Material Safety Data Sheet

HFC227ea / FM200

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SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : HFC227ea / FM200

Company : Zhejiang NOF Chemical Co.,Ltd.
New Youth Mansion,Wucheng Area,Jinhua City,Zhejiang,China

For more information call : 0086-579-82025658
(Monday-Friday, 9:00am-5:00pm)

In case of emergency call : **Medical: 0086-10-84340783 or 0086-10-84340782**
: **Transportation: 0086-10-84340783**
: (24 hours/day, 7 days/week)

SECTION 2. COMPOSITION

INGREDIENT NAME: 1,1,1,2,3,3,3-Heptafluoropropane
CAS No: 431890
Purity: ≥99.9%

EXPOSURE LIMITS:

Y (Hazardous)
Not established
Not established
Not established
Not established
Not established
Not established

SECTION 3: HAZARDS IDENTIFICATION

Emergency
Colorless
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:

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 11 for additional

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 depriva -tion and/or heart irregularities (arrhythmias).Misuse of the product by deliberat -ely inhaling high concentrations of this gas could cause death without warning.

Carcinogenicity:

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

SECTION 4 .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.

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.

SECTION 5. 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 HBFCs. These can include hydrogen fluoride, carbon monoxide, carbon dioxide and others.

SECTION 6.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 8
Environmental Precautions:	No information available

SECTION 7. 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 syste -ms,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

SECTION 8. EXPOSURE CONTROLS/PERSONAL

PROTECTION

Engineering Controls:	No information available
Ventilation Requirements:	Use local ventilation to minimize exposure to gas.Use mecha -nical 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 2.
Work Hygienic Practices:	Wash thoroughly after handling.Wash contaminated clothing before reuse.Make sure piping is empty before doing maintenance work.

SECTION 9. STABILITY AND REACTIVITY

Stability:	Stable under normal conditions of handling and use.
ncompatibility With Other Materials:	Powdered metals (ex. Al, Mg, or Zn) and strong alkalis,oxidi -zers or reducing agents are not compatible with this and most other halogenated organic compounds.

Hazardous Decomposition Products:

Thermal decomposition may produce the following:
Hydrogen fluoride
Carbon monoxide and carbon dioxide

Hazardous Polymerization:	Will not occur

SECTION 10. PHYSICAL & CHEMICAL PROPERTIES

Molecular/Chemical Formula:	C3HF7 (CF3CHFCF3)
Molecular Weight:	170.03
Appearance:	Colorless gas
Boiling Point:	-16.4 ℃
Melting Point:	-131 ℃
Color:	Colorless
Odor:	Odorless
Decomposition Temperature:	Not available
Evaporation Rate:	Not available
Critical Temperature:	101.8 ℃
Critical Pressure:	422 psia
Critical Density:	0.582 kg/l
Reactivity in Water:	Not water reactive
Saturated Vapor Concentration:	Not available
Solubility in Water:	260 mg/L
Specific Gravity or Density (Water=1):	1.46
Vapor Density(Air=1):	6.04
Vapor Pressure:	58.8 psia at 21 ℃
Viscosity of Liquid:	0.443 lb/ft hr at 25 ℃

SECTION 11 .TOXICOLOGICAL INFORMATION

VALUE (LD50 or LC50)	>788,696 ppm/4H (Rat) (Acute Inhalation)
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.Inha -lation 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%, heptafluoro -propane was not mutagenic in S. typhimurium.Neither toxicity nor mutagenicity was observed in a mouse lymphoma assay when heptafluoropropane was tested to 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 >788,696ppm (~80%), the highest level tested. A cardiac sensitization study in dogs found the No Observable Adverse Effect Level (NOAEL) 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).

SECTION 12. ECOLOGICAL INFORMATION

Ozone Depleting Potential:	0
Global Warming Potential:	0.6(compared to R11=1)
Atmospharic Lifetime:	about 40 years

SECTION 13. TRANSPORT INFORMATION

Proper Shipping Name:	Heptafluoropropane
Hazard Class:	2.2
ID Number:	UN3296
Packing Group:	N/A
Packing:	In returnable containers of 1000kg.Bulk quantities are shipped in ISO-tank-containers(up to19t).

Labels: Nonflammable gas
Special Provisions: N/A

SECTION 14.OTHER INFORMATION

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

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Prepared by Zhejiang NOF Chemical Co.,Ltd.