

J53748 - MSDS



Emerging Technologies inc.

MATERIAL SAFETY DATA SHEET

SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: *LiquiBlock™ AT-03S*

EFFECTIVE DATE: 1 September 2006

CHEMICAL FAMILY: Polyacrylate salt

CHEMICAL NAME: Acrylic Acid, Polymers, Sodium Salt

COMPANY IDENTIFICATION:

Emerging Technologies Inc.
 02 Edwardia Drive
 Greensboro, NC 27409 USA

EMERGENCY TELEPHONE: 24 hours a day, 7 days a week

CHEMTREC 1-800-424-9300 COMPANY CODE: EMTE

SECTION 2 – COMPOSITION / INFORMATION ON INGREDIENTS

CAS #	Component	Percent	OSHA HAZARD
9033-79-8	Acrylic Acid, Polymers, Sodium Salt		

Component Information / Information on Non-Hazardous Components

The components of this product are not regulated as hazardous under 29 CFR and 49 CFR. However, the potential for respiratory tract irritation as a result of inhalation of this material as a respirable dust is recognized. See Sections 8, 11, 14, and 15 for further regulatory information.

SECTION 3 – HAZARDS IDENTIFICATION

Emergency Overview

Sodium polyacrylate is a white, granular, odorless polymer that yields a gel-like material with the addition of water. It is insoluble in water and causes extremely slippery conditions when wet. Although not regulated as a hazardous material, the respirable dust is potential respiratory tract irritant. An eight-hour exposure limit of 0.05 mg/m³ is recommended.

Potential Health Effects: Eyes

Dust may cause burning, drying, itching, and other discomfort, resulting in reddening of the eyes.

Potential Health Effects: Skin

Exposure to the dust, such as in manufacturing, may aggravate existing skin conditions due to drying effect.

Potential Health Effects: Ingestion

Although not a likely route of entry, tests have shown that polyacrylate absorbents are non-toxic if ingested. However, as in any instance of non-food consumption, seek medical attention in the event of any adverse symptoms.

Potential Health Effects: Inhalation

Exposure to respirable dust may cause respiratory tract and lung irritation and may aggravate existing respiratory conditions.

HMIS Ratings: Health: 1 Fire: 0 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic Hazard

SECTION 7 – HANDLING AND STORAGE

Handling

Handle as an eye and respiratory tract irritant.

Storage

Store in a dry, closed container.

SECTION 8 – EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure Guidelines

A: General Product Information

This product is not regulated as a hazardous material. However, the manufacturer recognizes the potential for respiratory tract irritation and recommends an eight-hour exposure limit of 0.05 mg/m³.

B: Component Exposure Limits

No information available.

Engineering Controls

Provide local exhaust ventilation to maintain worker exposure to less than 0.05 mg/m³ over an eight-hour period.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipments: Eyes/Face

Wear safety glasses with side shields or goggles.

Personal Protective Equipments: Skin

Use impervious gloves when handling the product in the manufacturing environment.

Personal Protective Equipments: Respiratory

Wear respirator with a high efficiency filter if particulate concentration in the work area exceeds 0.05 mg/m³ over an eight hour time period.

Personal Protective Equipments: General

Obey reasonable safety precautions and practice good housekeeping. Wash thoroughly after handling.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	White Granular Powder, no odor
Specific Gravity (Bulk Density)	0.62 – 0.74 g/ml
Melting Point	> 330 °C
Solubility in Water	Swells in water
Auto-Ignition Temperature	> 400 °C

SECTION 10– STABILITY AND REACTIVITY

Chemical Stability

This material is chemically stable under normal and anticipated storage and handling conditions.

Chemical Stability: Conditions to Avoid

Store protected from moisture. Keep away from heat and sources of ignition.

Incompatibility

None

Hazardous Decomposition Products

Decomposition above 200 °C.

Hazardous Polymerization

Will not occur.

SECTION 14 – TRANSPORTATION INFORMATION
International Transportation Regulations

This product is not transport regulated.

SECTION 15 –REGULATORY INFORMATION
US Federal Regulations
A: General Product Information

This product is not federally regulated as a hazardous material.

B: Clean Air Act

No information is available.

C: Component Analysis

No information available.

D: Food and Drug Administration

No information available.

State Regulations
A: General Product Information

This product is not regulated by any state as a hazardous material.

B. Component Analysis – State

None of this product's components are listed on the state lists from CA, FL, MA, NJ, or PA.

SECTION 15 –REGULATORY INFORMATION, continued
Component Analysis – Inventory

Component	CAS #	TSCA	EINECS(EC)	ENC (Japan)
Sodium Polyacrylate	9033-79-8	Yes	Yes	Yes

SECTION 16 – OTHER INFORMATION
Revision Information:

Revision Date: 1 September 2006

Supersedes Revision Dated: 8 March 2005

Reason for Revision: Update Section 1 with new address.

MSDS Author: Jane Mills Davis, Technical Manager

Key: N/A – Not Applicable NE – Not Established

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MATERIAL SAFETY DATA SHEET

Ashland

Page 001
Date Prepared: 12/20/04
Date Printed: 11/29/05
MSDS No: 999.0001099-008.002

PROPYLENE GLYCOL IND

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity

Product Name: PROPYLENE GLYCOL IND
SAP Material No: 3900000 000 00B
General or Generic ID: GLYCOL

Company

Ashland
Ashland Distribution Co. &
Ashland Specialty Chemical Co.
P. O. Box 2219
Columbus, OH 43216
614-790-3333

Emergency Telephone Number:

1-800-ASHLAND (1-800-274-5263)
24 hours everyday

Regulatory Information Number:

1-800-325-3751

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient(s)	CAS Number	% (by weight)
PROPYLENE GLYCOL	57-55-6	100.0

3. HAZARDS IDENTIFICATION

Potential Health Effects

Eye

May cause mild eye irritation. Symptoms include stinging, tearing, and redness.

Skin

May cause mild skin irritation. Symptoms may include redness and burning of skin. Although rare, skin contact with propylene glycol may cause allergic skin reaction (delayed skin rash which may be followed by blistering, scaling and other skin effects). Passage of this material into the body through the skin is possible, but it is unlikely that this would result in harmful effects during safe handling and use.

Swallowing

Swallowing this material is not likely to be harmful.

Inhalation

It is possible to breathe this material under certain conditions of handling and use (for example, during heating, spraying, or stirring). Breathing small amounts of this material is not likely to be harmful. Symptoms usually occur at air concentrations higher than the recommended exposure limits (See Section 3).

Symptoms of Exposure

Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness).

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Date Prepared: 12/20/04

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MSDS No: 999.0001099-008.002

PROPYLENE GLYCOL IND

Target Organ Effects

Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals: kidney damage.

Developmental Information

Propylene glycol was not harmful to the fetus in laboratory animal studies.

Cancer Information

This material is not expected to cause cancer in humans since it did not cause cancer in laboratory animals. This material is not listed as a carcinogen by the International Agency for Research on Cancer, the National Toxicology Program, or the Occupational Safety and Health Administration.

Other Health Effects

Propylene glycol may be absorbed in potentially harmful amounts when applied in large quantities to severe burns (second or third degree) over large areas of the body as part of a cream or other topical application. Absorption under such circumstances can elevate serum osmolality and may result in osmotic shock.

Primary Route(s) of Entry

Inhalation, Skin absorption, Skin contact, Eye contact, Ingestion.

4. FIRST AID MEASURES

Eyes

If symptoms develop, move individual away from exposure and into fresh air. Flush eyes gently with water while holding eyelids apart. If symptoms persist or there is any visual difficulty, seek medical attention.

