol PC, avoid all contact with metals. Use plastic scoops for handling.

Shipping and Packaging

BIOBAN Bronopol PC

BIOBAN Bronopol PC preservative is classified as a Class 4.1 hazardous material in the U.S. Department of Transportation regulations and in the international regulations for air and open transport.

The bill of lading description used by Dow is:

2-BROMO-2-NITROPROPANE-1,3-DIOL,4.1,UN3241,III. DISINFECTANT NOI, OTHER THAN MEDICINAL OR TOILET PREPARATIONS. NMFC ITEM 57100 SUB 3 CLASS 60. TRADE NAME = BIOBAN Bronopol PC

<table>
<thead>
<tr>
<th>Shipping Containers</th>
<th>Net Wt.</th>
<th>Gross Wt.</th>
</tr>
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<tbody>
<tr>
<td>25 kg Fiber Drug</td>
<td>25 kg</td>
<td>80 lb</td>
</tr>
<tr>
<td>Palletized</td>
<td>600 kg/pallet</td>
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BIOBAN Bronopol PC 30

BIOBAN Bronopol PC 30 preservative is classified as a Class 8 Packing Group III corrosive liquid in the U.S. Department of Transportation regulations and in the international regulations for air and ocean transport because of its corrosive effects on aluminum.

The bill of lading description used by Dow is:

DISINFECTANT, LIQUID, CORROSIVE, N.O.S. (2-BROMO-2-NITROPROPANE-1,3-DIOL SOLUTION),8,UN3265,III. DISINFECTANT NOI, OTHER THAN MEDICINAL OR TOILET PREPARATIONS. NMFC ITEM 57100 SUB 3 CLASS 60. TRADE NAME = BIOBAN Bronopol PC 30

<table>
<thead>
<tr>
<th>Shipping Containers</th>
<th>Net Wt.</th>
<th>Gross Wt.</th>
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</thead>
<tbody>
<tr>
<td>55 gallon HDPE drums</td>
<td>500 lb</td>
<td>520 lb</td>
</tr>
<tr>
<td>1000 Liter IBC*</td>
<td>2,645 lb</td>
<td>2,354 lb</td>
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*Intermediate bulk container (tote tank) with HDPE bottle and steel cage and pallet.

Product Stewardship

Dow Microbial Control encourages its customers to review their applications of Dow Microbial Control products from the standpoint of human health and environmental quality. To help ensure that Dow Microbial Control products are not used in ways for which they are not intended or tested, Dow Microbial Control personnel are willing to assist customers in dealing with ecological and product safety considerations. Contact your representative if you need any assistance or information. When considering the use of any Dow product in a particular application, review the latest Safety Data Sheet and country-specific product label to ensure the intended use is within the scope of approved uses and can be accomplished safely. Before handling any of the products mentioned in the text, obtain available product safety information and take necessary steps to ensure safety of use.
Notice: No freedom from any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer’s use and for ensuring that Customer’s workplace and disposal practices are in compliance with applicable laws and other government enactments. The product shown in this literature may not be available for sale and/or available in all geographies where Dow is represented. The claims made may not have been approved for use in all countries. Dow assumes no obligation or liability for the information in this document. References to “Dow” or the “Company” mean the Dow legal entity selling the products to Customer unless otherwise expressly noted. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

USE BIOCIDES SAFELY. ALWAYS READ THE LABEL AND PRODUCT INFORMATION BEFORE USE.