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: HTF Iron Inhibitor

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
Local Emergency Contact: 989-636-4400

2. Hazards Identification

Emergency Overview
Color: Colorless to yellow
Physical State: Liquid
Odor: Characteristic

Hazard of product:

WARNING! Harmful or fatal if swallowed. May cause eye irritation. May cause skin irritation. Isolate area.

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: Prolonged contact may cause skin irritation with local redness. Repeated exposure may cause irritation, even a burn. May cause more severe response if skin is abraded (scratched or cut).
Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts. Repeated skin exposure to large quantities may result in absorption of harmful amounts.

Inhalation: At room temperature, exposure to vapor is minimal due to low volatility; vapor from heated material or mist may cause respiratory irritation and other effects.

Ingestion: Oral toxicity is expected to be moderate in humans due to ethylene glycol even though tests with animals show a lower degree of toxicity. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause serious injury, even death. Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure. May cause nausea and vomiting. May cause abdominal discomfort or diarrhea.

Effects of Repeated Exposure: Repeated excessive exposure may cause irritation of the upper respiratory tract. For ethylene glycol: In humans, effects have been reported on the following organs: Central nervous system. Contains component(s) which have been reported to cause effects on the following organs in humans: Kidney. Liver.

Birth Defects/Developmental Effects: Based on animal studies, ingestion of very large amounts of ethylene glycol appears to be the major and possibly only route of exposure to produce birth defects. Exposures by inhalation or skin contact, the primary routes of occupational exposure, had minimal effect on the fetus, in animal studies.

Reproductive Effects: Ingestion of large amounts of ethylene glycol has been shown to interfere with reproduction in animals.

3. Composition Information

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene glycol</td>
<td>107-21-1</td>
<td>&lt; 10.0 %</td>
</tr>
<tr>
<td>Sodium tolyltriazole</td>
<td>64665-57-2</td>
<td>&lt; 1.0 %</td>
</tr>
<tr>
<td>Dipotassium hydrogen phosphate</td>
<td>7758-11-4</td>
<td>&gt; 40.0 %</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>&gt; 40.0 - &lt; 50.0 %</td>
</tr>
</tbody>
</table>

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 flush skin with water while removing contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Destroy contaminated leather items such as shoes, belts, and watchbands.

Inhalation: Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Ingestion: Do not induce vomiting. Seek medical attention immediately. If person is fully conscious give 1 cup or 8 ounces (240 ml) of water. If medical advice is delayed and if an adult has swallowed several ounces of chemical, then give 3-4 ounces (1/3-1/2 Cup) (90-120 ml) of hard liquor such as 80 proof whiskey. For children, give proportionally less liquor at a dose of 0.3 ounce (1 1/2 tsp.) (8 ml) liquor for each 10 pounds of body weight, or 2 ml per kg body weight [e.g., 1.2 ounce (2 1/3 tsp.) for a 40 pound child or 36 ml for an 18 kg child].

Notes to Physician: If several ounces (60 - 100 ml) of ethylene glycol have been ingested, early administration of ethanol may counter the toxic effects (metabolic acidosis, renal damage). Consider hemodialysis or peritoneal dialysis & thiamine 100 mg plus pyridoxine 50 mg intravenously every 6 hours. If ethanol is used, a therapeutically effective blood concentration in the range of 100 - 150 mg/dl may be achieved by a rapid loading dose followed by a continuous intravenous infusion.

Consult standard literature for details of treatment. 4-Methyl pyrazole (Antizol®) is an effective blocker of alcohol dehydrogenase and should be used in the treatment of ethylene glycol (EG), di- or triethylene glycol (DEG, TEG), ethylene glycol butyl ether (EGBE), or methanol intoxication if available. Fomepizole protocol (Brent, J. et al., New England Journal of Medicine, Feb. 8, 2001, 344:6, p. 424-9): loading dose 15 mg/kg intravenously, follow by bolus dose of 10 mg/kg every 12 hours; after 48 hours, increase bolus dose to 15 mg/kg every 12 hours. Continue fomepizole until serum methanol, EG,
DEG, TEG or EGBE are undetectable. The signs and symptoms of poisoning include anion gap metabolic acidosis, CNS depression, renal tubular injury, and possible late stage cranial nerve involvement. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. No specific antidote. Maintain adequate ventilation and oxygenation of the patient. In severe poisoning, respiratory support with mechanical ventilation and positive end expiratory pressure may be required. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. If burn is present, treat as any thermal burn, after decontamination. 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.

