KLEA®404A
SAFETY DATA SHEET

Mexichem FLUOR

SECTION 1 - IDENTIFICATION

Product identifier used on the label:	KLEA®404A
Other means of identification:	R-404A
Recommended use of the chemical and restrictions on use:	Refrigerant

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party:

United States, Mexico & South America
Mexichem Fluor Inc.
4990B ICI Rd. / P.O. Box 30
St. Gabriel, LA 70776
800-424-5532 (US)
(81) 8156-1711 or 1712 (Mexico)

Canada
Mexichem Fluor Canada Inc.
5000 Yonge Street, Suite 1901
Toronto, Ontario, M2N 7E9
800-275-5532 Ext. 384 or 383

Emergency telephone numbers:

Medical:	**800-298-9164 or 303-389-1418**
Transportation:	**In US, Canada, or South America, call Chemtrec @ 800-424-9300 or 703-527-3887 (call collect)** **In Mexico, call SETIQ @ 01-800-00-214-00 (call free from any place in Mexico) or 01-55-59-15-88 (in Mexico City)**

SECTION 2 – HAZARDS IDENTIFICATION

Classification of the chemical:	Gases Under Pressure - Liquefied Gas
Signal word:	Warning
Hazard statement(s):	Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.
Precautionary statement(s):	Protect from sunlight. Store in a well-ventilated place.
Pictogram(s):	
Hazards not otherwise classified:	May cause frostbite. Exposure to high concentrations may cause an abnormal heart rhythm which can be fatal. Very high atmospheric concentrations may cause anesthetic effects such as dizziness, drowsiness, headaches, and unconsciousness.

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name, Common Name, and Synonyms	CAS #	Concentration (%wt)
1,1,1-trifluoroethane (R-143a, HFC-143a)	420-46-2	52
1,1,1,2,2-pentafluoroethane (Klea®125, Fluorocarbon 125, R-125, HFC-125, HFA-125)	354-33-6	44
1,1,1,2-tetrafluoroethane (Klea®134a, Fluorocarbon 134a, R-134a, HFC-134a, HFA-134a)	811-97-2	4

SECTION 4 – FIRST AID MEASURES

Skin:	Immediately wash with plenty of warm water (do not rub). Thaw affected area with water. Remove contaminated clothing. Caution: clothing may adhere to the skin in case of freeze burns. 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. Hold eyelids open during flushing. Have eyes examined and treated by medical personnel.
Inhalation:	Move victim to fresh air. Keep warm and at rest. If breathing is labored, give oxygen. If only breathing has stopped, give artificial respiration with a pocket mask equipped with a one-way valve to prevent exposure to product or body fluids. If breathing has stopped AND there is no pulse, give cardiopulmonary resuscitation (CPR). Get immediate medical attention.
Ingestion:	If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel. In case of frostbite, immediately rinse lips and mouth with tepid water for at least 15 minutes. Obtain medical attention promptly.
Note to physician:	Provide symptomatic and supportive therapy, as indicated. Administration of epinephrine or similar sympathomimetic drugs should be with special caution and only in situations of emergency life support as cardiac arrhythmia may result.

SECTION 5 - FIRE-FIGHTING MEASURES

Fire and explosion hazards:	KLEA®404A is not flammable in air under ambient conditions of temperature and pressure. Under conditions of high temperature and pressure, certain mixtures of KLEA®404A may be flammable. Certain mixtures of KLEA®404A and chlorine may be flammable under some conditions. Containers may burst under intense heat. Ruptured cylinders may rocket or fragment. Heavy vapor may suffocate.

Specific hazards arising from the chemical:	During a fire the product can form toxic and corrosive gases such as hydrogen fluoride.
Fire-fighting procedures:	Move containers from fire area, if it can be done without risk. Fight fire from a protected location to shield personnel from venting or ruptured containers.
Suitable extinguishing media:	As appropriate for surrounding materials/equipment. Water spray should be used to cool containers.
Unsuitable extinguishing media:	None known
Special protective equipment and precautions for fire-fighters:	Use self-contained breathing apparatus with a full-face piece and special protective clothing.
Sensitivity to mechanical impact:	Not applicable
Sensitivity to static discharge:	Not expected to be sensitive to static discharge.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures:	This product is a liquefied gas, which exits the container at temperatures capable of causing freeze burns (frostbite). Precautions should take into account the severity of the leak or spill. Move unprotected personnel upwind of leaking container. Ventilate the spill area. Use recommended personal protection and shut off the leak, if without risk. If possible, elevate leak position to highest point of container (should leak gas, not liquid). Water should never be put on leak nor should cylinder be immersed.
Methods and materials for containment and cleaning up:	If possible, dike and contain spillage. Prevent liquid from entering sewers, sumps, or pit areas since vapor is heavier than air and can create a suffocating atmosphere. Capture material for recycle or destruction if suitable equipment is available. Notify applicable government authority if release is reportable or could adversely affect the environment.

