SAFETY DATA SHEET - R-123 **November 21, 2018 Revised**

1. IDENTIFICATION

PRODUCT NAME: Refrigerant 123

SYNONYMS: R-123, REFRIGERANT 123, HCFC 123, 2,2-Dichloro-1,1,1-trifluoroethane,

RECOMMENDED USE: Refrigerant

DISTRIBUTOR: Hudson Technologies Company
ADDRESS: PO Box 1541
One Blue Hill Plaza
Pearl River, NY 10965

EMERGENCY PHONE: 1- 800-501-4376
CHEMTREC PHONE: 1-800-424-9300
INFORMATION PHONE: 1-800-953-2244

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Colorless, volatile liquid with ethereal and faint sweetish odor. Non-flammable material. Overexposure to vapors by inhalation may cause dizziness and loss of concentration. At higher levels, central nervous system depression and cardiac arrhythmia may result from exposure. Vapors displace air and can cause asphyxiation in confined spaces. At higher temperatures, (>250°C), decomposition products may include Hydrochloric Acid (HCL), Hydrofluoric Acid (HF) and carbonyl halides.

HAZARD CLASSIFICATION:

Hazardous to the Ozone Layer	
Specific target organ toxicity -	**single exposure, Category 2, Liver**
Specific target organ toxicity -	**repeated exposure, Category 2, Central Nervous System, Liver**

SIGNAL WORD: **WARNING**

HAZARD STATEMENTS: May displace oxygen and cause rapid suffocation
May cause organ and central nervous system damage.
May cause liver damage through prolonged or repeated exposure
May cause drowsiness or dizziness
Harms public health and environment by destroying ozone in the upper atmosphere

PRECAUTIONARY STATEMENTS

PREVENTION: Use only with adequate ventilation - never in a closed space. Wear protective gloves. Wear eye protection.

RESPONSE: If inhaled: Remove person to fresh air and keep comfortable for breathing.
Immediately call a POISON CENTER or physician. If not breathing, give artificial respiration, preferably mouth to mouth.
If breathing is difficult, give oxygen. Avoid stimulants. Do not give adrenalin
If on skin: Wash with plenty of water
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician.

STORAGE: Protect from sunlight. Store in well-ventilated place.
Do not heat above 120°F (50°C). Do not store in damp areas.

DISPOSAL: Comply with Federal, State and local regulations. Reclaim by distillation or remove to a permitted waste disposal facility

CARCINOGENICITY:

OSHA: <0.1% ACGIH: <0.1% NTP: <0.1% IARC: <0.1%

3. COMPOSITION / INFORMATION ON INGREDIENTS

PRODUCT NAME: Refrigerant 123
SYNONYMS: R-123, REFRIGERANT 123, HCFC 123, 2,2-Dichloro-1,1,1-trifluoroethane

INGREDIENT NAME CAS NUMBER WEIGHT %

Ingredient Name	CAS Number
2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	306-83-2

Trace impurities and additional material names not listed above may also appear in Section 15 toward the end of this Safety Data Sheet.

4. FIRST AID MEASURES

SKIN: Promptly flush skin with water until all chemical is removed. If water is not available, cover with a clean, soft cloth or similar covering. Get medical attention if symptoms persist.

EYES: Immediately flush eyes with large amounts of water for at least 15 minutes lifting eyelids occasionally to facilitate irrigation. Get medical attention if symptoms persist.

INHALATION: Immediately remove to fresh air. If breathing has stopped, give artificial respiration. Use oxygen as required, provided a qualified operator is available. Get medical attention.

INGESTION: If swallowed, do not induce vomiting. If conscious, immediately give 2 eight ounce glasses of water. Do not give anything by mouth to an unconscious person. Call a Poison Center or physician.

ADVICE TO PHYSICIAN: Because of the possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution and only in situations of emergency life support. Treatment of overexposure should be directed at the control of symptoms and the clinical conditions.

5. FIRE FIGHTING MEASURES

FLAMMABLE LIMITS IN AIR, UPPER: N/A
(% BY VOLUME) LOWER: N/A

FLASH POINT: None – will not burn

AUTOIGNITION TEMPERATURE: Not determined

NFPA HAZARD CLASSIFICATION
HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 1
OTHER:

EXTINGUISHING MEDIA: Appropriate for combustibles in the area.

