Material Safety Data Sheet

1. Product and Company Identification 262

KLEA ® 407D

General Use: Refrigerant
Alternative names:
Blend of Difluoromethane/Pentafluoroethane/1,1,1,2-tetrafluoroethane; R32/R125/R134a; HFC 32/HFC 125/HFC 134a; HFA 32/HFA125/HFA 134a; Hydrofluorocarbon 32/Hydrofluorocarbon 125/Hydrofluorocarbon 134a

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Issue Date: 12/31/01
Rev. 11
BPCS: 262

Medical Emergency (24 hr.): 800-298-9164
Transportation emergency (24 hr.): CHEMTREC 800-424-9300
Product Information: 800-275-5532

2. Composition Information on Ingredients

Ingredients	%(Wt)	OSHA PEL
Difluoromethane (CAS 75-10-5)	15	Not listed
Pentafluoroethane (CAS 354-33-6)	15	Not listed
1,1,1,2-tetrafluoroethane (CAS 811-97-2)	70	Not listed

3. Hazards Identification

Emergency Overview:
Appearance: Colorless liquified gas with faint ether-like odor
Physical hazards * : Compressed liquified gas
Health hazards * : Harmful (central nervous system depression, cardiac arrhythmias)

*** Hazard summary as defined by OSHA Hazard Comm. Std., 29 CFR 1910.1200.**

Potential Health Effects:
General: The health hazard assessment is based on toxicity studies together with information from a search of the scientific literature.

Ingestion: Extremely unlikely to occur in use.

Eye contact: Liquid splashes or vapor spray may cause freeze burns.

Skin contact: The liquid form of this product may cause freeze burns (frostbite-like lesions).

Skin absorption: This product will probably not be absorbed through human skin.

Hazards Identification (continued)

Inhalation: **Exposures to very high vapor concentrations can induce anesthetic effects progressing from dizziness, weakness, nausea, to unconsciousness. It can act as an axphyxiant by limiting oxygen. Very high doses can cause abnormal heart rhythm which is potentially fatal.**

Other effects of overexposure: **None expected.**

4. First Aid Measures

Skin: **Thaw affected areas with water. Remove contaminated clothing. Caution: clothing may adhere to the skin in case of freeze burns. After contact with skin, wash immediately with plenty of warm water. If symptoms (irritation or blistering) develop, get medical attention.**

Eyes: **Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Have eyes examined and treated by medical personnel.**

Ingestion: **Not applicable.**

Inhalation: **Remove victim to fresh air. Keep warm and at rest. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. In the event of cardiac arrest, apply external cardiac massage. Do not administer adrenaline or similar sympathomimetic drugs as cardiac arrhythmias may result. Get immediate medical attention.**

5. Fire Fighting Measures

Flashpoint and method: **Does not flash.**
Autoignition temperature: **Not applicable.**
Flammable limits (STP): **Nonflammable**
General hazards: **Compressed liquified gas.**
Heavy vapors can suffocate.

Klea 407D is not flammable in air under ambient conditions of temperature and pressure. Under conditions of high pressure, certain mixtures of Klea 407D and air may be flammable. Mixtures of Klea 407D and air or oxygen should not be used for leak or pressure testing.

Certain mixtures of Klea 407D and chlorine may be flammable under some conditions. Thermal decomposition will evolve toxic and irritant vapors.

Firefighting instructions: **Not applicable. Use media suitable for surrounding fire. Use water to cool containers.**

Firefighting equipment: **Self-contained breathing apparatus with full facepiece and protective clothing.**

Hazardous combustion products: **Highly toxic decomposition products.**

6. Accidental Release Measures

Precautions should take into account the severity of the leak or spill. For large releases: Use recommended personal protection and evacuate unprotected personnel. Shut off the leak if without risk. Ventilate the spill area. If possible, dike and contain spillage. Prevent liquid from entering sewers, sumps or pit areas since vapor can create a suffocating atmosphere. Capture material for recycle or destruction if suitable equipment is available.

7. Handling and Storage

Storage temperature: Keep at temperature not exceeding 120 deg. F (49 deg. C).

Storage: Store In a well ventilated cool place. Keep containers dry. Keep away from direct sunlight, heat and sources of ignition.