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: None known.

Hazardous Combustion Products: Not applicable.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Contain spilled material if possible. Small spills: Absorb with materials such as: Cat litter. Sawdust. Vermiculite. Zorb-all®. Collect in suitable and properly labeled containers. Large spills: Dike area to contain spill. Recover spilled material if possible. See Section 13, Disposal Considerations, for additional information.

Personal Precautions: 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.

7. Handling and Storage

Handling

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

Storage

Store in original unopened container.

8. Exposure Controls / Personal Protection

Exposure Limits
Personal Protection

Eye/Face Protection: Use safety glasses.

Skin Protection: When prolonged or frequently repeated contact could occur, use protective clothing chemically resistant to this material. Selection of specific items such as faceshield, boots, apron, or full-body suit will depend on the task.

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl"). Avoid gloves made of: Polyvinyl alcohol ("PVA"). 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. For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed, 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: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

9. Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Physical State</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Colorless to yellow</td>
</tr>
<tr>
<td>Odor</td>
<td>Characteristic</td>
</tr>
<tr>
<td>Flash Point - Closed Cup</td>
<td>108 °C (226 °F) Literature (boils @ 227degF with no flash)</td>
</tr>
<tr>
<td>Flammable Limits In Air</td>
<td>Lower: No test data available</td>
</tr>
<tr>
<td></td>
<td>Upper: No test data available</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>No test data available</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>0.1 mmHg @ 25 °C Literature</td>
</tr>
<tr>
<td>Boiling Point (760 mmHg)</td>
<td>108 °C (226 °F) Literature</td>
</tr>
<tr>
<td>Vapor Density (air = 1)</td>
<td>1 Literature</td>
</tr>
<tr>
<td>Specific Gravity (H2O = 1)</td>
<td>1.48 Literature</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>No test data available</td>
</tr>
<tr>
<td>Melting Point</td>
<td>No test data available</td>
</tr>
<tr>
<td>Solubility in Water (by weight)</td>
<td>Literature completely miscible with water</td>
</tr>
<tr>
<td>pH</td>
<td>No test data available</td>
</tr>
<tr>
<td>Kinematic Viscosity</td>
<td>12 mm2/s Calculated</td>
</tr>
</tbody>
</table>

10. Stability and Reactivity

Stability/Instability
Thermally stable at typical use temperatures.

Conditions to Avoid: Some components of this product can decompose at elevated temperatures.
Incompatible Materials: Avoid contact with: Oxidizers.

Hazardous Polymerization
Will not occur.

Thermal Decomposition
Decomposition products depend upon temperature, air supply and the presence of other materials.

11. Toxicological Information

Acute Toxicity
Ingestion
Single dose oral LD50 has not been determined.
For ethylene glycol: Lethal Dose, Human, adult 3 Ounces
For similar material(s): LD50, Rat > 3,980 mg/kg

Skin Absorption
The dermal LD50 has not been determined.

Repeated Dose Toxicity
Repeated excessive exposure may cause irritation of the upper respiratory tract. For ethylene glycol:
In humans, effects have been reported on the following organs: Central nervous system. Contains
component(s) which have been reported to cause effects on the following organs in humans: Kidney. Liver.

Chronic Toxicity and Carcinogenicity
Ethylene glycol did not cause cancer in long-term animal studies.