Skin

Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

Swallowing

First aid is not normally required. If symptoms develop, seek medical attention.

Inhalation

If symptoms develop, move individual away from exposure and into fresh air. If symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet; seek immediate medical attention.

Note to Physicians

Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: lung (for example, asthma-like conditions), kidney.

5. FIRE FIGHTING MEASURES

Flash Point

211.0 F (99.4 C) TCC

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Page 003

Date Prepared: 12/20/04

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PROPYLENE GLYCOL IND

Explosive Limit

(for product) Lower 2.6 Upper 12.6 %

Autoignition Temperature

700.0 F (371.1 C)

Hazardous Products of Combustion

May form: carbon dioxide and carbon monoxide, organic compounds.

Fire and Explosion Hazards

No special fire hazards are known to be associated with this product.

Extinguishing Media

alcohol resistant (AR) foam, water fog, carbon dioxide, dry chemical.

Fire Fighting Instructions

DO NOT direct a solid stream of water or foam into hot, burning pools of liquid since this may cause frothing and increase fire intensity. Frothing can be violent and possibly endanger any firefighter standing too close to the burning liquid. Use water spray to cool fire exposed containers and structures until fire is out if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes. Wear full firefighting turn-out gear (full Bunker gear), and respiratory protection (SCBA).

NFPA Rating

Health - 0, Flammability - 1, Reactivity - 0

6. ACCIDENTAL RELEASE MEASURES

Small Spill

Absorb liquid on vermiculite, floor absorbent or other absorbent material.

Large Spill

Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source, dike area of spill to prevent spreading, pump liquid to salvage tank. Remaining liquid may be taken up on sand, clay, earth, floor absorbent, or other absorbent material and shoveled into containers. Per good environmental management practices, prevent run-off to sewers, streams and other bodies of water. Stop spill at the source. Cover sewer grates and dike the spill. Absorb spilled material on to absorbents. Shovel materials into container. Close container tightly and dispose of properly.

7. HANDLING AND STORAGE

Handling

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed. Warning. Sudden release of hot organic chemical vapors or mists from process equipment operating at elevated temperature and pressure, or sudden ingress of air into vacuum equipment, may result in ignitions without the presence of obvious ignition sources. Published "autoignition" or "ignition" temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions. Any use of this product in elevated temperature processes should be thoroughly evaluated to establish and maintain safe operating conditions.

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PROPYLENE GLYCOL IND

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection

Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. Consult your safety representative.

Skin Protection

Wear resistant gloves (consult your safety equipment supplier). To prevent repeated or prolonged skin contact, wear impervious clothing and boots.

Respiratory Protections

If overexposure has been determined or documented, a NIOSH/MSHA jointly approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators under specified conditions. (See your safety equipment supplier.) Engineering or administrative controls should be implemented to reduce exposure.

Engineering Controls

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below level of overexposure (from known, suspected or apparent adverse effects).

Exposure Guidelines

Component

PROPYLENE GLYCOL (57-55-6)
AIHA WEEL 10.000 mg/m3 - TWA aerosol only
AIHA WEEL 50.000 ppm - TWA total

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point

(for product) 365.0 - 374.0 F (185.0 - 190.0 C) @ 760 mmHg

Vapor Pressure

(for product) .220 mmHg @ 68.00 F

Specific Vapor Density

2.600 @ AIR=1

Specific Gravity

1.037 @ 68.00 F

Liquid Density

8.640 lbs/gal @ 68.00 F
1.037 kg/l @ 20.00 C

Percent Volatiles

100.0 %

Volatile Organic Compounds (VOC)

100.000 %
1037.000 g/l
8.640 lbs/gal

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PROPYLENE GLYCOL IND

Evaporation Rate
< .01 (N-BUTYL ACETATE)

Appearance
CLEAR, VISCOUS

State
LIQUID

Physical Form
NEAT

Color
WATER-WHITE

Odor
SLIGHT/ODORLESS

pH
No data

Viscosity
46.0 cps

Freezing Point
< -76.0 F (-60.0 C)

Molecular Weight
76.1

Solubility in Water
COMPLETE

Octanol/Water Partition Coefficient
< 1.000

Bulk Density
1.160 lbs/ft³

10. STABILITY AND REACTIVITY

Hazardous Polymerization
Product will not undergo hazardous polymerization.

Hazardous Decomposition
May form: carbon dioxide and carbon monoxide, organic compounds.

Chemical Stability
Stable.

Incompatibility
Avoid contact with: strong acids, strong bases, strong oxidizing agents.

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PROPYLENE GLYCOL IND

11. TOXICOLOGICAL INFORMATION

No data

12. ECOLOGICAL INFORMATION

No data

13. DISPOSAL CONSIDERATION

Waste Management Information

Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution Company, IC&S Environmental Services Group at 800-531-7106.

14. TRANSPORT INFORMATION

DOT Information - 49 CFR 172.101

DOT Description:
NON-REGULATED BY D.O.T.

Container/Mode:
55 GAL DRUM/TRUCK PACKAGE

NOS Component:
None

RQ (Reportable Quantity) - 49 CFR 172.101
Not applicable

Other Transportation Information

The Transport Information may vary with the container and mode of shipment.

15. REGULATORY INFORMATION

US Federal Regulations

TSCA (Toxic Substances Control Act) Status
TSCA (UNITED STATES) The intentional ingredients of this product are listed.

CERCLA RQ - 40 CFR 302.4(a)
None listed

SARA 302 Components - 40 CFR 355 Appendix A
None

Section 311/312 Hazard Class - 40 CFR 370.2
Immediate() Delayed(X) Fire() Reactive() Sudden Release of
Pressure()

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PROPYLENE GLYCOL IND

SARA 313 Components - 40 CFR 372.65
None

OSHA Process Safety Management 29 CFR 1910
None listed

EPA Accidental Release Prevention 40 CFR 68
None listed

International Regulations

Inventory Status

AICS (AUSTRALIA) The intentional ingredients of this product are listed.
DSL (CANADA) The intentional ingredients of this product are listed.
ECL (SOUTH KOREA) The intentional ingredients of this product are listed.
EINECS (EUROPE) The intentional ingredients of this product are listed.
ENCS (JAPAN) The intentional ingredients of this product are listed.
IECSC (CHINA) The intentional ingredients of this product are listed.
PICCS (PHILIPPINES) The intentional ingredients of this product are listed.

State and Local Regulations

California Proposition 65
None

Pennsylvania RTK Label Information
1,2-PROPANEDIOL

57-55-6

16. OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.



Material Safety Data Sheet

The Dow Chemical Company

Product Name: DOWICIL* 200 Preservative

Issue Date: 02/16/2007
Print Date: 28 Jan 2008

The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name
DOWICIL* 200 Preservative

Product Code: #0337

COMPANY IDENTIFICATION
The Dow Chemical Company
2030 Willard H. Dow Center
Midland, MI 48674
USA

Distributed by:
The HallStar Company*
120 S. Riverside Plaza
Suite 1620
Chicago, IL 60606
Ph: 877-427-4255

Customer Information Number: 800-258-2436

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact: 989-636-4400
Local Emergency Contact: 989-636-4400

*Affiliated companies include
RTD*HallStar, Inc.,
HallStar Solutions Corp.,
Ester Solutions Company,
Memphis Solutions Company, and
Marine Magnesium & Minerals Company

2. Hazards Identification

Emergency Overview

Color: Off-white

Physical State: Powder

Odor: Amine.

Hazards of product:

WARNING! Flammable solid. Harmful if absorbed through skin. May cause skin irritation. May be harmful if swallowed. Slipping hazard. May form explosive dust-air mixture. Toxic fumes may be released in fire situations. Highly toxic to fish and/or other aquatic organisms.

