MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.          Emergency Contact:
150 Allen Road Suite 302          CHEMTREC 1-800-424-9300
Basking Ridge, New Jersey 07920   Calls Originating Outside the US:
Information: 1-800-416-2505       703-527-3887 (Collect Calls Accepted)

SUBSTANCE: OCTAFLUOROTETRAHYDROFURAN

TRADE NAMES/SYNONYMS:
MTG MSDS 249; PERFLUOROTETRAHYDROFURAN; C4F8O; 00227392

CHEMICAL FAMILY: cyclic, halogenated, ethers


2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: OCTAFLUOROTETRAHYDROFURAN
CAS NUMBER: 773-14-8
PERCENTAGE: 100

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4):  HEALTH=2  FIRE=0  REACTIVITY=0

EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: compressed, liquefied gas
ODOR: odorless
MAJOR HEALTH HAZARDS: difficulty breathing
PHYSICAL HAZARDS: Containers may rupture or explode if exposed to heat.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: nausea, vomiting, irregular heartbeat, headache, drowsiness, fatigue, dizziness, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma
LONG TERM EXPOSURE: no information is available
4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

SKIN CONTACT: If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

EYE CONTACT: Contact with liquid: Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard. Containers may rupture or explode if exposed to heat.

EXISTING MEDIA: carbon dioxide, regular dry chemical

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile). Use extinguishing agents appropriate for surrounding fire. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Do not get water directly on material. Reduce vapors with water spray. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Consider downwind evacuation if material is leaking.
FLASH POINT: not flammable
LOWER FLAMMABLE LIMIT: not flammable
UPPER FLAMMABLE LIMIT: not flammable

HAZARDOUS COMBUSTION PRODUCTS:
Thermal decomposition or combustion products: oxides of carbon, hydrogen fluoride, perfluoroisobutylene

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Stop leak if possible without personal risk. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.

7. HANDLING AND STORAGE


8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
OCTAFLUOROTETRAHYDROFURAN:
No occupational exposure limits established.

VENTILATION: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: For the gas: Eye protection not required, but recommended. For the liquid: Wear splash resistant safety goggles. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing.

GLOVES: Wear insulated gloves.

PROTECTIVE MATERIAL TYPES: neoprene

RESPIRATOR: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.
**For Unknown Concentrations or Immediately Dangerous to Life or Health** -
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

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### 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PHYSICAL STATE:</strong></td>
<td>gas</td>
</tr>
<tr>
<td><strong>COLOR:</strong></td>
<td>colorless</td>
</tr>
<tr>
<td><strong>PHYSICAL FORM:</strong></td>
<td>compressed, liquefied gas</td>
</tr>
<tr>
<td><strong>ODOR:</strong></td>
<td>odorless</td>
</tr>
<tr>
<td><strong>MOLECULAR WEIGHT:</strong></td>
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<tr>
<td><strong>MOLECULAR FORMULA:</strong></td>
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</tr>
<tr>
<td><strong>BOILING POINT:</strong></td>
<td>31 F (-0.8 C)</td>
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<tr>
<td><strong>FREEZING POINT:</strong></td>
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</tr>
<tr>
<td><strong>VAPOR PRESSURE:</strong></td>
<td>29.5 psia @ 20 C</td>
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<tr>
<td><strong>VAPOR DENSITY:</strong></td>
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<tr>
<td><strong>SPECIFIC GRAVITY:</strong></td>
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</tr>
<tr>
<td><strong>DENSITY:</strong></td>
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<tr>
<td><strong>WATER SOLUBILITY:</strong></td>
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<tr>
<td><strong>PH:</strong></td>
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</tr>
<tr>
<td><strong>VOLATILITY:</strong></td>
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<tr>
<td><strong>ODOR THRESHOLD:</strong></td>
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<tr>
<td><strong>EVAPORATION RATE:</strong></td>
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</tr>
<tr>
<td><strong>VISCOSITY:</strong></td>
<td>0.1 cP</td>
</tr>
<tr>
<td><strong>COEFFICIENT OF WATER/OIL DISTRIBUTION:</strong></td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

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### 10. STABILITY AND REACTIVITY

**REACTIVITY:** Stable at normal temperatures and pressure.

**CONDITIONS TO AVOID:** Protect from physical damage and heat. Containers may rupture or explode if exposed to heat.

**INCOMPATIBILITIES:** oxidizing materials

**HAZARDOUS DECOMPOSITION:**
Thermal decomposition or combustion products: oxides of carbon, hydrogen fluoride, perfluoroisobutylene

**POLYMERIZATION:** Will not polymerize.
11. TOXICOLOGICAL INFORMATION

Not available

12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Compressed gas, n.o.s.
(OCTAFLUOROTETRAHYDROFURAN)
ID NUMBER: UN1956
HAZARD CLASS OR DIVISION: 2.2
LABELING REQUIREMENTS: 2.2

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Compressed gas, n.o.s. (OCTAFLUOROTETRAHYDROFURAN)
UN NUMBER: UN1956
CLASS: 2.2

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.


SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):
ACUTE: Yes
CHRONIC: No
FIRE: No
REACTIVE: No
SUDDEN RELEASE: Yes


STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

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