

Miragas Co., Ltd.

SDS preparation date: 2016-5-15

SDS revision date: 2021-7-26

Section 1. Product and Company Identification

Chemical Name: Hexafluoroethane (R116)

CAS No.: 76-16-4

Molecular formula: C₂F₆

Molecular weight: 138.01

Supplier Name: Miragas Co. Ltd.

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Section 2. Hazards Identification

HAZARD CLASS: 2.2

GHS label elements:

Hazard pictograms:



Signal word: Warning

Hazard Statement(s):

H280: Contains gas under pressure; may explode if heated.

Route of invasion: respiratory tract

Health hazards: This product can cause rapid asphyxia. Headache, nausea and dizziness after exposure. Frostbite can be caused if the skin comes into contact with the liquid or vapor of the product.

Environmental hazard: none.

Fire and explosion hazard: this product is non combustible. Contact with evaporating liquid may cause frostbite or freezing of skin.

Section 3. Composition, Information on Ingredients

Substance/mixture: simple substance

Chemical name: Hexafluoroethane (Perfluoroethane)

Purity: $\geq 99.999\%$

CAS number: 76-16-4

Shelf life: 12 months

Section 4. First Aid Measures

Skin contact: Contact with evaporating liquid may cause frostbite or freezing of skin.

Eye contact: Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.

Inhalation: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Ingestion: Ingestion is not considered a potential route of exposure.

Section 5. Fire Fighting Measures

Hazardous characteristics: non combustible. In case of high heat, the internal pressure of the container will increase, and there is a risk of cracking and explosion.

Harmful combustion products: If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Carbonyl difluoride, Carbon monoxide, Hydrogen fluoride

Fire extinguishing method: This product is non combustible. Firefighters must wear filter gas masks (full face masks) or isolation respirators, and wear full body fire and gas suits to extinguish the fire in the upwind direction. Cut off the air supply. Spray water to cool the container and move the container from the fire site to an open place if possible. Fire extinguishing agents: fog water, foam, carbon dioxide.

Section 6. Accidental Release Measures

Emergency treatment: Quickly evacuate the personnel in the leakage pollution area to the windward and isolate them. Warning signs are set around to strictly restrict access. It is recommended that emergency personnel wear self-contained positive pressure respirator and general work clothes. Cut off the source of leakage as much as possible. Reasonable ventilation to accelerate diffusion. Leaking containers shall be properly disposed of and reused after repair and inspection.

Environmental protection measures: fully recycle the waste gas and avoid discharging it into the air.

Storage and removal methods of leaked chemicals and disposal materials used: reasonable ventilation to accelerate diffusion.

Preventive measures to prevent secondary hazards: wear self-contained breathing equipment, turn off the air source, remove all possible fire sources, ventilate, and quickly evacuate irrelevant personnel. Install corresponding

gas leakage alarm device.

Section 7. Handling and Storage

Precautions for operation: Do not drag, roll, slide or put down the cylinder. Use a suitable trolley to move the cylinder. Do not try to grab the cylinder's helmet to lift it. Ensure that the gas cylinder is in a fixed state during the whole process of use. A pressure reducing regulator is used to safely release gas from the cylinder, and a check valve is used to prevent backflow. Use reasonably designed pipelines to ensure that they can withstand the required pressure. Do not heat any part of the cylinder with an open flame or other adjacent heat source. No part of the cylinder is allowed to exceed 52 °C. Once the cylinder is connected to the production line, the valve should be opened carefully and slowly. If the user has difficulty in operating the cylinder valve, stop using it and contact the supplier. Do not insert tools (such as wrench, screwdriver, etc.) into the cylinder safety helmet, otherwise the valve will be damaged and leakage will be caused. Use an adjustable wrench to open tight or rusty caps. All conveying systems and related equipment must be grounded. All electrical equipment must be spark proof or explosion-proof. It is compatible with all commonly used building materials. The pressure requirements shall be considered when selecting materials and designing systems. Special attention: the compressed gas shall be stored and operated according to the provisions of cgap-1 Manual of American Compressed Gas Association (ph.703-412-0900). Local may have special equipment for use and storage.

Storage precautions: store in a cool and ventilated warehouse. Keep away from fire and heat source. The storage temperature should not exceed 52 °C. It shall be stored separately from inflammables, oxidants, reducing agents and edible chemicals, and mixed storage shall not be allowed. The storage area shall be equipped with leakage emergency treatment equipment.

Section 8. Exposure Controls, Personal Protection

Occupational exposure limits: None of the components have assigned exposure limits.

Monitoring method: If necessary, oxygen indicators should be monitored within the scope of use. Local exhaust devices and surrounding ventilation systems must be available within the usable range.

Engineering control: Adequate ventilation and / or special evacuation shall be provided to prevent the accumulation of high concentration gas. The oxygen content in the working area shall be monitored to make it not less than 19.5%.