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: May cause slight temporary eye irritation.

Skin Contact: Prolonged or repeated contact may cause skin irritation. May cause more severe response if skin is damp.

* Indicates a Trademark

Skin Absorption: Prolonged or widespread skin contact may result in absorption of harmful amounts. Anorexia and weight loss occurred in some rabbits used in dermal toxicity studies; internal lesions occurred in different organs, primarily gastrointestinal, but these lesions were inconsistently observed and had no dose response.

Skin Sensitization: Not likely to be a skin sensitizer in dry powder form. May be a weak skin sensitizer in susceptible individuals at concentrations > 1% aqueous solution."

Inhalation: No adverse effects are anticipated from single exposure to dust.

Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

Effects of Repeated Exposure: In animals, effects have been reported on the following organs after ingestion: Liver.

Cancer Information: Methylene chloride has been shown to increase the incidence of malignant tumors in mice and benign tumors in rats. Other animal studies, as well as several human epidemiology studies, failed to show a tumorigenic response. Methylene chloride is not believed to pose a measurable carcinogenic risk to man when handled as recommended. 1,3-Dichloropropene. Has been shown to cause cancer in laboratory animals by the oral route. Inhalation exposure resulted in an increase in the normal occurrence of benign lung tumors in male mice.

Birth Defects/Developmental Effects: CTAC has caused birth defects in rats administered relatively high oral doses; no defects were observed at lower doses. CTAC did not cause birth defects or any other effects on the fetus when relatively high doses were administered dermally, the most likely route of exposure.

3. Composition Information

Component	CAS #	Amount
1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane-chloride (CTAC)	51229-78-8	96.0 %
Cis-1,3-dichloropropene	10061-01-5	<= 0.3 %
Dichloromethane	75-09-2	<= 0.5 %

4. First-aid measures

Eye Contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Skin Contact: Immediately wash skin with soap and plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Obtain medical attention without delay. Wash clothing before reuse. Destroy contaminated articles such as shoes. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands.

Inhalation: Move person to fresh air; if effects occur, consult a physician.

Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

Notes to Physician: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. Fire Fighting Measures

Extinguishing Media: Water. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers.

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Soak thoroughly with water to cool and prevent re-ignition. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. If product becomes contaminated with water, monitor product for heat generation and/or decomposition. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles.

Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Hand held dry chemical or carbon dioxide extinguishers may be used for small fires. Dust explosion hazard may result from forceful application of fire extinguishing agents. Move container from fire area if this is possible without hazard.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation. Do not permit dust to accumulate. When suspended in air dust can pose an explosion hazard. Minimize ignition sources. If dust layers are exposed to elevated temperatures, spontaneous combustion may occur. Pneumatic conveying and other mechanical handling operations can generate combustible dust. To reduce the potential for dust explosions, electrically bond and ground equipment and do not permit dust to accumulate. Dust can be ignited by static discharge.

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Hydrogen chloride. Carbon monoxide. Carbon dioxide. Ammonia. Amines.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Contain spilled material if possible. Sweep up. See Section 13, Disposal Considerations, for additional information. Absorb with approx. 272.6 g NaHSO₃ (or 249 g Na₂S₂O₅) for 100 g biocidal product.

Personal Precautions: Isolate area. Spilled material may cause a slipping hazard. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental Precautions: Spills or discharge to natural waterways is likely to kill aquatic organisms. Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. Handling and Storage

Handling

General Handling: No smoking, open flames or sources of ignition in handling and storage area. Avoid contact with eyes, skin, and clothing. Do not swallow. Keep container tightly closed. Good housekeeping and controlling of dusts are necessary for safe handling of product. Product can decompose upon severe impact. Electrically ground and bond all equipment.

Other Precautions: Aqueous solutions containing this product can generate formaldehyde. Additional information on this and other products we offer may be obtained by contacting our Customer Information Group. Ask for a product information brochure or data on how to access our website.

Storage

Protect from atmospheric moisture. Store in a dry place. Avoid moisture. Do not store in: Aluminum.

Shelf life: Use within 24 Months

Storage temperature: <= 49 °C

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Dichloromethane	ACGIH	TWA	50 ppm BEI
	OSHA	TWA	25 ppm SKIN
	OSHA	STEL	125 ppm SKIN

	OSHA	Action Level	12.5 ppm	SKIN
Cis-1,3-dichloropropene	ACGIH	TWA	1 ppm	SKIN

A "skin" notation following the exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact.

It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

Personal Protection

Eye/Face Protection: Use safety glasses.

Skin Protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task. Safety shower should be located in immediate work area. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and disposed of properly.

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Neoprene, Polyvinyl chloride ("PVC" or "vinyl"), Nitrile/butadiene rubber ("nitrile" or "NBR"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. In dusty or misty atmospheres, use an approved particulate respirator. The following should be effective types of air-purifying respirators: Particulate filter.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

9. Physical and Chemical Properties

Physical State	Powder
Color	Off-white
Odor	Amine.
Flash Point - Closed Cup	No test data available
Flammable Limits in Air	Lower: No test data available Upper: No test data available
Autoignition Temperature	No test data available
Vapor Pressure	@ 25 °C <i>Literature</i> (0.000000001 mmHg)
Boiling Point (760 mmHg)	Not applicable.
Vapor Density (air = 1)	No test data available
Specific Gravity (H ₂ O = 1)	Not applicable
Freezing Point	Not applicable
Melting Point	(decomposes upon melting)
Solubility in Water (by weight)	<i>Literature</i> miscible with water
pH	No test data available
Dynamic Viscosity	Not applicable

10. Stability and Reactivity

Stability/Instability

Stable under recommended storage conditions. See Storage, Section 7. Unstable at elevated temperatures.

Conditions to Avoid: Avoid temperatures above 80°C (176°F) Active ingredient decomposes at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Avoid static discharge. Avoid moisture. Water contamination may cause heat generation and decomposition.

Incompatible Materials: Avoid contact with oxidizing materials. Avoid contact with: Strong acids. Avoid contact with metals such as: Aluminum.

Hazardous Polymerization

Will not occur.

Thermal Decomposition

Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Chlorinated hydrocarbons. Carbon dioxide. Ammonia. Amines. Hydrogen chloride. Trimethylamine. Gases are released during decomposition.

11. Toxicological Information**Acute Toxicity****Ingestion**

LD50, Rat 1,550 mg/kg

Skin Absorption

The data presented are for the following material: Solid LD50, Rabbit 923 - 3,980 mg/kg

The data presented are for the following material: Strong solutions (50%). LD50, Rabbit 400 - 2,831 mg/kg

Inhalation

LC50, 4 h, Aerosol, Rat > 4.7 mg/l

Sensitization**Skin**

Not likely to be a skin sensitizer in dry powder form. May be a weak skin sensitizer in susceptible individuals at concentrations > 1% aqueous solution."

Repeated Dose Toxicity

In animals, effects have been reported on the following organs after ingestion: Liver.

Chronic Toxicity and Carcinogenicity

Methylene chloride has been shown to increase the incidence of malignant tumors in mice and benign tumors in rats. Other animal studies, as well as several human epidemiology studies, failed to show a tumorigenic response. Methylene chloride is not believed to pose a measurable carcinogenic risk to man when handled as recommended. 1,3-Dichloropropene. Has been shown to cause cancer in laboratory animals by the oral route. Inhalation exposure resulted in an increase in the normal occurrence of benign lung tumors in male mice.

