SECTION I - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: FM-200
Manufacturer: Great Lakes Chemical Corporation
Address: P.O. Box 2200
City: West Lafayette
State: Indiana
Zip: 47996-2200
Emergency Telephone Number: 1-800-949-5187
Information Telephone Number: 1-765-497-6100
Fax: 1-765-497-6123
Chemtrec Phone: 1-800-424-9300
Effective Date: 4/7/98
Supercede Date: 8/11/97
MSDS Prepared By: Regulatory Affairs Department/Great Lakes Chemical Corporation
Synonyms: 1,1,1,2,3,3,3-Heptafluoropropane, 2H-Heptafluoropropane
Product Use: Fire extinguishing, fire suppression, explosion suppression and inerting agent
Chemical Name: 1,1,1,2,3,3,3-Heptafluoropropane
Chemical Family: Halogenated alkane

Additional Information

No information available

SECTION II - COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>CAS No.</th>
<th>%</th>
<th>EXPOSURE LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,1,2,3,3,3-Heptafluoropropane</td>
<td>431890</td>
<td>&gt;99</td>
<td>Y (Hazardous)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (OSHA PEL TWA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (OSHA PEL STEL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (ACGIH TLV TWA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (ACGIH TLV STEL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not established (ACGIH TLV CEIL)</td>
</tr>
</tbody>
</table>

*Mixture. Indented chemicals components of mixture.

Additional Information

No information available
SECTION III - HAZARDS IDENTIFICATION

Emergency Overview: Colorless gas
Odorless
Direct eye or skin contact with the liquid or cold gas can cause chilling or possibly frostbite of exposed tissues.
May cause central nervous system effects.
Inhalation of high concentrations can be harmful or fatal due to oxygen deprivation and/or heart irregularities.

Relevant Routes of Exposure: Inhalation

Signs and Symptoms of Overexposure: Symptoms similar to oxygen deprivation (headache, nausea, dizziness or loss of consciousness) may result from overexposure by inhalation. Heart irregularities such as irregular pulse or heart palpitations may indicate cardiac sensitivity. Cold, white or discolored skin or in severe cases blistering, can be a sign of frostbite caused by cold liquids or gases.

Medical Conditions Generally Aggravated By Exposure: Persons with preexisting cardiac, respiratory, or central nervous system disorders may be more susceptible to effects of an overexposure. The use of epinephrine or similar compounds can increase susceptibility to heart irregularities caused by excessive exposure to these types of compounds.

Potential Health Effects: See Section XI for additional information.

Eyes: Direct eye contact with the liquid or cold gas can cause chilling or possibly frostbite of exposed tissues.

Skin: Direct skin contact with the liquid or cold gas can cause chilling or possibly frostbite of exposed tissues.

Ingestion: Not expected to be a hazard in normal industrial use.

Inhalation: Inhalation of high concentrations can be harmful or fatal due to oxygen deprivation and/or heart irregularities (arhythmias). Misuse of the product by deliberately inhaling high concentrations of this gas could cause death without warning.

Carcinogenicity: No

NTP: No
IARC: No
OSHA: No
ACGIH: No
OTHER: No

No information available

Additional Information

SECTION IV - FIRST AID MEASURES

Eyes: Flush with water. Get medical attention.

Skin: Flush with water; if frostbite occurs get medical attention.

Ingestion: No information available

Inhalation: Remove person to fresh air; if not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
SECTION IV - FIRST AID MEASURES

Antidotes: 
No information available

Notes to Physicians and/or Protection for First-Aiders: 
The use of epinephrine or similar compounds can increase susceptibility to heart irregularities caused by excessive exposure to these types of compounds.

Additional Information

No information available

SECTION V - FIRE FIGHTING MEASURES

Flammable Limits in Air (% by Volume): 
Not applicable

Flash Point: 
Nonflammable gas

Autoignition Temperature: 
Not available

Extinguishing Media: 
All conventional media are suitable.

Fire Fighting Instructions: 
Keep cylinders cool with a water spray applied from a safe distance. Use a self-contained breathing apparatus if containers rupture or release under fire conditions. Do not allow reentry into areas where this material has been released without first ventilating to remove products of combustion/decomposition.

Unusual Fire and Explosion Hazards: 
Although containers of our product are provided with pressure and temperature relief devices, containers can rupture if exposed to localized heat. Thermal decomposition will generate toxic and corrosive gases.

Flammability Classification: 
Nonflammable gas

Known or Anticipated Hazardous Products of Combustion: 
Decomposition by elevated temperatures (fire conditions, glowing metal surfaces) may generate hazardous decomposition products common to other CFCs, HCFCs or HBCFs. These can include hydrogen fluoride, carbon monoxide, carbon dioxide and others.

Additional Information

No information available

SECTION VI - ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: 
Evacuate the area and ventilate. Do not enter areas where high concentrations may exist (especially confined or poorly ventilated areas) without appropriate protective equipment including a self-contained breathing apparatus.

Personal Precautions: 
See Section VIII.