Developmental Toxicity
Based on animal studies, ingestion of very large amounts of ethylene glycol appears to be the major
and possibly only route of exposure to produce birth defects. Exposures by inhalation or skin contact,
the primary routes of occupational exposure, had minimal effect on the fetus, in animal studies.

Reproductive Toxicity
Ingestion of large amounts of ethylene glycol has been shown to interfere with reproduction in animals.

Genetic Toxicology
Contains a component(s) which was negative in In Vitro genetic toxicity studies. For ethylene glycol:
Animal genetic toxicity studies were negative.

12. Ecological Information

CHEMICAL FATE
Data for Component: Ethylene glycol

Movement & Partitioning
Bioconcentration potential is low (BCF < 100 or Log Pow < 3). Potential for mobility in soil is
very high (Koc between 0 and 50). Given its very low Henry's constant, volatilization from
natural bodies of water or moist soil is not expected to be an important fate process.

Henry's Law Constant (H): 8.05E-09 atm*m3/mole; 25 °C Estimated
Partition coefficient, n-octanol/water (log Pow): -1.36 Measured
Partition coefficient, soil organic carbon/water (Koc): 1 Estimated

Distribution in Environment: Mackay Level 1 Fugacity Model:

<table>
<thead>
<tr>
<th>Air</th>
<th>Biota</th>
<th>Soil</th>
<th>Sediment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>98 %</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Persistence and Degradability
Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is
ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent
biodegradability).

Indirect Photodegradation with OH Radicals
<table>
<thead>
<tr>
<th>Rate Constant</th>
<th>Atmospheric Half-life</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.32E-12 cm³/s</td>
<td>15 h</td>
<td>Estimated</td>
</tr>
</tbody>
</table>

**OECD Biodegradation Tests:**

<table>
<thead>
<tr>
<th>Biodegradation</th>
<th>Exposure Time</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 94 %</td>
<td>28 d</td>
<td>OECD 301F Test</td>
</tr>
<tr>
<td>90 %</td>
<td>1 d</td>
<td>OECD 302B Test</td>
</tr>
</tbody>
</table>

**Biological oxygen demand (BOD):**

<table>
<thead>
<tr>
<th>BOD 5</th>
<th>BOD 10</th>
<th>BOD 20</th>
<th>BOD 28</th>
</tr>
</thead>
<tbody>
<tr>
<td>60.5 %</td>
<td>82 %</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Chemical Oxygen Demand:** 1.19 mg/mg  
**Theoretical Oxygen Demand:** 1.29 mg/mg  

**Data for Component:** Dipotassium hydrogen phosphate  

**Movement & Partitioning**  
No bioconcentration is expected because of the relatively high water solubility.

**Persistence and Degradability**  
Biodegradation is not applicable.

**ECOTOXICITY**

**Data for Component:** Ethylene glycol  
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 (Oncorhynchus mykiss), static, 96 h: 18,000 - 46,000 mg/l  
**Aquatic Invertebrate Acute Toxicity**  
LC50, water flea Daphnia magna, static, 48 h: 46,300 - 51,100 mg/l  
**Aquatic Plant Toxicity**  
EC50, green alga Selenastrum capricornutum, biomass growth inhibition, 96 h: 9,500 - 13,000 mg/l  
**Toxicity to Micro-organisms**  
EC50, OECD 209 Test; activated sludge, respiration inhibition, 30 min: 225 mg/l  

**Data for Component:** Dipotassium hydrogen phosphate  
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, golden orfe (Leuciscus idus), static, 48 h: > 900 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: Recycler. Reclaimer. 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.
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  Yes
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
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.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene glycol</td>
<td>107-21-1</td>
<td>&lt; 10.0 %</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
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</table>

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

**Recommended Uses and Restrictions**
A heat transfer agent - Corrosion inhibitor. Dow recommends that you use this product in a manner consistent with the listed use. If your intended use is not consistent with Dow's stated use, please contact Dow's Customer Information Group.

**Revision**
Identification Number: 81661 / 1001 / Issue Date 10/25/2006 / Version: 2.1
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>
<th>Not available</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.*