Revised date 23.01.2024

MATERIAL SAFETY DATA SHEET
HFO 449A

CHEMICAL PRODUCT

Corporate MSDS Number	: TAB-005004
Gas	: HFO 449A (100%)
Chemical Formula	: CH_2F_2 + CHF_2CF_3 + $C_3H_2F_4$ + CH_2FCF_3
Chemical Name	: Difluoromethane + Pentafluoroethane + 2,3,3,3-tetrafluoro-1-propene + 1,1,1,2 tetrafluoroethane
Composition	: HFC 32 (24.3%) + HFC 125 (24.7%) + HFO 1234yf 25.3%) + HFC 134a (25.7%)
CAS#	: 75-10-5 + 354-33-6 + 754-12-1 + 811-97-2
UN#	: 3163
HS Code	: 382765
Hazard	: 2.2

COMPANY IDENTIFICATION

TABRIGAS Egypt
Port Said Free Zone area – Egypt
Sunday – Thursday (9:00 – 17:00)
00 202 2734 22 77 / 78 / 79
info@tabrigas.com
www.tabrigas.com

PRODUCT USE

Refrigerant

TRADE NAMES & SYNONYMS

R 449A
HFO 449A

HAZARDS IDENTIFICATION

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200
Classification of the	: GASES UNDER PRESSURE - Liquefied gas substance or mixture
GHS label elements	: Hazard pictograms

Signal word	: Warming
Hazard statements	: Contains gas under pressure; may explode if heated May cause frostbite. May displace oxygen and cause rapid suffocation Precautionary statements
General	: Read and follow all Safety Data Sheets (SDS'S) before use. Read the label before use. Keep out of reach of children. If medical advice is needed, have a product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position.
Prevention	: Not applicable.□
Response	: Not applicable.
Storage	: Protect from sunlight. Store in a well-ventilated place.
Disposal	: Not applicable
Hazards not otherwise	: Liquid can cause burns similar to frostbite.
Classified Substance/mixture	: Mixture

FIRST-AID MEASURES

Skin contact :

- Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
- Remove the victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt, or waistband.
- Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. In case of contact with liquid, warm frozen tissues slowly with lukewarm water and get medical attention. Do not rub the affected area. Wash clothing before reuse. Clean shoes.

Ingestion :

- Remove the victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if adverse health effects persist or are severe.
- Ingestion of liquid can cause burns similar to frostbite. If frostbite occurs, get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately.
- Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. As this product rapidly becomes a gas when released, refer to the inhalation section.
- Most important symptoms/effects,
    - acute and delayed Potential

- acute health effects

Eye contact : Liquid can cause burns similar to frostbite.
Inhalation : No known significant effects or critical hazards.
Skin contact : Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
Frostbite : Try to warm up the frozen tissues and seek medical attention.
Ingestion : Ingestion of liquid can cause burns similar to frostbite. Over-exposure signs/symptoms
Eye contact : Adverse symptoms may include the following: frostbite
Inhalation : No specific data.
Skin contact : Adverse symptoms may include the following: frostbite
Ingestion : Adverse symptoms may include the following: frostbite Indication of immediate medical attention and special treatment needed, if necessary
Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments : No specific treatment.
Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

FIRE FIGHTING MEASURES

Extinguishing media

Suitable extinguishing : Use an extinguishing agent suitable for the surrounding fire. Media
Unsuitable extinguishing : None known.
Specific hazards arising : Contains gas under pressure. In a fire or if heated, pressure from the chemical increase will occur and the container may burst or explode.

Hazardous thermal : Decomposition products may include the following materials: decomposition products - Carbon dioxide - Carbon monoxide - Halogenated compounds
Special protective actions : Promptly isolate the scene by removing all persons from the vicinity for firefighters of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact the supplier immediately for specialist advice. Move containers from the fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE, Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Ventilate areas, especially low or enclosed places where heavy vapors might collect. Remove open flames. Use a self-contained breathing apparatus (SCBA) if large spill or leak occurs.

HANDLING AND STORAGE

Handling (Personnel)

Use sufficient ventilation to keep employee exposure below recommended limits.

Handling (Physical Aspects)

HFC-134a should not be mixed with air for leak testing or used for any other purpose above atmospheric pressure. See Flammable Properties section. Contact with chlorine or other strong oxidizing agents should also be avoided.

Storage

Store in a clean, dry place. Do not heat above 52 ^{0}C (126 ^{0}F). Valve protection caps and valve cutlet threaded plugs must remain in place unless the container is secured with a valve outlet piped to the use point. Do NOT drag, slide, or roll cylinders. Use a suitable hand truck for cylinder movement.

Never attempt to lift the cylinder by its cap. Use a pressure-reducing regulator when connecting the cylinder to lower-pressure (>3000 PSIG) piping or systems. Do NOT heat the cylinder. Use a check valve or trap in the discharge line to prevent hazardous backflow into the cylinder.

Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Separate full containers from empty containers. Storage area temperatures should not exceed 125 ^{0}F (52 ^{0}C) and should be free of combustible materials. Avoid areas where salt or other corrosive materials are present. Avoid excessive inventory and storage time. Use a first-in first-out system. Keep accurate inventory records.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Normal ventilation for standard manufacturing procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low or enclosed places. Refrigerant concentration monitors may be necessary to determine vapor concentrations in work areas before use of torches or other open flames, or if employees are entering enclosed areas.