Carcinogenicity Classifications:

Component	List	Classification
Cis-1,3-dichloropropene	NTP	Anticipated carcinogen.
	IARC	Possible carcinogen.; 2B
Dichloromethane	NTP	Anticipated carcinogen.
	IARC	Possible carcinogen.; 2B

Developmental Toxicity

CTAC has caused birth defects in rats administered relatively high oral doses; no defects were observed at lower doses. CTAC did not cause birth defects or any other effects on the fetus when relatively high doses were administered dermally, the most likely route of exposure.

Genetic Toxicology

In vitro genetic toxicity studies were predominantly negative. Animal genetic toxicity studies were negative.

12. Ecological Information

CHEMICAL FATE

Data for Component: 1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane-chloride (CTAC)

Movement & Partitioning

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is medium (Koc between 150 and 500).

Henry's Law Constant (H): 1.76E-8 atm*m3/mole; 25 °C Estimated

Partition coefficient, n-octanol/water (log Pow): -5.92 Estimated

Partition coefficient, soil organic carbon/water (Koc): 320 - 420 Estimated

Persistence and Degradability

Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
5.23E-10 cm3/s		Estimated

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method
51 %	28 d	OECD 301F Test

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
23 %	28 %	28 %	

Theoretical Oxygen Demand: 2.23 mg/mg

Data for Component: Cis-1,3-dichloropropene

Movement & Partitioning

Potential for mobility in soil is high (Koc between 50 and 150). Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient, n-octanol/water (log Pow): 1.603 Estimated

Persistence and Degradability

1,3-Dichloropropene has a stratospheric ozone depletion potential (ODP) of 0.002, relative to CFC 12 (ODP=1). Material is expected to biodegrade only very slowly (in the environment).

Fails to pass OECD/EEC tests for ready biodegradability.

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method
8 %	28 d	OECD 301D Test

Data for Component: Dichloromethane

Movement & Partitioning

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50).

Henry's Law Constant (H): 3.25e-03 atm*m3/mole; 25 °C Measured

Partition coefficient, n-octanol/water (log Pow): 1.25 Measured

Partition coefficient, soil organic carbon/water (Koc): 24 Estimated

Bioconcentration Factor (BCF): 2 - 40; common carp (Cyprinus carpio); Measured

Persistence and Degradability

Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions. Biodegradation rate may increase in soil and/or water with acclimation.

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
0.13E-12 cm3/s	79 - 110 d	Estimated

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method
5 - 26 %	28 d	OECD 301C Test

Theoretical Oxygen Demand: 0.38 mg/mg

ECOTOXICITY**Data for Component: 1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane-chloride (CTAC)**

Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

LC50, bluegill (*Lepomis macrochirus*): 26 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, water flea *Daphnia magna*, immobilization: 25.8 mg/l

Aquatic Plant Toxicity

EC50, green alga *Selenastrum capricornutum*, biomass growth inhibition: 0.493 mg/l

Toxicity to Micro-organisms

EC50, activated sludge, respiration inhibition: 1,870 mg/l

Aquatic Invertebrates Chronic Toxicity Value:

ChV Value mg/l	Species	Test Type	Endpoint	Exposure Time
23 mg/l	water flea <i>Daphnia magna</i>		number of offspring	21 d

Data for Component: Cis-1,3-dichloropropene

Material is very highly toxic to aquatic organisms on an acute basis (LC50/EC50 <0.1 mg/L in most sensitive species). Material is practically non-toxic to birds on a dietary basis (LC50 > 5000 ppm).

Fish Acute & Prolonged Toxicity

LC50, rainbow trout (*Oncorhynchus mykiss*): 2.96 mg/l

LC50, sheepshead minnow (*Cyprinodon variegatus*): 0.068 - 1.8 mg/l

Aquatic Invertebrate Acute Toxicity

LC50, water flea *Daphnia magna*: 0.09 - 6.2 mg/l

Aquatic Plant Toxicity

EC50, green alga *Selenastrum capricornutum*, biomass growth inhibition: 4.95 mg/l

EC50, diatom *Navicula* sp., biomass growth inhibition: 0.28 mg/l

Toxicity to Non-mammalian Terrestrial Species

dietary LC50, bobwhite (*Colinus virginianus*): > 10,000 ppm

dietary LC50, mallard (*Anas platyrhynchos*): > 10,000 ppm

contact LD50, Honey bee (*Apis mellifera*): > 6.6 micrograms/bee

Data for Component: Dichloromethane

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

LC50, bluegill (*Lepomis macrochirus*), static, 96 h: 224 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, water flea *Daphnia magna*, 48 h, immobilization: 480 mg/l

Aquatic Plant Toxicity

EC50, green alga *Selenastrum capricornutum*, biomass growth inhibition: > 662 mg/l

13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. DOW HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE

PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Group at 1-800-258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details.

Treatment and disposal methods of used packaging: Do not dump into any sewers, on the ground, or into any body of water.

14. Transport Information

DOT Non-Bulk

Proper Shipping Name: FLAMMABLE SOLIDS, ORGANIC, NOS

Technical Name: 1-(3-CHLOROALLYL)-3,5,7-TRIAZA, -1-AZONIAADAMANTANE CHLORIDE

Hazard Class: 4.1 ID Number: UN1325 Packing Group: PG III

DOT Bulk

Proper Shipping Name: FLAMMABLE SOLID, ORGANIC, N.O.S.

Technical Name: 1-(3-CHLOROALLYL)-3,5,7-TRIAZA, -1-AZONIAADAMANTANE CHLORIDE

Hazard Class: 4.1 ID Number: UN1325 Packing Group: PG III

IMDG

Proper Shipping Name: FLAMMABLE SOLID, ORGANIC, N.O.S.

Technical Name: 1-(3-CHLOROALLYL)-3,5,7-TRIAZA, -1-AZONIAADAMANTANE CHLORIDE

Hazard Class: 4.1 ID Number: UN1325 Packing Group: PG III

EMS Number: F-A,S-G

ICAO/IATA

Proper Shipping Name: FLAMMABLE SOLID, ORGANIC, N.O.S.

Technical Name: 1-(3-CHLOROALLYL)-3,5,7-TRIAZA, -1-AZONIAADAMANTANE CHLORIDE

Hazard Class: 4.1 ID Number: UN1325 Packing Group: PG III

Cargo Packing Instruction: 420

Passenger Packing Instruction: 419

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	Yes
Delayed (Chronic) Health Hazard	Yes
Fire Hazard	No
Reactive Hazard	Yes
Sudden Release of Pressure Hazard	No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

This product contains the following substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and which are listed in 40 CFR 372.

Component	CAS #	Amount
1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane-chloride (CTAC)	51229-78-8	<= 100.0 %
Dichloromethane	75-09-2	<= 0.5 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

The following product components are cited in the Pennsylvania Special Hazardous Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
Dichloromethane	75-09-2	<= 0.3 %

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Section 103

This product contains the following substances which are subject to CERCLA Section 103 reporting requirements and which are listed in 40 CFR 302.4.

Component	CAS #	Amount
Cis-1,3-dichloropropene	10061-01-5	<= 0.3 %
Dichloromethane	75-09-2	<= 0.5 %

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product (when prepared in aqueous formulations) contains a chemical known to the State of California to cause cancer.

US. Toxic Substances Control Act

This product contains chemical substance(s) exempt from TSCA Inventory requirements. It is sold solely for uses subject to regulation under the Federal Food, Drug, and Cosmetic Act.

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16. Other Information

Hazard Rating System

NFPA	Health	Fire	Reactivity
	1	2	2

Recommended Uses and Restrictions

For biocidal applications. For industrial use.

Revision

Identification Number: 50096 / 1001 / Issue Date 02/16/2007 / Version: 5.1

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.



