

INEOS Fluor

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: ARCTON®22

Product Use: Refrigerant

Alternate Names: Fluorocarbon 22, R-22, FC-22, HCFC-22

Manufacturer: INEOS Fluor Americas LLC
4990B ICI Rd. / P.O. Box 30
St. Gabriel, LA 70776

Medical Emergency (24 hr.): 800-298-9164

Transportation Emergency (24 hr.): CHEMTREC 800-424-9300
(outside U.S. 703-527-3887)

Product Information: 800-424-5532

2. COMPOSITION INFORMATION ON INGREDIENTS

<u>Ingredients:</u>	<u>%(Wt)</u>	<u>OSHA PEL</u>
Chlorodifluoromethane (CAS 75-45-6)	100	Not listed

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

CAUTION! This product is a clear, colorless, liquefied gas. Contents under pressure. Cylinders may rupture and rocket under fire conditions. Thermal decomposition can produce toxic and corrosive gases. Vapors are heavier than air. May cause asphyxia. Liquid splashes or spray may cause freeze burns (frostbite). High vapor concentrations may cause dizziness or more severe anesthetic effects. Very high exposures can cause potentially fatal abnormal heart rhythm. Read the entire MSDS for a more thorough evaluation of the hazards.

POTENTIAL HEALTH EFFECTS:

Ingestion: Extremely unlikely to occur in use.

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

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

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

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

Other effects of overexposure: None expected.

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.

Ingestion: Highly unlikely, but should this occur, freeze burns will result. Do not induce vomiting unless instructed to do so by a physician.

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.

Note to physician: 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 arrhythmias may result.

5. FIRE FIGHTING MEASURES

Flash Point: Does not flash

Flammable Limits (Lower): Not applicable.

Flammable Limits (Upper): Not applicable.

Auto Ignition Temperature: 1170 °F (632 °C)

Hazardous Reactions: 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.

During a fire the product can form toxic and corrosive gases such as hydrogen fluoride and hydrogen chloride.

Fire and Explosion Hazards: Compressed liquefied gas. Containers may burst under intense heat. Ruptured cylinders may rocket or fragment. Heavy vapor may suffocate.

HCFC-22 is not flammable in air under ambient conditions of temperature and pressure. Certain mixtures of HCFC-22 and air when under pressure may be flammable. Certain mixtures of HCFC-22 and chlorine may be flammable under some conditions.

Extinguishing Media: As appropriate for surrounding materials/equipment.

Fire Fighting Procedures: Water spray should be used to cool containers.

Fire Fighting Protective Equipment: Use self-contained breathing apparatus with a full-face piece and special protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Contents under pressure. Ruptured cylinder may rocket or fragment. 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. Remove ignition sources and 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. 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.

7. HANDLING AND STORAGE

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 HCFC-22 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 HCFC-22 contact with flames or very hot surfaces.

Storage Requirements: Keep containers tightly closed, in a cool, well-ventilated place. Keep containers dry. Keep away from incompatibles, open flames, hot surfaces, welding operations, and other heat sources.

Storage Temperature: Store at temperature not exceeding 125 deg. F. (52 deg. C.).

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE GUIDELINES:

INGREDIENT NAME: Chlorodifluoromethane

INEOS Fluor Guideline	1000 ppm 8 hour TWA
ACGIH TLV	1000 ppm 8 hour TWA
No OSHA PEL established.	

Minimize exposure in accordance with good hygiene practice.

PREVENTIVE MEASURES:

Engineering Controls: Use ventilation to maintain safe levels. Where appropriate engineering controls are not in place or are inadequate, wear suitable respiratory equipment.

PERSONAL PROTECTIVE 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.

Other Protection: Shower and eye wash station.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Colorless liquefied gas with faint ether-like odor

Boiling point: -41.4°F., -40.8°C.

Vapor pressure (mmHg at 20°C.): 6805

Vapor density (air = 1): 3.03

Solubility in water: slightly soluble

pH: Not applicable

Specific gravity: 1.2 at 25°C.

% Volatile by volume: 100

10. STABILITY AND REACTIVITY

Chemical Stability: Stable under normal conditions.

Incompatibility: 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.