SPECIAL FIRE FIGHTING PROCEDURES: Use water spray or fog to cool containers. Self-contained breathing apparatus (SCBA) is required if cylinders rupture and contents are released under fire conditions**.**

UNUSUAL FIRE AND EXPLOSION HAZARDS: Containers may rupture under fire conditions.

HAZARDOUS DECOMPOSITION PRODUCTS: Under high temperatures, this product can form Carbonyl halides, Hydrogen chloride, Hydrogen fluoride.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE:
(Always wear recommended personal protective equipment.)
Ventilate area, especially low and enclosed spaces where vapors may collect. Do not flush down sewers or storm drains. Contain spill with dikes or other containment devices. Collect with pumps, or absorbent material and transfer to steel drums for recovery, reclamation or disposal. Remove open flame. Use self-contained breathing apparatus (SCBA) for large spills.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

7. HANDLING AND STORAGE

NORMAL HANDLING: Always wear recommended personal protective equipment.
Avoid breathing vapors and liquid contact with eyes, skin or clothing. Do not puncture or drop containers, expose them to open flame or excessive heat.

STORAGE RECOMMENDATIONS:
Store in a cool, well-ventilated area of low fire risk and keep out of direct sunlight. Protect container and its fittings from physical damage. Storage in subsurface locations should be avoided. Close valve or container tightly after use and when empty. Do not heat cylinders above 125ºF (52ºC) to avoid over pressurizing the cylinder. Do not expose drums to direct heat or temperature above 115ºF (46ºC) to avoid pressurizing. If container temperature exceeds boiling point, cool the container before opening.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide local ventilation at filling zones and areas where leakage is probable. Mechanical (general) ventilation may be adequate for other operating and storage areas.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION: General work clothing and gloves (leather) should provide adequate protection. **:** Where contact with liquid is likely, impervious gloves should be used. Any contaminated clothing should be promptly removed and washed before reuse.

EYE PROTECTION: For normal conditions, wear safety glasses. Where there is reasonable probability of liquid contact, wear chemical safety goggles.

RESPIRATORY PROTECTION: None generally required for adequately ventilated work situations. For accidental release or non-ventilated situations, or release into confined space, where the concentration may be above applicable limits, use a self-contained, NIOSH- approved breathing apparatus or supplied air respirator. For escape: use the former or a NIOSH-approved gas mask with organic vapor canister.

ADDITIONAL RECOMMENDATIONS: Where contact with liquid is likely, such as in a spill or leak, impervious boots and clothing should be worn. High dose-level warning signs are recommended for areas of principle exposure. Provide eyewash stations and quick-drench shower facilities at convenient locations. For tank cleaning operations, see OSHA regulations, 29 CFR 1910.132 and 29 CFR 1910.133.

EXPOSURE GUIDELINES

INGREDIENT NAME	ACGIH TLV	OSHA PEL	OTHER LIMIT
2,2-Dichloro-1,1,1-trifluoroethane	pm		*50 ppm 8 & 12 Hr

*refers to Dupont's Acceptable Exposure Limit ("AEL"). Any governmentally imposed occupational exposure limits established for this substance that are lower than the Dupont AEL shall take precedence

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:

Hydrogen Fluoride: ACGIH TLV: 3 ppm ceiling

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Clear, colorless liquid
ODOR:	Slight ethereal
PHYSICAL STATE:	liquid
PH	Neutral
BOILING POINT (@ 736 mm Hg):	F: 82.0 / C: 27.8
VAPOR PRESSURE (psia):	13 @ 77ºF (25ºC)
VAPOR DENSITY (AIR = 1):	5.3 @ 77ºF (25ºC)
SPECIFIC GRAVITY (H2O = 1):	1.47 @ 77ºF (25ºC)
SOLUBILITY IN WATER (@14.7 psia):	0.39 WT% @ 77F (25 C) at 1 atm
DENSITY	0.39 WT% @ 77F (25 C) at 1 atm
PERCENT SOLIDS BY WEIGHT:	Liquid
PERCENT VOLATILE:	100% By Wt
VOLATILE ORGANIC COMPOUNDS (VOC):	Gas

10. STABILITY AND REACTIVITY

NORMALLY STABLE (CONDITIONS TO AVOID):
The product is stable.
Do not mix with oxygen or air above atmospheric pressure. Any source of high temperature, such as lighted cigarettes, flames, hot spots or welding may yield toxic and/or corrosive decomposition products.