Dow Biocides

- # Why Biocides First?
- # Products & Applications
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- # Contact Us
- # Safety Data Sheets (SDS)
- # Distributor Network

DOWICIL 200 Preservative

DOWICIL* 200 Preservative is a versatile and highly effective biocide used in most cosmetic and personal care product categories. Major applications include baby products, hair care products, shaving products, liquid hand soaps, eye area products, powders, lotions, creams, surfactants and sun care products. DOWICIL 200 Preservative is compatible with a large number of formulations ingredients.

Active Composition	96% cis 1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride
Description	Powder
EPA Registration No.	N/A
CAS Registry No.	51229-78-8
EINECS No.	223-805-0
Recommended pH Use Range	4-10
INCI Designated Name	Quaternium-15

Additional Information

Applications

Personal Care

Other Product-Related Literature:

[Personal Care Preservatives \(221KB PDF\)](#)

[DOWICIL 200 Sales and Formulating Guide \(338KB PDF\)](#)

[DOWICIL 200 Preservative Shows Excellent Results in Skin Irritancy and Contact Dermatitis Testing \(13KB PDF\)](#)

[DOWICIL 200 and Formaldehyde Q & A \(33KB PDF\)](#)

To view the PDFs of these literature pieces, you will need to download [Adobe Reader](#).



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Dow Biocides Home : Products & Applications : DOWICIL 200 Preservative

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Safe use and handling of DOWICIL 200 Preservative

These precautions are general in nature and are directed toward exposure to undiluted DOWICIL 200 Preservative or strong solutions (10% or more). Specific recommendations can be made only when specific handling conditions are known.

Handling

Observe reasonable precautions to avoid ingestion and skin contact, especially with strong (10% or more) aqueous solutions. Avoid contact with the undiluted material when the skin is wet, as with perspiration. Keep concentrated solutions or the dry powder of DOWICIL 200 away from cuts or wounds.

After working with DOWICIL 200, wash the hands and face well before eating or smoking. Remove grossly contaminated clothing as soon as possible and wash it before reuse. Wash contaminated skin with soap and a large quantity of water. Personnel working in a dusty atmosphere should shower and change clothing at the end of each work period.

Ventilation to control dusts below an exposure guideline of 1 mg/m³ is recommended. If necessary, provide personnel with dust respirators and enforce their use. All personnel working with the product should wear clean, body-covering clothing. Use adequate eye protection, such as safety glasses. Locate any eye wash station reasonably close to personnel working with the product.

Storage

Keep DOWICIL 200 Preservative in closed containers, in a dry, cool area. To avoid decomposition, which will release smoke and flammable vapors, store below 120°F (49°C). Keep away from heat, sparks and open flame. Do not store DOWICIL 200 near flammable materials.

Disposal

Spills can be swept up. Use a floor sweeping compound, then flush the spill area with water to ground. Avoid contamination of public water supplies. Collected (swept-up) material can be disposed of either by burial or incineration in accordance with local regulations.

In disposal of any wastes, be certain all applicable federal, state and local regulations are met.

Thermal decomposition

DOWICIL 200 Preservative is an organic material that can undergo exothermic decomposition when the dry powder is exposed to elevated temperatures (>100°C).

Decomposition will take place with evolution of toxic, flammable vapors. If such decomposition occurs in a closed container, violent rupture of the container is possible.

Make fire fighters aware of possible hazards. They should use self-contained breathing apparatus if exposure to vapors is possible. Extinguish fires involving DOWICIL 200 with water fog.

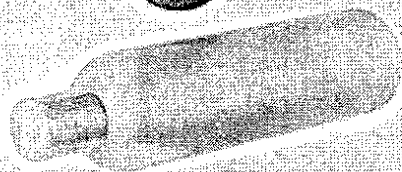
Customer Notice

Dow encourages its customers to independently review their applications of Dow products from the standpoint of human health and environmental quality. It is important that each customer ensure that Dow products are not used in ways for which they are not intended or tested. For specific information, refer to the current material safety data sheet for DOWICIL 200.



DOWICIL 200 Preservative

Reliable, broad-spectrum antimicrobial protection
for cosmetics and personal care formulations



For more information about DOWICIL 200 Preservative:

From the U.S. and Canada call 1-800-447-4369

From Mexico call 95-880-447-4369

In Europe call +31/20.691.6268

fax +31/20.691.6418

In Asia call +852/2879.8222

fax +852/2827.7860

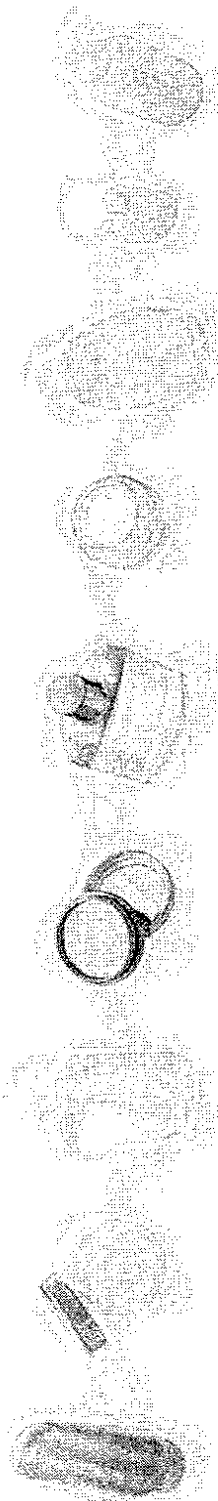
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Publication 8012-1999

Form No. 253-01116-59993W



DOWICIL 200 Preservative offers an ideal combination of properties for preserving most cosmetic and personal care products

More and more, formulation chemists, microbiologists and toxicologists are specifying DOWICIL 200 Preservative for antimicrobial protection in cosmetic and personal care formulations. There is no single reason why. Rather, it's because DOWICIL 200 offers a unique combination of desirable properties. Here's an initial look at some of those properties, and how they may prove beneficial in your new or existing formulation.

Effective at low concentrations

DOWICIL 200 Preservative is highly effective at low concentrations. Typically, 0.02 to 0.2% by weight of DOWICIL 200 provides dependable antimicrobial activity in most formulations.

Broad spectrum effectiveness

When you formulate with DOWICIL 200, you're working with a material that's proven effective against a broad variety of bacteria, yeasts and molds.

Excellent formulation compatibility

The many formulations that include DOWICIL 200 are the best testament to its compatibility with an enormous variety of ingredients and total formulation systems. The antimicrobial activity of DOWICIL 200 is independent of system pH between 4 and 10, and it displays excellent compatibility with proteinaceous matter. Moreover, DOWICIL 200 is not inactivated by anionic or cationic formulation ingredients.

Well-documented, favorable toxicologic profile

Extensive toxicologic studies conducted on DOWICIL 200 Preservative both at Dow laboratories and in independent institutions show a quite favorable toxicologic profile for this product. Well-documented skin, eye and ingestion studies have been conducted in animals, and additional irritation and sensitization studies have been conducted in humans. The results indicate that DOWICIL 200 should not present any hazards through its proper handling during manufacturing or use by the consumer in finished products. Further information is available through your Dow representative.

High water solubility, virtually insoluble in oil

DOWICIL 200 is highly soluble in water, while remaining virtually insoluble in oils or organic solvents. As a result, it stays in the aqueous component of your formulation, where microorganisms can live. That can mean less preservative is needed to protect the total formulation and that means lower costs.

Shelf life in formulations

At the dilute levels (typically 0.02 to 0.2%) used in finished formulations, DOWICIL 200 Preservative remains highly effective for two or more years.