Respiratory protection: when the concentration in the air exceeds the standard, wear a self-priming filter gas mask (full mask). In case of emergency rescue or evacuation, it is recommended to wear positive pressure self-contained respirator.

Eye protection: safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.

Body protection: No special precautions.

Hand protection: Wear working gloves while handling containers

Guideline: EN 388 Protective gloves against mechanical risks.

Other protection: Wear safety shoes while handling containers

Guideline: ISO 20345 Personal protective equipment - Safety footwear.

Section 9. Physical and Chemical Properties

Main component: hexafluoroethane

Appearance and properties: Colorless, odorless and incombustible gas

Melting point(°C): -100.7

Boiling point(°C): -78.2

Relative density(water=1): 1.23

Relative vapor density(air=1): 4.8

Saturated vapor pressure(kPa): No data available

Heat of combustion(kJ/mol): No data available

Critical temperature(°C): 19.7

Critical pressure(kPa): 2.98

Logarithm of octanol / water partition coefficient: No data available

Flash point(°C): No data available

Ignition temperature(°C): No data available

Upper explosion limit %(V/V): No data available

Lower explosion limit %(V/V): No data available

Solubility: Insoluble in water, slightly soluble in alcohol

Other information: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

Section 10. Stability and Reactivity

Stability: stable under normal conditions.

Conditions to be avoided: high temperature, heat.

Hazardous reaction: no data

Hazardous decomposition substances: hydrogen halide, carbon monoxide, acyl halide, etc

Prohibited substances: strong oxidant

Section 11. Toxicological Information

Acute toxicity: no data available

Skin irritation or corrosion: none

Eye irritation or corrosion: none

Germ cell mutagenicity: none

Carcinogenicity: no data

Reproductive toxicity: no data

Specific target organ systemic toxicity: none

Toxicokinetic, metabolic and distribution information: no data

Inhalation hazard: none



Section 12. Ecological Information

Ecotoxicity: no data

Persistence and degradability: no data

Potential bioaccumulation: no data

Mobility: no data

Other harmful effects: The product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

Section 13. Disposal Considerations

Waste disposal method:

Product: Avoid discharges to atmosphere. Do not discharge into any place where its accumulation could be dangerous.

Unclean packaging: return contaminated containers to the supplier or dispose of them according to national and local regulations.

Precautions for disposal: refer to relevant national and local regulations before disposal.

Section 14. Transport Information

United Nations Hazardous Chemicals Code: 22034

UN Number: 2193

SHIPPING LABEL(s): Non combustible gas

DOT/IMO SHIPPING NAME: Hexafluoroethane

Packing category: 053

Packing method: steel cylinder; Ordinary wooden case outside ampoules.

Precautions for transportation: the railway transportation time limit of this product shall be transported by the tank truck provided by the pressure liquefied gas enterprise, which shall be reported to the relevant departments for approval before shipment. During railway transportation, the dangerous goods shall be loaded in strict accordance with the dangerous goods loading table in the dangerous goods transportation rules of the Ministry of railways.

When the steel cylinder is used for transportation, the safety helmet on the steel cylinder must be worn. The steel cylinder is generally placed horizontally, and the bottle mouth shall be in the same direction without crossing; The height shall not exceed the protective fence of the vehicle, and shall be firmly clamped with triangular wood cushion to prevent rolling. It is strictly prohibited to mix with combustibles or combustibles, oxidants, reducing agents, edible chemicals, etc. In summer, it shall be transported in the morning and evening to prevent sunlight exposure. During highway transportation, it is necessary to drive according to the specified route, and it is forbidden to stay in residential areas and densely populated areas. It is forbidden to slip away during railway transportation.

Section 15. Regulatory Information

Regulatory information:

Regulations on the safety management of hazardous chemicals (Order No. 591 of the State Council of the people's



Republic of China)

Supervision Regulation on safety technology of gas cylinder (TSG r0006-2014)

Contents and project sequence of technical instructions for chemical safety (GB / t16483-2008)

General technical conditions for transport packaging of dangerous goods (GB 12463-2009)

General rules for classification and hazard publicity of chemicals (GB 13690-2009)

Packaging marks for dangerous goods (GB 190-2009)

Classification and product name number of dangerous goods (GB 6944-2012)

List of dangerous goods (GB 12268-2012)

Catalogue of hazardous chemicals (2015 Edition)

Regulations on the administration of road transport of dangerous goods (2010)

General rules for storage of common hazardous chemicals (GB 15603-1995)

Safety code for classification, warning labels and warning instructions of chemicals gas under pressure GB 20580-2006

Section 16. Other Information

Modification Description: it shall be revised and updated every three years. In case of special and major changes, it shall be revised immediately.