INCOMPATIBILITIES:
Under specific conditions: e.g. very high temperatures and/or appropriate pressures – Freshly abraded aluminum surfaces may cause strong exothermic reaction. Chemically active metals: potassium, calcium, powdered aluminum, magnesium and zinc.

HAZARDOUS DECOMPOSITION PRODUCTS:
Hydrogen chloride, Hydrogen fluoride and possibly Carbonyl halides. These materials are toxic and irritating.

HAZARDOUS POLYMERIZATION:
Will not occur.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION:

Animal Data: Inhalation Low Observed: 20,000 ppm in dogs
Inhalation No Observed: 10,000 ppm in dogs
Oral LD50: >9000 mg/kg in rats
Dermal LD50: >2000 mg/kg in rabbits, >2000 mg/kg in rats

Based upon animal testing, HCFC 123 is not a skin irritant or skin sensitizer, but is a mild to moderate eye irritant.

Toxic effects noted in animals from single inhalation exposure at concentrations of 5000 ppm or greater include effects on unconditioned reflexes, locomotor activity and coordination, suggesting anesthetic effects. Single inhalation exposures caused central nervous system effects, such as anesthesia, and nonspecific clinical signs and organ pathology changes. Cardiac sensitization occurred in dogs at concentrations of 20,000 ppm and greater.

Repeated exposures to 300 ppm and higher resulted in decreased cholesterol, triglycerides or glucose, and increased urinary fluoride levels. At 5000 ppm or greater, anesthetic effects, reduced lymphocyte counts, organ weight changes, including increased liver weight, and enzyme alterations, and decreased body weight gain were observed. Exposure to dogs, guinea pigs or monkeys at 1000 ppm or greater induced slight or mild liver damage. HCFC-123 was not neurotoxic in animals repeatedly exposed by inhalation at concentrations up to 5,000 ppm, but did cause a slight decrease in arousal at this concentration.

Long-term exposure caused decreased body weight, decreased cholesterol, triglycerides and glucose, and increased urinary fluoride concentrations in rats. Inhalation of 300, 1000 or 5000 ppm for two years caused an increase in benign testicular tumors in male rats. An increase in benign pancreatic and liver tumors was observed in rats exposed to 1000 or 5000 ppm. The tumors were late-occurring and none were judged to be life-threatening. The biological significance of these tumors to man is considered to be limited. Additionally, evidence of retinal atrophy was observed in this two-year study in both treated and control animals, although the toxicological significance is undetermined.

Animal data indicate that HCFC-123 does not affect reproductive performance in rats or harm the unborn animal. HCFC-123 does not produce genetic damage in bacterial cell cultures or in animals. In two studies, genetic damage was produced in mammalian cell cultures, but did not produce genetic damage in another study. Overall weight of evidence indicates that HCFC-123 is not mutagenic.

12. ECOLOGICAL INFORMATION

Aquatic Toxicity:
96 hour LC50: 55.5 mg/l in rainbow trout
96 hour ErC50: 96.6 mg/l in green algae
96 hour EbC50: 67.8 mg/l in green algae
48 hour EC50: 17.2 mg/l in Daphnia Magna

Degradability (BOD): Not readily biodegradable
Bioaccumulation: Bioaccumulation Factor is 33. Bioaccumulation is unlikely.

13. DISPOSAL CONSIDERATIONS

Disposal must comply with federal, state, and local disposal or discharge laws. R-123 is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION – Not a regulated hazardous material by DOT or IMO.

Shipping Containers: Steel Drums
Tank Cars
Drums

15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

TSCA (TOXIC SUBSTANCE CONTROL ACT): TSCA Inventory Status: Reported/Included

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT): Not listed

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT):

311/312 HAZARD CATEGORIES: Acute, Chronic

WARNING:
Do not vent to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered.

Contains 2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123), a substance that harms public health and environment by destroying ozone in the upper atmosphere.

California Prop. 65: This product does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

16. OTHER INFORMATION

DISCLAIMER: The above information is based upon technical information believed to be accurate but does not purport to all-inclusive and should be used only as a guide. Hudson Technologies Company shall not be held liable for any damage from handling or from contact with this product. No warranty of merchantability or any warranty, express or implied is made with respect to such information.