Cost effective

When you formulate with DOWICIL 200, you're working with one of the most cost-effective preservatives available. Because it's highly effective at low concentrations, DOWICIL 200 shouldn't represent more than a small fraction of your total formulation costs.

Easy to work with

DOWICIL 200 is remarkably easy to incorporate into your formulation. You get the flexibility to work with a highly uniform, free-flowing powder that disperses and dissolves readily into the water phase of your formulation. You can also premix DOWICIL 200 into an aqueous concentrate just before adding it to your formulation. Either way, you get the same reliable antimicrobial effectiveness.

The following pages will give you a closer look at some of the properties of DOWICIL 200 Preservative discussed here only briefly.

You'll discover some of the reasons for its broad compatibility, and learn about Dow services that can provide considerable assistance as you develop your formulation.

There's also more detailed technical information about DOWICIL 200, including toxicologic properties, formulating considerations, and proper handling methods.

*Trademark of The Dow Chemical Company

DOWICIL 200 Preservative is compatible with a broad array of cosmetic and personal care formulations

Given the almost unlimited number of potential combinations of ingredients for cosmetic and personal care products, it's impossible to guarantee that any one preservative will be compatible with all formulations.

On the other hand, the sheer weight of variety and numbers of formulations currently using DOWICIL 200 makes a convincing case for its broad compatibility with ingredient materials and formulation systems.

Now in thousands of formulations

DOWICIL 200 Preservative is currently providing safe, effective antimicrobial performance in thousands of formulations. And these formulations are a cross-section of almost all types of cosmetic and personal care products.

There are a number of identifiable reasons for the popularity of DOWICIL 200.

Low concentration

One reason is that DOWICIL 200 is effective at low concentrations — typically 0.02 to 0.2% by weight in formulations.

Active from pH 4 through 10

The antimicrobial activity of DOWICIL 200 is essentially uniform between pH 4 and pH 10. So DOWICIL 200 can be considered compatible with almost any formulation from a pH standpoint. Moreover, the wide pH "window" offered by this preservative provides a margin of assurance in the event of moderate pH drift by the formulation.

Good with protein, surfactants and parabens

Finally, DOWICIL 200 Preservative displays excellent compatibility with many common formulation ingredients. For example, its effectiveness is not diminished by relatively high concentrations of proteinaceous matter or sulfate-containing products. DOWICIL 200 retains its antimicrobial activity in the presence of anionic, nonionic and cationic formulation ingredients. Moreover, DOWICIL 200 displays excellent compatibility with parabens.

There are many good reasons to give DOWICIL 200 first consideration as you evaluate the compatibility of various preservative systems with your formulation.

But the question still remains: "Is DOWICIL 200 compatible with my formulations?" Only actual formulation testing can give a definitive answer. But the following list of product types that are successfully using DOWICIL 200 helps to illustrate its tremendous versatility.

Hair care products

conditioners
protein conditioners
protein convalescences
herbal shampoo
conditioning shampoo
medicated shampoo
setting lotion
styling lotion

protein shampoo
aloe shampoo
finishing rinses
hair creams
hair rinses
texture lotion

Eye area products

makeup
eye shadow
eye color

eyeliner
creamy powder

Lotions

moisturizing lotion
body and skin lotions
cleansing lotion

coconut butter lotion

Baby products

baby shampoo
baby powder

baby lotion
baby oil

Powders

blush
pressed powders
bath powder

dusting powders
talcum powders

Creams

skin cream
moisturizing cream
foot and hand cream

night cream
aloe cream
cold cream

Shaving products

shaving creams
shaving lotions
shaving gels

Suntanning products

sunbath lotion
tanning accelerators
sunscreen oil
sunscreens

Raw materials

proteins
sulfacetamides
shampoo base

Ethnic market products

hair moisturizers
hair dressings
hair conditioners
hair straighteners

styling mousses
curl activators
makeup

Miscellaneous

beauty masks
makeup base
waterless hand cleaners
scrub masks

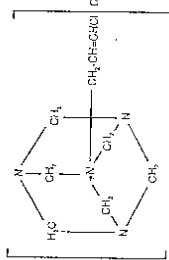
bath preparations
corn silk
liquid hand soaps
liquid makeup

Physical Properties of DOWICIL 200 Preservative

(Laboratory results typical of the products; not to be considered specifications.)

DOWICIL 200 Preservative is a highly effective antimicrobial that has proven its effectiveness in numerous formulations in virtually every major cosmetic and personal care product category.

Figure 1 - Molecular Structure of DOWICIL 200 Preservative

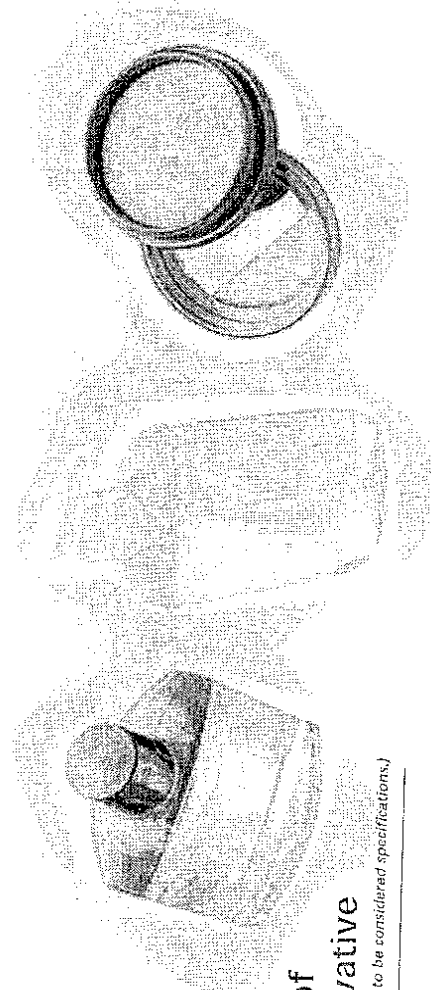


Formula $C_8H_{12}N_4(CH_2CH_2CH_2)Cl$
 CIPA Label Name Quaternium-15
 Molecular Weight 251.2
 Bulk Density lb/l³ 25.0
 CAS# 51220-78-8

Sales Specifications

(Method of Analysis 247 (b))
 Description Off-white powder
 Active ingredient¹ 94% (minimum)
 Color, Gardner
 (2% aqueous solution) 2 (maximum)
 Sieve analysis:
 Through No. 20
 (U.S. Standard Sieve) 100%

¹As tested: 1-(3-chloroethyl)-3,5,7-trimethylammonium chloride.



The fine powder form of DOWICIL 200 Preservative is hygroscopic. Therefore, shipping/storage containers must be kept closed (when not in use) to prevent caking and discoloration.

NOTE: Caking and discoloration do not impair antimicrobial properties, but may adversely affect the aesthetic appearance of end products.

Solubility

The solubility characteristics of DOWICIL 200 in common cosmetic ingredients are seen in Table 1. This table shows that DOWICIL 200 is highly soluble in water and has very low solubility in non-aqueous solvents. Little or no DOWICIL 200 Preservative migrates to the oil phase of a cosmetic product. Instead, it stays in the water phase, where it can be most effective against microorganisms.

Table 1 - Solubility of DOWICIL 200 in Common Cosmetic Ingredients

Solvent	In Cosmetics Levels of Solute @ 25°C
Water	12.7
Methanol (anhydrous)	20.8
Propylene glycol, USP	18.7
Glycerol (98.5%)	17.6
Ethanol (absolute)	2.04
Isopropyl alcohol (isobutyl)	<0.1
Methyl Cel	<0.1

Solution pH
 Fresh aqueous solutions of DOWICIL 200 have a pH of 4.5 to 5.5. After standing for several hours, these solutions will drift slightly and attain an equilibrium pH of 6.5 to 7.5.