SECTION 7 - HANDLING AND STORAGE

Precautions for safe handling:	Wear appropriate personal protective equipment. A safety shower and eyewash station should be nearby and ready for use. This product is a liquefied gas, which exits the container at temperatures capable of causing freeze burns (frostbite). Ensure personnel are trained in handling and storing cylinders. Secure containers at all times. Keep containers closed when not in use. Ensure there is adequate ventilation or use proper respiratory protection in poorly ventilated or confined areas. Avoid causing and inhaling high concentrations of vapor. Atmospheric levels should be controlled to below the occupational exposure limit and kept as low as practicable. Prevent liquid or vapor from entering sumps or sewers since vapor is heavier than air and may form suffocating atmospheres. Do not put mixtures of KLEA®404A with air or oxygen under pressure;

	do not use such mixtures for leak or pressure testing. Do not heat containers. Liquid transfers between containers may generate static electricity. Ensure adequate grounding. Avoid trapping liquid between closed valves or overfilling containers as high pressures can develop with an increase in temperature. Avoid KLEA®404A contact with flames or very hot surfaces.
Conditions for safe storage, including any incompatibilities:	Keep containers tightly closed, in a cool, well-ventilated place. Store at temperature not exceeding 125°F (52°C.). Keep containers dry. Keep away from open flames, hot surfaces, welding operations, and other heat sources. Keep away from finely divided metals such as aluminum, zinc, magnesium, and alloys containing more than 2% magnesium. Can react violently if in contact with alkali metals and alkaline earth metals such as sodium, potassium, or barium.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

OSHA Permissible Exposure Limit (PEL):	Not established for any of the components
American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV):	Not established for any of the components
American Industrial Hygiene Association (AIHA) Workplace Environmental Exposure Level (WEEL):	1000 ppm 8-hour TWA; 1,1,1-trifluoroethane (HFC-143a) 1000 ppm 8-hour TWA; 1,1,1,2,2-pentafluoroethane (HFC-125) 1000 ppm 8-hour TWA; 1,1,1,2-tetrafluoroethane (HFC-134a)
Mexichem Fluor Guideline:	1000 ppm 8-hour TWA; 1,1,1-trifluoroethane (HFC-143a) 1000 ppm 8-hour TWA; 1,1,1,2,2-pentafluoroethane (HFC-125) 1000 ppm 8-hour TWA; 1,1,1,2-tetrafluoroethane (HFC-134a)
Appropriate engineering controls:	Use ventilation to maintain safe levels. Where appropriate engineering controls are not in place or are inadequate, wear suitable respiratory equipment.
Eye Protection:	Use chemical safety goggles or safety glasses and a face shield when there is potential for eye contact.
Skin Protection:	Take all precautions to prevent skin contact. Use gloves and protective clothing made of material that has been found by user to be impervious under conditions of use to prevent the skin from becoming frozen from contact with liquid. User should verify impermeability under normal conditions of use prior to general use. Additional protection such as an apron, arm covers, or full body suit may be needed depending on conditions of use.
Respiratory Protection:	Not normally needed if controls are adequate. If needed, use NIOSH/MSHA approved respirator for organic vapors. For high

	concentrations and oxygen-deficient atmospheres, use positive pressure air-supplied respirator.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, colorless liquefied gas
Odor:	Faint ether-like
Odor threshold:	Not available
pH:	Not applicable
Melting point/freezing point:	Not available
Boiling point:	-47.2°C to -46.4°C (-53.0°F to -51.5°F) (boiling range)
Flash point:	Does not flash
Evaporation rate:	Not available
Flammability (solid, gas):	Not available
Upper/lower flammability/explosive limits:	Not applicable
Vapor pressure:	8,270 mm Hg at 20°C
Vapor density:	3.42 at bubble point temperature (air = 1)
Specific gravity (relative density):	1.06 at 20°C
Solubility(ies):	Insoluble
Partition coefficient: n-octanol/water:	Not available
Auto-ignition temperature:	Not available
Decomposition temperature:	Not available

