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
DOWFLAKE® 77-80% Calcium Chloride (50 LB Bag)

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

Customer Information Number: 800-258-2436

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 989-636-4400

2. Hazards Identification

Emergency Overview
Color: White
Physical State: Flakes
Odor: Odorless

Hazard of product:
WARNING! Causes eye irritation. May cause skin irritation. May be harmful if swallowed.

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: For dust: May cause severe eye irritation. May cause corneal injury. Effects may be slow to heal.
Skin Contact: Brief contact is essentially nonirritating to skin. Prolonged contact may cause skin irritation, even a burn. Not classified as corrosive to the skin according to DOT guidelines. May cause more severe response if skin is damp. May cause more severe response if skin is abraded (scratched or cut). May cause more severe response on covered skin (under clothing, gloves).

* Indicates a Trademark
Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Inhalation: Dust may cause irritation to upper respiratory tract (nose and throat). Vapors are unlikely due to physical properties.

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. Swallowing may result in gastrointestinal irritation or ulceration.

Effects of Repeated Exposure: The data presented are for the following material: Potassium chloride. In animals, effects have been reported on the following organs after ingestion:
- Gastrointestinal tract
- Heart
- Kidney

Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use.

### 3. Composition Information

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium chloride</td>
<td>10043-52-4</td>
<td>&gt; 77.0 %</td>
</tr>
<tr>
<td>Potassium chloride</td>
<td>7447-40-7</td>
<td>2.5 %</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>7647-14-5</td>
<td>1.5 %</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>&lt; 19.0 %</td>
</tr>
</tbody>
</table>

### 4. First-aid measures

Eye Contact: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist.

Skin Contact: Wash skin with plenty of water.

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

Ingestion: Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth to an unconscious person.

Notes to Physician: Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/oesophageal control if lavage is done. If burn is present, treat as any thermal burn, after decontamination. 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: This material does not burn. If exposed to fire from another source, use suitable extinguishing agent for that fire.

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. This material does not burn. Fight fire for other material that is burning. Water should be applied in large quantities as fine spray.

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). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

Unusual Fire and Explosion Hazards: Heat is generated when product mixes with water.

Hazardous Combustion Products: Not applicable.
6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Small and large spills: Contain spilled material if possible. Collect in suitable and properly labeled containers. Flush residue with plenty of water. See Section 13, Disposal Considerations, for additional information.

Personal Precautions: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Refer to Section 7, Handling, for additional precautionary measures.

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. Handling and Storage

Handling

General Handling: Heat developed during diluting or dissolving is very high. Use cool water when diluting or dissolving (temperature less than 80°F, 27°C). Avoid contact with eyes, skin, and clothing. Do not swallow. Wash thoroughly after handling. Keep container closed. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Storage

Store in a dry place. Protect from atmospheric moisture.

8. Exposure Controls / Personal Protection

Exposure Limits

<table>
<thead>
<tr>
<th>Component</th>
<th>List</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium chloride</td>
<td>Dow IHG</td>
<td>TWA</td>
<td>10 mg/m3</td>
</tr>
</tbody>
</table>

Personal Protection

Eye/Face Protection: Use safety glasses. For dusty operations or when handling solutions of the material, wear chemical goggles.

Skin Protection: Wear clean, body-covering clothing.

Hand Protection: Use gloves chemically resistant to this material. If hands are cut or scratched, use gloves chemically resistant to this material even for brief exposures. 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. When respiratory protection is required for certain operations, use an approved air-purifying respirator. 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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Flakes</td>
</tr>
<tr>
<td>Color</td>
<td>White</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Flash Point - Closed Cup</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammable Limits In Air</td>
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<tr>
<td></td>
<td>Upper: Not applicable</td>
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<tr>
<td>Autoignition Temperature</td>
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<tr>
<td>Vapor Pressure</td>
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<tr>
<td>Boiling Point (760 mmHg)</td>
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<tr>
<td>Vapor Density (air = 1)</td>
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<tr>
<td>Specific Gravity (H2O = 1)</td>
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<tr>
<td>Bulk Density</td>
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<tr>
<td>Freezing Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting Point</td>
<td>174 °C (345 °F) Literature (Approx.)</td>
</tr>
<tr>
<td>Solubility in Water (by weight)</td>
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</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Kinematic Viscosity</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

### 10. Stability and Reactivity

**Stability/Instability**

Stable. Hygroscopic.