Broad spectrum antimicrobial effectiveness
 The function of a preservative is to prevent the growth of microorganisms. As the data in Table 2 show, DOWICIL 200 Preservative is highly effective against both bacteria and fungi.

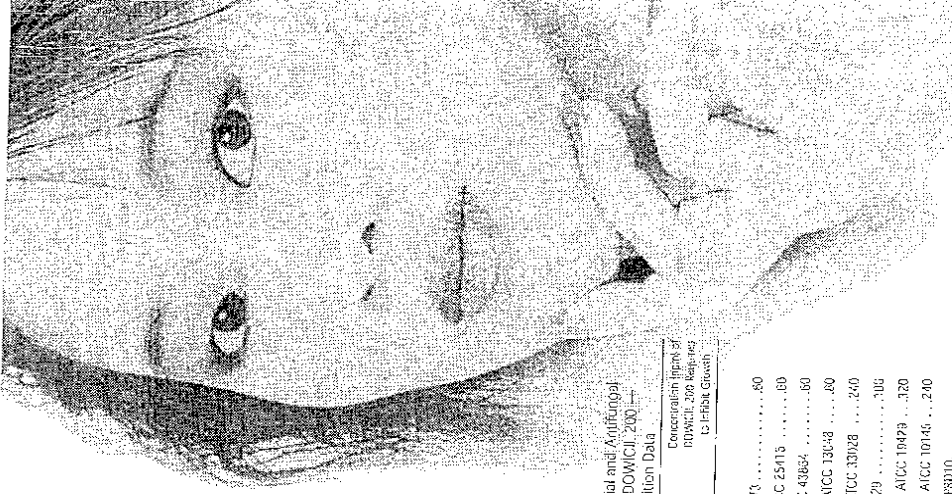
The agar inhibition data in Table 2 are just a starting point. We've also run laboratory evaluations on many different types of cosmetic formulations. These tests consistently demonstrate that concentrations of DOWICIL 200 Preservative from 0.02 to 0.2% by weight maintain effective control after repeated insult.

Obviously, the most effective level of DOWICIL 200 should be determined for each formulation using appropriate testing procedures. That's the only way to precisely determine the antimicrobial activity of any preservative in a given formulation. Dow offers a 10-Cycle Challenge Test to assist in determining the effective level of preservative required for a formulation.

Table 2 - Antimicrobial and Antifungal Efficacy of DOWICIL 200 - Agar¹ Inhibition Data

Test Organism	Concentration (ppm) of DOWICIL 200 Required to Inhibit Growth
Bacteria	
<i>Bacillus subtilis</i> , ATCC 8473	0.80
<i>Staphylococcus aureus</i> , ATCC 25915	0.80
<i>Citrobacter freundii</i> , ATCC 43634	0.80
<i>Enterobacter aerogenes</i> , ATCC 13048	0.80
<i>Enterobacter gergoviae</i> , ATCC 33028	2.40
<i>Escherichia coli</i> , ATCC 11729	1.60
<i>Pseudomonas aeruginosa</i> , ATCC 10479	3.20
<i>Pseudomonas aeruginosa</i> , ATCC 10146	2.40
<i>Aspergillus niger</i> , ATCC 16412	1.60
<i>Pseudomonas obovarum</i> , ATCC 0002	1.60
<i>Staphylococcus aureus</i> , ATCC 0538	1.60
Fungi	
<i>Aspergillus niger</i> , ATCC 16404	5.00
<i>Candida albicans</i> , ATCC 10251	2.50

¹Agar inhibition tests were run with standard agar diffusion techniques. Fungal tests were run on both agar (Difco) with added yeast extract.



How the Dow 10-Cycle Challenge Test is performed

How the Dow 10-Cycle Challenge Test is performed

One effective test method is the 10-Cycle inoculation-incubation procedure. We'll be glad to run the procedure on your formulation to help you evaluate DOWICIL 200. The following summary will familiarize you with the test method.

- 1) Samples are tested for sterility.
- 2) Each sample is inoculated with a 24-hour culture of mixed bacteria, followed by an incubation period lasting 24 hours. The samples are then streaked on nutrient agar. Both the samples and the agar plates are incubated for 48 hours, after which the plates are read for growth.
- 3) After 24 hours between test cycles, step 2 is repeated for a total of ten inoculation-incubation cycles. The preservative is considered to provide adequate in-use antimicrobial activity only if no microbial contamination occurs during the ten test cycles.

This basic test procedure can also be performed with additional samples, using yeast or mold for inoculation, with appropriate changes in culture media, number of inoculations, temperature, and incubation time.

Advantages of the 10-Cycle Test procedure
The 10-Cycle Test method provides you with two fundamental benefits.

First, it's a repeated inoculation study involving a large number of insults. So it's a good simulation of the type of repeated exposure your formulation may be subjected to during manufacturing, shipping and consumer use.

Second, the Dow test is designed to reveal the level of preservative required to protect a specific formulation. That eliminates much of the guesswork from cost analysis and compatibility studies.

Put Us TO THE TEST

Put unique Dow services and expertise to work in your formulation

Free formulation testing and additional lab services

Challenge testing of your formulation is a primary service offered free of charge by The Dow Chemical Company. We'll be glad to test the effectiveness of DOWICIL 200 in your formulation with our 10-Cycle Challenge Test.

We'll test your formulation with the levels of preservative you select. The results you'll get will tell you whether the levels you've chosen will adequately protect your formulation.

The information you obtain from Dow testing can be quite valuable, regardless of the size or sophistication of your operation. Our tests provide useful data that can dovetail with the results of separate tests. Getting started is as easy as picking up your phone and contacting your nearby Dow representative.

Dow knows cosmetic ingredients

When you work with Dow, you'll also enjoy the benefits of working with a major supplier of many other cosmetic and personal care product ingredients.

Ingredient materials produced by Dow include solvents, stabilizers, texturizing agents, aromatics, bases for creams and pastes, humectants, emollients, neutralizers, oxidizers, and thickening agents.

So if you have a question about the properties of a basic formulation ingredient, it's more than likely Dow can help.

Dow makes antimicrobials for more than just cosmetics

Our ability to provide formulators with technical assistance is also based on a comprehensive understanding of antimicrobials well beyond cosmetics.

Dow also manufactures antimicrobials for adhesives, paints, metalworking fluids, pulp and paper products, latex, waxes, cooling towers, disinfectants, cleaners, pet care products, and textiles, to name a few. You might be surprised to learn how many basic ingredients these water-based products have in common with cosmetics.

In addition, we produce low-persistence biocides for use in enhanced oil recovery systems and many types of circulating water systems.

These applications probably don't relate directly to your specific situation, but they do speak for a pool of experience and diversity that's unique among suppliers of cosmetic preservatives.

Formulating with DOWICIL 200 Preservative

Here are some general guidelines for adding DOWICIL 200 Preservative to your formulations. Contact your Dow representative for assistance with specific formulations.

Preparing a Solution

A concentrated aqueous solution of DOWICIL 200 can be prepared by slowly adding the appropriate amount of powdered preservative to water in a 1:1 or 1:2 ratio, at a temperature below 45°C, and agitating until completely dissolved.

Adding DOWICIL 200 to Aqueous Formulations

The cosmetics formulator enjoys flexibility when adding DOWICIL 200 in products. Dow laboratory studies have shown that DOWICIL 200 can be incorporated into formulations by different methods — all resulting in equal preservative effectiveness.