Handling: Avoid causing and inhaling high concentrations of vapors. Atmospheric levels should be controlled to below the occupational exposure limit and kept as low as practicable.

Do not put mixture of Klea 407D with air or oxygen under pressure; do not use such mixtures for leak or pressure testing.

Avoid Klea 407D contact with flame or very hot surfaces.

8. Exposure Controls/Personal Protection

Exposure guidelines: No OSHA PELs and ACGIH TLVs have been assigned for difluoromethane, pentafluoroethane and 1,1,1,2-tetrafluoroethane. INEOS Fluor has established recommended occupational exposure limits of 1,000 ppm (8-hour TWA) for each of these ingredients. Exposures should be kept as low as reasonably practicable below the overall 1,000 ppm limit.

Engineering controls: Ventilate low-lying areas such as sumps or pits where dense vapors collect. Use ventilation adequate to maintain safe levels. Provide eyewash station in work area.

Respiratory protection: Not normally needed if controls are adequate. If needed, use MSHA-NIOSH approved respirator for organic vapors. For high concentrations and oxygen-deficient atmospheres, use positive pressure air-supplied respirator.

Protective clothing: Impervious gloves if any possibility of skin contact with liquid. Additional protection may be required such as apron, arm covers, or full body suit, depending upon conditions.

Eye protection: Chemical tight goggles; full faceshield in addition if splashing is possible.

9. Physical and Chemical Properties

Appearance: Colorless liquified gas with faint ether-like odor
Boiling point: -39.1 to -27.0 deg F, -39.5 to -32.8 deg C (boiling range)
Vapor pressure: 6620 at 20 deg. C.
Vapor density (air = 1): 3.47 approx.
Solubility in water: Insoluble
pH: Not applicable
Specific gravity: No data
% Volatile by volume: 100

10. Stability and Reactivity

Stability: Stable under normal conditions.

Incompatibility: Finely divided metals, magnesium, and alloys containing more than 2% magnesium. Can react violently if in contact with alkali metal and alkaline earth metals such as sodium, potassium or barium.

Hazardous decomposition products: Hydrogen fluoride by thermal decomposition and hydrolysis.

Hazardous polymerization: Will not occur.

11. Toxicological Information

Possible Human Health Effects:

Inhalation: High atmospheric concentrations may lead to anesthetic effects, including loss of consciousness. Very high exposures may cause an abnormal heart rhythm and prove suddenly fatal. Higher concentrations may cause asphyxiation due to reduced oxygen content of the atmosphere.

Skin contact: Liquid splashes or spray may cause freeze burns. Unlikely to be hazardous by skin absorption.

Eye contact: Liquid splashes or spray may cause freeze burns.

Ingestion: Highly unlikely, but should this occur, freeze burns will result.

Animal data:
Difluoromethane (HFC32):
The inhalation 4 hour LC50 in rats was greater than 520,000 ppm

Because of its volatility, this compound has not been tested for skin or eye irritancy , or skin sensitization.

No cardiac sensitization (arrhythmia) was seen in dogs pretreated with epinephrine and exposed to atmospheres up to and including 350,000 ppm.

Toxicological Information (continued)

Stability and Reactivity (continued)In the rat, minimal effects were observed in mothers and offspring as result of exposures to 50,000 ppm during gestation. The no observed adverse effect level was 15,000 ppm in this study.

HFC 32 showed no genetic toxicity in a range of in-vitro tests or in an in-vivo mouse micronucleus assay.

No effects of any kind was seen in a 90-day inhalation study in the rat at dose levels up to and including 50,000 ppm (6 hours per day, 5 days per week).

Pentafluoroethane (HFC 125):
The inhalation 4 hour LC50 in rats was greater than 800,000 ppm.

Because of volatility, this compound has not been tested for skin or eye irritancy, or skin sensitization.

The threshold for cardiac sensitization (arrhythmias) in dogs pretreated with epinephrine was an atmosphere of 75,000 ppm.

No developmental effects were seen in rabbits or rats following exposures during gestation to inhalation dose levels of 50,000 ppm.

HFC 125 showed no genetic toxicity in a range of the in-vitro tests or in an in-vivo mouse micronucleus assay.