Environmental Precautions: 
No information available

Additional Information

No information available
SECTION VII - HANDLING AND STORAGE

Handling: Use the same type of precautions as would be used in handling any cryogenic gas. Protect container from damage. Handle in well-ventilated areas. When this material is used as a firefighting agent in fixed or portable extinguishing systems, follow manufacturer's instructions for operation, inspection, maintenance and repair of the system.

Storage: Store in a cool, dry, well-ventilated area away from incompatible materials. Keep container tightly closed.

Other Precautions: No information available

No information available

SECTION VIII - EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: No information available
Ventilation Requirements: Use local ventilation to minimize exposure to gas. Use mechanical ventilation for general area control.

Personal Protective Equipment:
Eye/Face Protection: Chemical splash goggles when handling liquid
Skin Protection: Use lined neoprene gloves if handling liquid. Clothing designed to minimize skin contact


Other Protective Clothing or Equipment: No information available

Exposure Guidelines: See Section II.
Work Hygienic Practices: Wash thoroughly after handling. Wash contaminated clothing before reuse. Make sure piping is empty before doing maintenance work.

No information available

SECTION IX - PHYSICAL & CHEMICAL PROPERTIES

Appearance: Colorless gas
Boiling Point: -184.4 degrees C (3 degrees F)
Bulk Density: Not available
Color: Colorless
Decomposition
**SECTION IX - PHYSICAL & CHEMICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not available</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>Not available</td>
</tr>
<tr>
<td>Heat Value</td>
<td>Not available</td>
</tr>
<tr>
<td>Melting Point</td>
<td>-131 degrees C (-204 degrees F)</td>
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<tr>
<td>Molecular/Chemical Formula</td>
<td>C3HF7</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>170</td>
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<tr>
<td>Octanol/Water Partition Coefficient</td>
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</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>Particle Size</td>
<td>Not available</td>
</tr>
<tr>
<td>Percent Volatile</td>
<td>Not available</td>
</tr>
<tr>
<td>pH Value</td>
<td>Not available</td>
</tr>
<tr>
<td>pH Concentration</td>
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</tr>
<tr>
<td>Physical State</td>
<td>Gas</td>
</tr>
<tr>
<td>Reactivity in Water</td>
<td>Not water reactive</td>
</tr>
<tr>
<td>Saturated Vapor Concentration</td>
<td>Not available</td>
</tr>
<tr>
<td>Softening Point</td>
<td>Not available</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>260 mg/L</td>
</tr>
<tr>
<td>Specific Gravity or Density (Water=1)</td>
<td>1.46</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>6.04</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>58.8 psia at 70 degrees F (21 degreesC)</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not available</td>
</tr>
<tr>
<td>Volatile Organic Compounds</td>
<td>Not available</td>
</tr>
<tr>
<td>Water/Oil Distribution</td>
<td>Not available</td>
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<tr>
<td>Coefficient</td>
<td>Not available</td>
</tr>
<tr>
<td>Weight Per Gallon</td>
<td>Not available</td>
</tr>
</tbody>
</table>

No information available

**SECTION X - STABILITY AND REACTIVITY**

**Stability:** Stable under normal conditions of handling and use.

**Conditions to Avoid:** None

**Incompatibility With Other Materials:** Powdered metals (ex. Al, Mg, or Zn) and strong alkalis, oxidizers or reducing agents are not compatible with this and most other halogenated organic compounds.

**Hazardous Decomposition Products:** Thermal decomposition may produce the following:
SECTION X - STABILITY AND REACTIVITY

Hazardous Polymerization: Will not occur

Conditions to Avoid: None

Additional Information

No information available

SECTION XI - TOXICOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>VALUE (LD50 or LC50)</th>
<th>ANIMAL</th>
<th>ROUTES</th>
<th>COMPONENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;788.696 ppm/4H</td>
<td>Rat</td>
<td>Acute Inhalation</td>
<td>1,1,1,2,3,3,3-Heptafluoropropane</td>
</tr>
</tbody>
</table>

Toxicological Information:
The human health hazards of this product are expected to be similar to other liquified gases including N2, CO2, CFCs, HCFCs, and HBFCs. Therefore, direct eye or skin contact with the liquid or cold gas can cause chilling or possibly frostbite of exposed tissues. Inhalation of high concentrations can be harmful or fatal due to oxygen deprivation and/or heart irregularities (arrhythmias). Misuse of the product by deliberately inhaling high concentrations of this gas could cause death without warning. Persons with preexisting cardiac or central nervous system disorders may be more susceptible to effects of an overexposure.

When tested with and without metabolic activation over a concentration range of 43.9-93.5%, heptafluoropropane was not mutagenic in S. typhimurium. Neither toxicity nor mutagenicity was observed in a mouse lymphoma assay when heptafluoropropane was tested at a concentration of 56.8%. Neither toxicity nor an increase in micronuclei was observed in mice exposed to 10.5% heptafluoropropane. Therefore, there is no evidence that heptafluoropropane is capable of inducing gene or chromosomal mutations in vitro or chromosomal effects in vivo. In other studies, heptafluoropropane did not show genotoxicity or cytotoxicity.