- DOWICIL 200 may be added either as a free-flowing powder or as a water concentrate to the final product. It's preferable to add DOWICIL 200 during the cooling phase, when formulation temperatures are below 50°C. If you must add the preservative to formulations at temperatures above 50°C, consult your Dow representative for assistance.

- It is often more convenient to add the antimicrobial to the water phase immediately before mixing it with the oil phase during the formulating process.

In any case, to obtain the maximum benefit of DOWICIL 200, the preservative should be added after any processing steps requiring prolonged elevated temperature (>50°C).

Adding DOWICIL 200 to Anhydrous Formulations

DOWICIL 200 is an ideal preservative for use in anhydrous formulations, as well. Its exceptionally high water solubility gives DOWICIL 200 the ability to eliminate the microbial contamination that may be present if small amounts of moisture are introduced into the product during use. Products such as mascaras, eye shadows, eyeliners, and pressed powders, for example, can be effectively preserved against repeated user contamination by grinding DOWICIL 200 into the color powder mix.

Although DOWICIL 200 has been incorporated into anhydrous formulations at temperatures exceeding 80°C without exhibiting loss of antimicrobial activity, formulators are urged to limit any exposure to elevated temperatures, and to consult with a Dow representative if desired.

pH

Fresh aqueous solutions of DOWICIL 200 have a pH of 4.5 to 5.5. Solution pH will subsequently shift. After several hours, an equilibrium pH of 6.5 to 7.5 will be obtained.

These solutions, or products containing DOWICIL 200, can be pH-adjusted with organic acids or bases. A variety of buffer systems may also be used. Avoid the use of strong acids or bases (e.g., concentrated HCl or NaOH), since DOWICIL 200 generally becomes unstable below a pH of 4 and above a pH of 10.

Some formulations and/or ingredients may be sensitive to changes in pH. The potential for undesirable effects can be minimized by preparing stock solutions containing DOWICIL 200 and allowing them to equilibrate prior to use.

Table 3 - Suggested Starting Points: Concentrations of DOWICIL 200 Preservative in Selected Products Types*

Product Type*	Concentration of DOWICIL 200 Preservative
Creams and lotions	.05-.20
Shampoos	.05-.30
Pressed powders	.05-.10
Mascara	.05-.20
Suncare products	.05-.15
Staving products	.05-.15
Raw materials	.05-.30

*Preservative concentration ranges are based on data available at time of publication, and are presented as suggested starting points only. The most effective level of DOWICIL 200 in a particular formulation should be determined through the use of appropriate test procedures.

Discoloration

Some formulations containing DOWICIL 200 will demonstrate a slight to pronounced yellow discoloration. This occasional problem has been linked to a combination of DOWICIL 200 and fragrances that incorporate citral.

Interestingly, the yellowing phenomenon apparently occurs in only a few systems containing this combination.

The advantages of using DOWICIL 200 need not necessarily be ruled out: if yellowing occurs. In the event of incompatibility, the presence of citral in the fragrances should be evaluated. It is important for formulators to be aware of the phenomenon and to make appropriate tests for compatibility.

In addition, corrective measures may often solve compatibility problems even if citral is present.

In many instances, small quantities of sodium borate or sodium sulfite have been effective in preventing this discoloration. However, avoid using strong oxidizing or reducing agents, since these additives may adversely affect the antimicrobial performance of DOWICIL 200.

The propensity for DOWICIL 200 to discolor in any particular formulation can be determined simply by storing the formulation at 45 to 50°C for 48 hours. Discoloration should not be a factor if none occurs during that time.

Shelf Life of Concentrated Solutions

The antimicrobial activity of concentrated solutions of DOWICIL 200 gradually diminishes over time. For optimal preservative performance, do not store stock solutions longer than two weeks.

Shelf Life in Formulations

At the dilute levels (typically 0.02 to 0.2%) used in finished formulations, DOWICIL 200 Preservative remains highly effective for two or more years.

Using DOWICIL 200 in Combination with Other Antimicrobials

Challenge test results show that cost-effective concentrations of DOWICIL 200 provide excellent antimicrobial activity against even the most stubborn organisms. Combinations with methyl, propyl, and/or ethyl parabens at levels of 0.2 to 0.3% total parabens are sometimes used. Incorporation of EDTA at 0.05 to 0.1% may be useful in some cases as well.

The face formulation challenge testing service available from Dow can help you determine the most cost-effective level of DOWICIL 200 Preservative for achieving broad-spectrum antimicrobial performance in your specific system.

Packaging Considerations for Products Containing DOWICIL 200

No incompatibility problems are known to exist between DOWICIL 200 and commonly used packaging materials. However, to ensure that products formulated with DOWICIL 200 maintain maximum antimicrobial activity during subsequent storage and use, packaging material should be treated as a formulation ingredient for the purposes of compatibility testing.

Lab samples of DOWICIL 200

DOWICIL 200 Preservative is hygroscopic, and the small lab samples supplied to formulators may, as a result, begin to discolor and become cakey after a few months. To avoid this, we suggest replacing lab samples of DOWICIL 200 every six months. Please contact your Dow representative to order replacement samples.

Comprehensive Testing Shows a Favorable Toxicologic Profile

Extensive animal as well as human studies have provided a comprehensive base of safety substantiation data on DOWICIL 200 Preservative. The results of these studies point to the conclusion that DOWICIL 200 has a favorable toxicologic profile. The material should present no serious handling, utilization or waste disposal problems when handled in accordance with the material safety data sheet and label instructions.

This section provides summary toxicologic information obtained from on-going Dow studies. Further information is available through your local Dow representative.

Eye

DOWICIL 200 Preservative, undiluted, is no more than slightly irritating to the eye. Direct contact with the eye may result in some discomfort and slight transient conjunctival irritation, which would be expected to subside promptly.

Ingestion

The single dose oral toxicity of DOWICIL 200 is low in all animal species tested, with the exception of rabbits. LD₅₀ values were found to be as follows: male and female rats, 940-2664 mg/kg; mice, 1310 mg/kg; male guinea pigs, 710 mg/kg; male chicks, 2800 mg/kg; female rabbits, 78 mg/kg.

Skin

As a dry powder or in solution (10%), DOWICIL 200 Preservative is, at most, slightly irritating to the skin. Stronger solutions and the powdered concentrate, moist and confined to the skin, can cause moderate skin irritation and possibly a burn.

As a dry powder, DOWICIL 200 is not absorbed through the skin in acutely toxic amounts. The material may be absorbed through the skin in harmful amounts if in strong solution or if the skin is irritated or abraded.

A study in pregnant rats showed no maternal or fetal toxicity nor any birth defects resulting from dermal application of DOWICIL 200 in a 50% aqueous solution at dose levels of 250 or 500 mg/kg/day.

Human skin studies

DOWICIL 200 was tested in human studies for skin irritation, skin fatiguing, sensitization and photosensitization properties. These tests were conducted with aqueous solutions of the preservative and with freshly made and aged prototype cosmetic formulations at

use concentrations up to 0.75%. It was concluded that DOWICIL 200 Preservative is not a primary irritant, fatiguing agent, skin sensitizer or photosensitizer at concentrations up to 1%. Higher concentrations may be weak skin sensitizers in susceptible individuals.

NOTE: The toxicologic characteristics of DOWICIL 200 Preservative are a prime focus of continuing Dow studies. Information in addition to the summaries in this bulletin is available from your Dow representative.

These data substantiate the relative safety of DOWICIL 200 in cosmetic and personal care products. However, we do not have knowledge of, or control over, customers' formulations or end products. Responsibility for adequate testing to establish safety of final products must be assumed by the cosmetics formulator.

Discuss your needs and interests for further information with your Dow representative. Be certain to request the latest current MSD sheet prior to handling or using DOWICIL 200.