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
DOWTHERM* Q HEAT TRANSFER FLUID

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

Customer Information Number: 800-258-2436

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

2. Hazards Identification

Emergency Overview
Color: Colorless to yellow
Physical State: Liquid.
Odor: Aromatic

Hazard of product:

WARNING! May cause allergic skin reaction. May cause eye irritation. May cause skin irritation. Aspiration hazard. Can enter lungs and cause damage. Isolate area. 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 eye irritation. Corneal injury is unlikely.
Skin Contact: Brief contact may cause moderate skin irritation with local redness. Repeated contact may cause skin burns. Symptoms may include pain, severe local redness, swelling, and tissue damage.
Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts. 
Skin Sensitization: Has demonstrated the potential for contact allergy in mice. 
Inhalation: Prolonged exposure is not expected to cause adverse effects. 
Ingestion: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. 
Aspiration hazard: Aspiration into the lungs may occur during ingestion or vomiting, causing lung damage or even death due to chemical pneumonia. 
Birth Defects/Developmental Effects: Has caused birth defects in laboratory animals only at doses toxic to the mother. Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

3. Composition Information

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene, ethylenated, by-products from</td>
<td>68608-82-2</td>
<td>&gt; 99.0 %</td>
</tr>
</tbody>
</table>

4. First-aid measures

Description of first aid measures

General advice: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment. 
Inhalation: Move person to fresh air; if effects occur, consult a physician. 
Skin Contact: Wash skin with plenty of water. Suitable emergency safety shower facility should be available in work area. 
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. 
Ingestion: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

Most important symptoms and effects, both acute and delayed
Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

Indication of immediate medical attention and special treatment needed
If burn is present, treat as any thermal burn, after decontamination. The decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. 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

Suitable extinguishing media
Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. General purpose synthetic foams (including AFFF type) or protein foams are preferred if available. Alcohol resistant foams (ATC type) may function. 
Extinguishing Media to Avoid: Do not use direct water stream. May spread fire.

Special hazards arising from the substance or mixture
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: Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Liquid mist of this product can burn. Flammable concentrations of vapor can accumulate at temperatures above flash point; see Section 9. Dense smoke is produced when product burns.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Do not use direct water stream. May spread fire. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this (M)SDS.

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. If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. Accidental Release Measures

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

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

Methods and materials for containment and cleaning up: Contain spilled material if possible. Small spills: Absorb with materials such as: Non-combustible material. Collect in suitable and properly labeled containers. Large spills: Dike area to contain spill. Pump into suitable and properly labeled containers. Wash the spill site with water. See Section 13, Disposal Considerations, for additional information.

7. Handling and Storage

Handling

General Handling: Avoid contact with eyes, skin, and clothing. Do not swallow. Wash thoroughly after handling. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Other Precautions: Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Storage

Store in the following material(s): Store in tightly closed container. Do not store in: Opened or unlabeled containers. See Section 10 for more specific information. Additional storage and handling information on this product may be obtained by calling your sales or customer service contact.
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>Dowtherm Q</td>
<td>Dow IHG</td>
<td>TWA</td>
<td>4 ppm</td>
</tr>
<tr>
<td></td>
<td>AIHA WEEL</td>
<td>TWA</td>
<td>7.8 mg/m³</td>
</tr>
</tbody>
</table>

Personal Protection

Eye/Face Protection: Use safety glasses (with side shields).

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.

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Viton. Polyethylene. Polyvinyl chloride (“PVC” or “vinyl”). Styrene/butadiene rubber. Polyvinyl alcohol (“PVA”). Ethyl vinyl alcohol laminate (“EVAL”). Examples of acceptable glove barrier materials include: Butyl rubber. Neoprene. Chlorinated polyethylene. 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: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions no respiratory protection should be needed; however, if discomfort is experienced, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Ingestion: Avoid ingestion of even very small amounts; do not consume or store food or tobacco in the work area; wash hands and face before smoking or eating.

Engineering Controls

Ventilation: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations.

9. Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless to yellow</td>
</tr>
<tr>
<td>Odor</td>
<td>Aromatic</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No test data available</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not applicable to liquids</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>&lt; -40 °C (&lt; -40 °F) Literature</td>
</tr>
<tr>
<td>Boiling Point (760 mmHg)</td>
<td>267 °C (513 °F) Literature</td>
</tr>
<tr>
<td>Flash Point - Closed Cup</td>
<td>121 °C (250 °F) Setaflash Closed Cup ASTMD3278</td>
</tr>
<tr>
<td>Flash Point - Open Cup</td>
<td>Cleveland Open Cup ASTM D92 None</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1)</td>
<td>&lt;0.1 Estimated.</td>
</tr>
<tr>
<td>Flammable Limits In Air Lower</td>
<td>0.55 % (V) Literature</td>
</tr>
<tr>
<td></td>
<td>Upper: 5.5 % (V) Literature</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>0.002 mmHg @ 25 °C Literature</td>
</tr>
<tr>
<td>Vapor Density (air = 1)</td>
<td>6.5 Literature</td>
</tr>
<tr>
<td>Specific Gravity (H2O = 1)</td>
<td>0.97 20 °C/25 °C Literature</td>
</tr>
</tbody>
</table>
10. Stability and Reactivity

Reactivity
No dangerous reaction known under conditions of normal use.