Animal studies have found the rat 4 hour LC50 to be >788.696 ppm (~80%), the highest level tested. A cardiac sensitization study in dogs found the NOAEL (No Observable Adverse Effect Level) to be 9.0%. The Lowest Observable Adverse Effect Level (LOAEL) for this study was reported to be 10.5%. A 90 day inhalation study did not find any exposure related effects at 105,000 ppm (10.5% vol./vol.), the highest level tested. Inhalation studies looking for developmental effects on pregnant rabbits and rats or their offspring did not show any exposure related effects at the highest concentrations tested (105,000 ppm).

Additional Information
## SECTION XII - ECOLOGICAL INFORMATION

Ecological Information: No information available  

Additional Information:

No information available

## SECTION XIII - DISPOSAL CONSIDERATIONS

Disposal Considerations: Non-contaminated product is reclaimable. Contact Great Lakes Chemical Corporation for information. Otherwise, dispose of waste in an approved chemical incinerator equipped with a scrubber as allowed by current Local, State/Province, Federal/Canadian laws and regulations.  

Additional Information:

No information available

## SECTION XIV - TRANSPORT INFORMATION

### U.S. DOT

<table>
<thead>
<tr>
<th>Proper Shipping Name</th>
<th>Hazard Class</th>
<th>ID Number</th>
<th>Packing Group</th>
<th>Labels</th>
<th>Special Provisions</th>
<th>Packaging Exceptions</th>
<th>Non-Bulk Packaging</th>
<th>Bulk Packaging</th>
<th>Air/Rail Limit</th>
<th>Air Cargo Limit</th>
<th>Vessel Stowage</th>
<th>Other Stowage</th>
<th>Reportable Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heptafluoropropane</td>
<td>2.2</td>
<td>UN3296</td>
<td>N/A</td>
<td>Nonflammable gas</td>
<td>N/A</td>
<td>306</td>
<td>304</td>
<td>314, 315</td>
<td>75 kg</td>
<td>150 kg</td>
<td>A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

### AIR - ICAO OR IATA

<table>
<thead>
<tr>
<th>Proper Shipping Name</th>
<th>Hazard Class</th>
<th>ID Number</th>
<th>Subsidiary Risk</th>
<th>Packing Group</th>
<th>Hazard Labels</th>
<th>Packing Instructions</th>
<th>Air Passenger Limit Per Package</th>
<th>Packing Instruction - Cargo</th>
<th>Air Cargo Limit Per Package</th>
<th>Special Provisions Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heptafluoropropane</td>
<td>2.2</td>
<td>UN3296</td>
<td>N/A</td>
<td>N/A</td>
<td>Nonflammable gas</td>
<td>200</td>
<td>75 kg</td>
<td>200</td>
<td>150 kg</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### WATER - IMDG
**SECTION XIV - TRANSPORT INFORMATION**

Proper Shipping Name: Heptaffluoropropene

Hazard Class: 2.2

ID Number: UN3296

Packing Group: N/A

Subsidary Risk: N/A

Medical First Aid Guide Code: 350

EmS No. 2-09

**Additional Information**

**SECTION XV - REGULATORY INFORMATION**

U.S. Federal Regulations: The components of this product are either on the TSCA Inventory or exempt (i.e. impurities, a polymer complying with the exemption rule at 40 CFR 723.250) from the Inventory.

State Regulations: None known

International Regulations: This material (or each component) is listed on the following inventories:

EU - EINECS

Canadian WHMIS Hazard Class and Division = A.

**SARA Hazards:**

Acute: Yes

Chronic: No

Reactive: No

Fire: No

Pressure: No

**Additional Information**

The above regulatory information represents only selected regulations and is not meant to be a complete list.

**SECTION XVI - OTHER INFORMATION**

**NFPA Codes:**

Health: 1

Flammability: 0

Reactivity: 0

Other: 0

**HMIS Codes:**

Health: 1

Flammability: 0

Reactivity: 0

Protection: X

**Label Statements:** Not available

**Other Information:** Abbreviations:

(L) = Loose bulk density in g/ml

LOEC = Lowest observed effect concentration
SECTION XVI - OTHER INFORMATION

MATC = Maximum acceptable toxicant concentration
NA = Not available
N/A = Not applicable
NL = Not limited
NOEC = No observed effect concentration
NOEL = No observable effect level
NR = Not rated
(P) = Packed bulk density in g/ml
PNOC = Particulates Not Otherwise Classified
PNOR = Particulates Not Otherwise Regulated
REL = Recommended exposure limit
TS = Trade secret

Additional Information

Information on this form is furnished solely for the purpose of compliance with OSHA's Hazard Communication Standard, 29CFR 1910.1200 and The Canadian Environmental Protection Act, Canada Gazette Part II, Vol. 122, No. 2 and shall not be used for any other purpose.

Revision Information:
Section XIV - IMDG Code Information
Section XV - Regulatory Information