Personal Protective Equipment

Impervious gloves and chemical splash goggles should be used when handling liquid.
Under normal manufacturing conditions, no respiratory protection is required when using this product. A self-contained breathing apparatus (SCBA) is required if a large release occurs.

Exposure Guidelines

Exposure Limits

"SUVA"-134a	
PEL (OSHA)	: None Established
TLV (ACGIH)	: None Established
AEL * (DuPont)	: 1000 ppm, 8 & 12 Hr. TWA
WEEL (AIHA)	: 1000 ppm, 8 Hr. TWA

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Liquefied Gas
Color	: Colorless.
Odor	: Ether (slight)
PH	: No data available
Melting point/ Freezing point	: No data available
Initial boiling point	: -46 ^{0}C
Flash point	: Not applicable
Evaporation rate	: > 1 (CCl_4 = 1.0)
Flammability (Solid/gas)	: Will not burn :
Liquid Density	: 1.21 g/cm3 @ 25 C (77 F)
Specific Gravity	: 1.208 @ 77 F (25 C)
Vapor Pressure	: 12,748 hPa (25 °C)
Relative Vapor Density	: 3.07 (Air=1.0) @ 25 C (77 F)
Relative density	: 1.10 @ 25 C (77 F)
Solubility in Water	: Not data available
Decomposition Temperature	: Not data available

STABILITY AND REACTIVITY

Chemical Stability

Stable.

Conditions to Avoid

Avoid open flames and high temperatures.

Incompatibility with Other Materials

Incompatible with alkali or alkaline earth metals - powdered Al, Zn, Be, etc.

Decomposition

Decomposition products are hazardous. This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride. These materials are toxic and irritating. Contact should be avoided.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

T Animal Data

ETHANE, 1, 1, 1, 2-TETRAFLUORO

EYE:

A short-duration spray of vapor produced very slight eye irritation.

SKIN:

Animal testing indicates this material is a slight skin irritant, but not a skin sensitizer.

INHALATION:

4 hours, ALC, rat: 567,000 ppm.

Single exposure caused: Cardiac sensitization, a potentially fatal disturbance of heart rhythm associated with a heightened sensitivity to the action of epinephrine.

Lowest-Observed-Adverse-Effect-Level for cardiac sensitization: 75,000 ppm. Single exposure caused: Lethargy. Narcosis. Increased respiratory rates. These effects were temporary. Single exposure to near lethal doses caused: Pulmonary edema.

Repeated exposure caused: Increased adrenals, liver, spleen weight. Decreased uterine, prostate weight. Repeated dosing of higher concentrations caused: the following temporary effects - Tremors. In coordination.

CARCINOGENIC, DEVELOPMENTAL, REPRODUCTIVE, MUTAGENIC EFFECTS:

In a two-year inhalation study, HFC-134a, at a concentration of 50,000 ppm, produced an increase in late-occurring benign testicular tumors, testicular hyperplasia and testicular weight. The no-effect level for this study was 10,000 ppm. Animal data show slight fetotoxicity but only at exposure levels producing other toxic effects in the adult animal. Reproductive data on male mice show No change in reproductive performance. Tests have shown that this material does not cause genetic damage in bacterial or mammalian cell cultures or animals. In animal testing, this material has not caused permanent genetic damage in the reproductive cells of mammals (has not produced heritable genetic damage).

ECOLOGICAL INFORMATION

Eco toxicological Information

AQUATIC TOXICITY:

48-hour EC50 - Daphnia magna	: 980 mg/L.
96-hour LC50 - Rainbow trout	: 450 mg/L

DISPOSAL CONSIDERATIONS

Waste Disposal

Contaminated HFC-134a can be recovered by distillation or removed to a permitted waste disposal facility. Comply with Federal, State, and local regulations.

TRANSPORTATION INFORMATION

Shipping Information

DOT/IMO

Proper Shipping Name	: 1, 1, 1, 2-TETRAFLUOROETHANE
Hazard Class	: 2.2
UN No.	: 3159
DOT/IMO Label	: NONFLAMMABLE GAS

Shipping Containers

Tank Cars.
Tank Trucks.
Ton Tanks.
Cylinders.

Shipping Information – Canada

TDG

Proper Shipping Name	: 1, 1, 1, 2-TETRAFLUOROETHANE
TDG Class	: 2.2
UN #	: 3159

REGULATORY INFORMATION

U.S. Federal Regulations

TSCA Inventory Status: Reported/Included.

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute	: Yes
Chronic	: Yes
Fire	: No
Reactivity	: No
Pressure	: Yes

HAZARDOUS CHEMICAL LISTS

SARA Extremely Hazardous Substance	: No
CERCLA Hazardous Substance	: No
SARA Toxic Chemical	: No

Canadian Regulations

CEPA Status	: DSL: REPORTED/INCLUDED.
WHMIS Classification	: CLASS A Compressed Gas

This product has been classified under the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

OTHER INFORMATION

NFPA, NPCA-HMIS

NPCA-HMIS Rating

Health	: 1
Flammability	: 0
Reactivity	: 1

Personal Protection rating to be supplied by user depending on use conditions

Additional Information

MEDICAL USE: CAUTION: Do not use it in medical applications involving permanent implantation in the human body.

End of MSDS

(Version August 2024)


150th anniversary
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