**Conditions to Avoid:** None known. Avoid moisture.

**Incompatible Materials:** Heat is generated when mixed with water. Spattering and boiling can occur. Avoid contact with: Sulfuric acid. Corrosive when wet. Flammable hydrogen may be generated from contact with metals such as: Zinc. Sodium.

**Hazardous Polymerization**

Will not occur.

**Thermal Decomposition**

Does not decompose.

### 11. Toxicological Information

**Acute Toxicity**

**Ingestion**

For the major component(s): LD50, Rat 900 - 2,100 mg/kg

**Skin Absorption**

For the major component(s): LD50, Rabbit > 5,000 mg/kg

**Repeated Dose Toxicity**

The data presented are for the following material: Potassium chloride. In animals, effects have been reported on the following organs after ingestion: Gastrointestinal tract. Heart. Kidney. Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use.

**Developmental Toxicity**

For the major component(s): Did not cause birth defects or any other fetal effects in laboratory animals.

**Genetic Toxicology**
The data presented are for the following material: Calcium chloride or CaCl₂. In vitro genetic toxicity studies were negative. The data presented are for the following material: Potassium chloride. In vitro genetic toxicity studies were positive. However, the relevance of this to humans is unknown.

## 12. Ecological Information

### CHEMICAL FATE

**Data for Component: Calcium chloride**

**Movement & Partitioning**

No bioconcentration is expected because of the relatively high water solubility. Partitioning from water to n-octanol is not applicable.

**Persistence and Degradability**

Biodegradation is not applicable.

**Data for Component: Potassium chloride**

**Movement & Partitioning**

Partitioning from water to n-octanol is not applicable.

**Persistence and Degradability**

Biodegradation is not applicable.

**Data for Component: Sodium chloride**

**Movement & Partitioning**

No bioconcentration is expected because of the relatively high water solubility. Potential for mobility in soil is very high (Koc between 0 and 50). Partitioning from water to n-octanol is not applicable.

**Persistence and Degradability**

Biodegradation is not applicable.

### ECOTOXICITY

**Data for Component: Calcium chloride**

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): 8,350 - 10,650 mg/l

- **Aquatic Invertebrate Acute Toxicity**
  - LC50, water flea Daphnia magna: 759 - 3,005 mg/l

- **Toxicity to Micro-organisms**
  - EC50; activated sludge, respiration inhibition: > 1,000 mg/l

**Data for Component: Potassium chloride**

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, rainbow trout (Oncorhyncus mykiss), 96 h: 4,236 mg/l

- **Aquatic Invertebrate Acute Toxicity**
  - EC50, water flea Daphnia magna, 24 h, immobilization: 590 mg/l

**Data for Component: Sodium chloride**

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**
13. Disposal Considerations

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: Reclaimer. Landfill. Waste water treatment system. 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 1-800-258-2496 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details.

14. Transport Information

| DOT Non-Bulk | NOT REGULATED |
| DOT Bulk    | NOT REGULATED |
| IMDG        | NOT REGULATED |
| ICAO/IATA   | NOT REGULATED |

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: No
Fire Hazard: No
Reactive Hazard: No
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
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 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:
To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

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.

US. Toxic Substances Control Act
All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

16. Other Information

Recommended Uses and Restrictions
Snow and ice melting. Dust Control For industrial use.

Revision
Identification Number: 50106 / 1001 / Issue Date 11/04/2005 / Version: 2.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend
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<tbody>
<tr>
<td>W/W</td>
<td>Weight/Weight</td>
</tr>
<tr>
<td>OEL</td>
<td>Occupational Exposure Limit</td>
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<tr>
<td>STEL</td>
<td>Short Term Exposure Limit</td>
</tr>
<tr>
<td>TWA</td>
<td>Time Weighted Average</td>
</tr>
<tr>
<td>ACGIH</td>
<td>American Conference of Governmental Industrial Hygienists, Inc.</td>
</tr>
<tr>
<td>DOW IHG</td>
<td>Dow Industrial Hygiene Guideline</td>
</tr>
<tr>
<td>WEEL</td>
<td>Workplace Environmental Exposure Level</td>
</tr>
<tr>
<td>HAZDES</td>
<td>Hazard Designation</td>
</tr>
</tbody>
</table>

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 its 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
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