No adverse effects were seen at the highest dose level of 50,000 ppm in a 28 day inhalation study in the rat.

1,1,1,2-tetrafluoroethane (HFC 134a):
The inhalation 4 hour LC50 in rat was greater than 500,000 ppm.

Slight eye irritation resulted from a brief spray of vapor.

The material was a slight skin irritant, but not a skin sensitizer.

The threshold for cardiac sensitization (arrhythmia) in dogs pretreated with epinephrine was an atmosphere of 75,000 ppm. The no observed effect level (NOEL) was 50,000 ppm.

No effect of any kind was seen in a 90-day inhalation study in the rat at dose levels up to, and including, 50,000 ppm (6 hours per day. 5 days per week).

No developmental effects were seen in the rabbit following inhalation exposure to 40,000 ppm during gestation despite slight maternal toxicity. In a range-finding study in the rabbit, possible minimal embryolethality was seen at a dose level of 50,000 ppm. in the rat, slight fetotoxicity was present at an inhalation dose of 50,000 ppm administered during gestation and no effects were seen at 10,000 ppm. In another study in the rat, no developmental effects were seen at a dose of 100,000 ppm in the presence of slight maternal toxicity; clear

Toxicological Information (continued)

maternal effects were followed by embryotoxicity and fetotoxicity at a dose level of 300,000 ppm. There were no increases in the incidence of fetal malformations in rats or rabbits at doses up to and including 300,000 and 50,000 ppm, respectively.

HFC-134a showed no genetic toxicity in a range of in-vitro and in-vivo tests.

No effects were found in a study in which rats were followed to week 104 after receiving 300 mg/kg bodyweight/day of HFC 134a by gavage for 52 weeks. In a 2-year inhalation study in rats, no adverse effects of any kind were observed, increased incidence of non-life threatening, benign microscopic testicular interstitial (Leydig) cell tumors and associated interstitial cell hyperplasia which were confined to the top dose of 50,000 ppm.

12. Ecological Information

Persistence and degradation: HFC 32 and HFC 134a decompose comparatively rapidly in the lower atmosphere (troposphere) while HFC 125 decomposes slowly in the lower atmosphere (troposphere). Estimated atmospheric lifetimes are 7.3, 40 and 15.6 years for HFC 32, HFC 125 and HFC 134a, respectively. Products of decomposition will be highly dispersed and hence have a very low concentration. Components are not significant contributors to photochemical smog and are not considered to be VOCs. Is not considered an ozone depleting chemical.

Effect on effluent treatment: Discharges of the product will enter the atmosphere and will not result in long term aqueous contamination.

13. Disposal Considerations

Disposal method: Discarded product is not a hazardous waste under RCRA, 40 CFR 261. However, Klea 407D should be recycled, reclaimed or destroyed whenever possible.

Container disposal: For disposable (DOT 39) cylinders only: Do not distribute, make available, furnish or reuse empty container when once emptied of original product. Open valve to remove pressure in the cylinder. Then puncture, drill, crush or otherwise destroy empty cylinder and dispose of in a facility permitted for nonhazardous waste.

Refrigeration Applications: Subject to "no venting" regulations of Section 608 of the Clean Air Act during the service or disposal of equipment.

14. Transport Information

DOT Hazard Description:
Proper Shipping Name: REFRIGERANT GAS, NOS (DIFLUOROMETHANE/ TETRAFLUOROETHANE/PENTAFLUOROETHANE MIXTURE R32/R134A/R125)
Hazard Class: 2.2
Identification Number: UN 1078
Packing Group: None
Hazardous Substance (RQ): None
Placard/Label: NON-FLAMMABLE GAS

15. Regulatory Information

TSCA (Toxic Substances Control Act) Regulations, 40 CFR 710: HFC 134a, HFC 125 and HFC 32 are on the TSCA Chemical Substances Inventory.

CERCLA and SARA Regulations (40 CFR 355, 370, and 372): This product does not contain any chemicals subject to the reporting requirements of SARA Section 313.

The information herein is given in good faith, but no warranty, expressed or implied, is made.

*** **Indicate changes since prior revision.**