SECTION 10 - STABILITY AND REACTIVITY

Reactivity:	Reacts with finely divided metals such as aluminum, zinc, magnesium, and alloys containing more than 2% magnesium. Can react violently if in contact with alkali metals and alkaline earth metals such as sodium, potassium, or barium.
Chemical stability:	Stable under normal conditions
Possibility of hazardous reactions:	Hazardous polymerization will not occur.
Conditions to avoid:	Keep away from heat, sparks, and flame. Avoid high temperatures.
Incompatible materials:	Finely divided metals such as aluminum, zinc, magnesium, and alloys containing more than 2% magnesium. Alkali metals and alkaline earth metals such as sodium, potassium, or barium.
Hazardous decomposition products:	Hydrogen fluoride by thermal decomposition and hydrolysis. Oxides of carbon and fluoride may be produced by thermal decomposition.

SECTION 11 - TOXICOLOGICAL INFORMATION

Information on the likely routes of exposure:	Inhalation, eye, and skin contact
Symptoms related to the physical, chemical and toxicological characteristics: Delayed and immediate effects and also chronic effects from short- and long-term exposure:	**Inhalation:** Vapor is heavier than air. May displace oxygen and cause rapid suffocation. Exposure to high concentrations may cause an abnormal heart rhythm (arrhythmia) under stressful conditions which can be fatal. Very high atmospheric concentrations may cause anesthetic effects such as dizziness, drowsiness, headaches, and unconsciousness. **Ingestion:** Liquid will cause freeze burns. **Eye contact:** Liquid splashes or spray may cause freeze burns. **Skin contact:** Liquid splashes or spray may cause freeze burns. **Other effects:** None anticipated.
Numerical measures of toxicity:	See below for each component
Animal test data:	**1,1,1-trifluoroethane (HFC-143a)** LC50: 4 hr. (rat) = >540,000 ppm LD50: Not applicable Cardiac arrhythmias were seen in dogs exposed to 300,000 ppm HFC-143a for 5 minutes, when followed by an injection of epinephrine. No toxicity was seen in rats exposed up to 40,000 ppm HFC-143a for 4 or 13 weeks. HFC-143a was not genotoxic when evaluated in a variety of *in vitro* and *in vivo* tests. HFC-143a was not carcinogenic to rats when given oral doses in a lifetime study. Studies in rats and rabbits showed that exposure to HFC-143a during pregnancy did not cause any developmental toxicity. **1,1,1,2,2-pentafluoroethane (HFC-125)** LC50: 4 hr. (rat) = >800,000 ppm LD50: Not applicable Acute inhalation exposures at high concentrations of HFC-125 have been shown to cause central nervous system depression in laboratory animals. Cardiac arrhythmias were seen in dogs exposed to 100,000 ppm HFC-125 and higher for 5 minutes, when followed by an injection of epinephrine. No toxicity was seen in rats exposed up to 50,000 ppm HFC-125 for 13 weeks. HFC-125 was not genotoxic when evaluated in a variety of *in vitro*

	and *in vivo* tests. Studies in rats and rabbits showed that exposure during pregnancy did not cause any developmental toxicity. **1,1,1,2-tetrafluoroethane (HFC-134a)** LC50: 4 hr. (rat) = 567,000 ppm LD50: Not applicable Acute inhalation exposures at high concentrations of HFC-134a have been shown to cause central nervous system depression in laboratory animals. Cardiac arrhythmias were seen in dogs exposed to 80,000 ppm HFC-134a for 5 minutes, when followed by an injection of epinephrine. This phenomenon is referred to as cardiac sensitization and is an increased sensitivity of the heart to epinephrine. Liquefied material was a slight skin irritant to rats, possibly due to local freezing. Vaporized material is non-irritating. It is not a skin sensitizer. No toxicity was seen in rats exposed by inhalation for 6 hours/day, 5 days/week for 13 weeks to concentrations up to 50,000 ppm HFC-134a. HFC-134a was not genotoxic when evaluated in a variety of *in vitro* or *in vivo* tests. In a two-year carcinogenicity study, there was a slight increase in the incidence of benign testicular tumors in male rats exposed to 50,000 ppm HFC-134a. No increased tumors were seen in female rats or in male and female mice. Not a reproductive or developmental toxicant.
Carcinogenicity:	None of the components have been classified as carcinogenic by NTP, IARC, ACGIH, or OSHA.
Teratogenicity, mutagenicity, other reproductive effects:	None known. For further information see animal test data above.
Toxicologically synergistic products:	None known. Note that administration of epinephrine or similar sympathomimetic drugs following exposure may result in cardiac arrhythmia.