Hazardous Decomposition Products: Hydrogen fluoride by thermal decomposition and hydrolysis. Oxides of carbon and fluoride may be produced by thermal decomposition.

Conditions to Avoid: Keep away from heat, sparks, and flame. Avoid high temperatures.

Hazardous polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

POSSIBLE HUMAN HEALTH EFFECTS

Routes of exposure: Inhalation, ingestion, eye, and skin contact.

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.

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

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

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

Other effects: None anticipated.

Carcinogenicity: None of the ingredients are classified as carcinogenic by IARC, ACGIH, NTP, or OSHA.

ANIMAL DATA:

LC₅₀: 4 hr. (inh., rat) = 220,000 ppm

Because of volatility, meaningful tests of skin or eye irritancy, or skin sensitization are not possible.

The no observed effect level (NOEL) for cardiac sensitization (arrhythmias) in dogs pretreated with epinephrine was an atmosphere of 59,300ppm.

No effect of any kind was seen in 90-day inhalation studies in the rat and dog at exposure concentrations of up to and including 10,000ppm.

In the rat, a number of developmental toxicity studies have suggested a link between exposure to chlorodifluoromethane and defects of the eye (micro- and anophthalmia). A large study conducted to investigate this effect showed, at atmospheres of 50,000ppm, slight maternal and fetal toxicity, as well as a statistically significant increase in the incidence of fetal eye defects. However, the incidence was very low and within the range seen in other control groups. No effects were seen in the next lower dose used (1,000ppm). In a developmental toxicity study in rabbits, no fetal effects were seen at concentrations up to and including 60,000ppm, a dose level which elicited slight maternal toxicity.

Although chlorodifluoromethane has some mutagenic activity in the Ames test, this effect appears to be specific to bacteria, as a number of other *in-vitro* and *in-vivo* studies have not demonstrated any significant genotoxic activity.

No adverse effects were found in a study in which rats were maintained to week 104 after receiving 300mg/kg bodyweight/day chlorodifluoromethane by gavage for 52 weeks. In a 2-year inhalation study, rats were exposed to concentrations up to 50,000ppm for 118 weeks (females) and 131 weeks (males), at which times survival was 80%. There were no clinical haematological or biochemical changes in treated animals. In the male group exposed to 50,000ppm, there was

a statistically significant increase in numbers of malignant tumors, mainly being fibrosarcoma. This increase occurred particularly late in the study (weeks 105 to 130). No effect was seen in females or at lower exposure concentrations in males. In an analogous study in the mouse, exposures of up to 50,000ppm for 83 weeks (males) and 94 weeks (females) did not give rise to increased incidence of benign or malignant tumors.

12. ECOLOGICAL INFORMATION

Persistence and Degradation: Decomposes comparatively rapidly in the lower atmosphere (troposphere). Estimated atmospheric lifetime is 11.8 years. Products of decomposition will be highly dispersed and hence will have a very low concentration. It is not a significant contributor to photochemical smog and is not considered to be a VOC. Ozone depletion potential (ODP) is 0.055 measured against a standard of 1 for CFC11 (as defined by UNEP).

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, HCFC-22 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 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 empty containers to supplier.

Refrigeration Application: Subject to "no venting" regulations of Sections 608 and 609 of the Clean Air Act during the service or disposal of equipment.

14. TRANSPORT INFORMATION

DOT Hazard Description:

Proper Shipping Name: chlorodifluoromethane or Refrigerant gas R 22

Hazard Class: 2.2

Identification Number: UN 1018

Packing Group: None

Hazardous Substance (RQ): None

Placard/Label: Non-Flammable gas

15. REGULATORY INFORMATION

TSCA (Toxic Substances Control Act) Regulations, 40 CFR 710: All Ingredients are on the TSCA Chemical Substances Inventory.

CERCLA and SARA Regulations:

40 CFR 372: This product contains the following toxic chemicals subject to reporting requirements of SARA Section 313:

Chlorodifluoromethane (CAS 75-45-6)

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)

Health: Acute effects (CNS depression, cardiac sensitization).

Physical: Compressed liquefied gas.

(Actions may be necessary under SARA Section 311 – consult regulations for applicability).

16. OTHER INFORMATION

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

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