Chemical stability
Thermally stable at typical use temperatures.

Possibility of hazardous reactions
Polymerization will not occur.

Conditions to Avoid: Exposure to elevated temperatures can cause product to decompose.

Incompatible Materials: Avoid contact with oxidizing materials.

Hazardous decomposition products
Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Benzene.

11. Toxicological Information

Acute Toxicity
Ingestion
LD50, rat, male and female > 5,000 mg/kg

Inhalation
No deaths occurred following exposure to a saturated atmosphere. LC50, 1 h, Vapor, rat > 1.6 mg/l

Eye damage/eye irritation
May cause slight eye irritation. Corneal injury is unlikely.

Skin corrosion/irritation
Brief contact may cause moderate skin irritation with local redness. Repeated contact may cause skin burns. Symptoms may include pain, severe local redness, swelling, and tissue damage.

Sensitization
Skin
Has demonstrated the potential for contact allergy in mice.

Respiratory
Relevant data not available.

Repeated Dose Toxicity
Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Chronic Toxicity and Carcinogenicity
Relevant data not available.

Developmental Toxicity
Has caused birth defects in laboratory animals only at doses toxic to the mother. Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

Reproductive Toxicity
In animal studies, did not interfere with reproduction. In animal studies, did not interfere with fertility.

**Genetic Toxicology**
In vitro genetic toxicity studies were negative.

### 12. Ecological Information

#### Toxicity

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).

**Aquatic Invertebrate Acute Toxicity**
EC50, Ceriodaphnia Dubia (water flea), static test, 48 h, immobilization: 0.17 mg/l

#### 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. Material is inherently biodegradable (reaches > 20% biodegradation in OECD test(s) for inherent biodegradability).

**OECD Biodegradation Tests:**

<table>
<thead>
<tr>
<th>Biodegradation</th>
<th>Exposure Time</th>
<th>Method</th>
<th>10 Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>40.6 %</td>
<td>29 d</td>
<td>OECD 301B Test</td>
<td>fail</td>
</tr>
</tbody>
</table>

**Theoretical Oxygen Demand:** 3.07 mg/mg

**Bioaccumulative potential**

- **Bioaccumulation:** Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
- **Partition coefficient, n-octanol/water (log Pow):** 4.08 - 6.01 OECD Guideline 117 (Partition Coefficient (n-octanol / water), HPLC Method)

**Mobility in soil**

- **Mobility in soil:** Expected to be relatively immobile in soil (Koc > 5000).
- **Partition coefficient, soil organic carbon/water (Koc):** > 5,000

### 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. AS YOUR SUPPLIER, WE HAVE 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: Recycler. Reclaimer. Incinerator or other thermal destruction device.

### 14. Transport Information

**DOT Non-Bulk**
NOT REGULATED
DOT Bulk
NOT REGULATED

IMDG
Proprietary Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical Name: Benzene, ethylenated, by-products from
Hazard Class: 9 ID Number: UN3082 Packing Group: PG III
EMS Number: F-A,S-F
Marine pollutant.: Yes

ICAO/IATA
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical Name: Benzene, ethylenated, by-products from
Hazard Class: 9 ID Number: UN3082 Packing Group: PG III
Cargo Packing Instruction: 964
Passenger Packing Instruction: 964
Additional Information

MARINE POLLUTANT

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

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

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Recommended Uses and Restrictions

Identified uses
Intended as a heat transfer fluid for closed-loop systems. For industrial use only. We recommend that you use this product in a manner consistent with the listed use. If your intended use is not consistent with the stated use, please contact your sales or technical service representative.

Revision
Identification Number: 50465 / 0000 / Issue Date 04/05/2012 / Version: 8.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

<table>
<thead>
<tr>
<th>N/A</th>
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<tbody>
<tr>
<td>W/W</td>
<td>Weight/Weight</td>
</tr>
<tr>
<td>OEL</td>
<td>Occupational Exposure Limit</td>
</tr>
<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>HAZ DES</td>
<td>Hazard Designation</td>
</tr>
<tr>
<td>Action Level</td>
<td>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.</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 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.