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	**1,1,1,2-tetrafluoroethane (HFC-134a)** Daphnia 48 hour EC50: 980 mg/l Rainbow trout 96 hour LC50: 450 mg/l No data are available for the other components.

Persistence and degradability:	This product is highly volatile and has low water solubility. It will rapidly evaporate from water. HFC-143a and HFC-125 decompose slowly in the lower atmosphere (troposphere) while HFC-134a decomposes comparatively rapidly in the lower atmosphere (troposphere). Estimated atmospheric lifetimes are 52, 29, and 14 years for HFC-143a, HFC-125 and HFC-134a, respectively. Products of decomposition will be highly dispersed and hence will have a very low concentration. Practically non-biodegradable.
Bioaccumulative potential:	Expected to be low given the low Log K_{ow} of the components.
Mobility in soil:	Expected to be mobile in soil.
Other adverse effects:	Components are not significant contributors to photochemical smog and are not considered to be VOCs. None of the components are considered ozone-depleting chemicals.

SECTION 13 - DISPOSAL CONSIDERATIONS

Disposal Method:	Discarded product is not a hazardous waste under RCRA, 40 CFR 261. However, this product should be recycled or reclaimed whenever possible.
Container Disposal:	For disposable (DOT 39) cylinders only. Do not distribute, make available, furnish, or reuse container when emptied of the 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. Return all other containers to supplier.
Refrigeration Application:	Subject to "no venting" regulations of Section 608 of the Clean Air Act during the service or disposal of equipment.

SECTION 14 - TRANSPORT INFORMATION

UN number (DOT, TDG, IMDG, IATA, Mexico):	UN 3337
UN proper shipping name (DOT, TDG, IMDG, IATA, Mexico):	Refrigerant gas R 404A
Hazard class (DOT, TDG, IMDG, IATA, Mexico):	2.2
Packing group (DOT, TDG, IMDG, IATA, Mexico):	None
Hazardous substance (RQ):	None
Environmental hazards (e.g., Marine pollutant):	Not a Marine Pollutant
Placard/label:	Non-flammable gas

Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code):	Not available
Special precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises:	Consult applicable regulations (*e.g.*, DOT, TDG, IATA, IMDG) for special precautions applicable to transport outside of user's premises. Within user's premises transport in upright, closed, and secured containers.

SECTION 15 - REGULATORY INFORMATION

USA Classification	This material is classified as hazardous under OSHA regulations (29 CFR 1910.1200).
TSCA (Toxic Substances Control Act) Regulations, 40 CFR 710:	All components are listed on the TSCA Chemical Substances Inventory.
CERCLA and SARA Regulations:	40 CFR 372: This product does not contain any chemicals subject to reporting requirements of SARA Section 313. 40 CFR 355: This product does not contain any "extremely hazardous chemical" subject to the requirements of SARA Section 312. 40 CFR 370: Hazardous properties as defined under the Hazard Communication Standard (29 CFR 1910.1200): Immediate (acute) health hazard, Sudden release of pressure. Actions may be necessary under SARA Sections 311 and 312. Consult regulations for applicability.
Ozone Protection & 40 CFR 82:	This product does not contain ozone depleting substances.
Other regulations/legislation:	Subject to "no venting" regulations of Section 608 of the Clean Air Act during the service or disposal of equipment.
Canadian Classification:	This product has been classified according to the hazard criteria of the Controlled Product Regulations (CPR) and the SDS contains all the information required by the CPR.
Controlled Products Regulations (WHMIS Classification):	Class A: Compressed Gas
CEPA/Canadian Domestic Substances List (DSL):	The substances in this product are on the Canadian Domestic Substance List (CEPA DSL).
Other regulations/legislation:	This product contains the following substances present on the CEPA 2014 list of greenhouse gases subject to mandatory reporting: 1,1,1-trifluoroethane (HFC-143a), 1,1,1,2,2-pentafluoroethane (HFC-125), and 1,1,1,2-tetrafluoroethane (HFC-134a).

SECTION 16 - OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Prepared by:	Joel R. Hall, Mexichem Fluor Inc.
Telephone number of preparer:	225-642-0094
Date of preparation:	May 11, 2015
Version:	1

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. The information herein is given in good faith and no warranty of any kind is given or implied. Mexichem Fluor Inc. will not be liable for any damages, losses, injuries, or consequential damages that may result from the use of or reliance on any information contained herein. This Safety Data Sheet has been prepared from information current at the time of writing.