

SAFETY DATA SHEET**Freon™ 123 (R-123) refrigerant**

Version	Revision Date:	SDS Number:	Date of last issue: 01/30/2018
7.0	05/02/2018	1329735-00035	Date of first issue: 02/27/2017

SECTION 1. IDENTIFICATION

Product name : Freon™ 123 (R-123) refrigerant

Product code : D10114117

SDS-Identcode : 130000024258

Manufacturer or supplier's details

Company name of supplier : The Chemours Company FC, LLC

Address : 1007 Market Street
Wilmington, DE 19899 United States of America (USA)

Telephone : 1-844-773-CHEM (outside the U.S. 1-302-773-1000)

Emergency telephone : Medical emergency: 1-866-595-1473 (outside the U.S. 1-302-773-2000) ; Transport emergency: +1-800-424-9300 (outside the U.S. +1-703-527-3887)

Recommended use of the chemical and restrictions on use

Recommended use : Refrigerant

Restrictions on use : For professional and industrial installation and use only.

SECTION 2. HAZARDS IDENTIFICATION**GHS classification in accordance with 29 CFR 1910.1200**

Specific target organ systemic toxicity - single exposure : Category 3

GHS label elements

Hazard pictograms :



Signal Word : Warning

Hazard Statements : H336 May cause drowsiness or dizziness.

Precautionary Statements :

Prevention:

P261 Avoid breathing mist or vapors.

P271 Use only outdoors or in a well-ventilated area.

Response:

P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON

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CENTER/doctor if you feel unwell.

Storage:

P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

Dangerous for the ozone layer.

Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing. Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.

Rapid evaporation of the product may cause frostbite.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance
Substance name : 2,2-Dichloro-1,1,1-trifluoroethane
CAS-No. : 306-83-2

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
2,2-Dichloro-1,1,1-trifluoroethane	306-83-2	100

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately. When symptoms persist or in all cases of doubt seek medical advice.

If inhaled : If inhaled, remove to fresh air.
Get medical attention if symptoms occur.

In case of skin contact : In case of contact, immediately flush skin with plenty of water.
Get medical attention if symptoms occur.

In case of eye contact : Flush eyes with water as a precaution.
Get medical attention if irritation develops and persists.

If swallowed : If swallowed, DO NOT induce vomiting.
Get medical attention if symptoms occur.
Rinse mouth thoroughly with water.

Most important symptoms and effects, both acute and delayed : May cause cardiac arrhythmia.
Inhalation of high concentration may cause
Anaesthetic effects
Dizziness
confusion
Light-headedness

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Drowsiness
Unconsciousness
Irregular cardiac activity
fainting
Weakness
Skin contact may provoke the following symptoms:
Irritation
Discomfort
Pain
Swelling of tissue
Rash
Itching
Eye contact may provoke the following symptoms
Discomfort
Pain
Redness
Impairment of vision
Adverse effects from repeated inhalation may include
Liver disorders
May cause drowsiness or dizziness.

Protection of first-aiders : First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.

Notes to physician : Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Not applicable
Will not burn

Unsuitable extinguishing media : Not applicable
Will not burn

Specific hazards during fire fighting : Exposure to combustion products may be a hazard to health.

Hazardous combustion products : No hazardous combustion products are known

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Use water spray to cool unopened containers.
Remove undamaged containers from fire area if it is safe to do so.
Evacuate area.

Special protective equipment for fire-fighters : In the event of fire, wear self-contained breathing apparatus.
Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protection : Use personal protective equipment.

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- tive equipment and emergency procedures Follow safe handling advice and personal protective equipment recommendations.
- Environmental precautions : Discharge into the environment must be avoided.
Prevent further leakage or spillage if safe to do so.
Prevent spreading over a wide area (e.g., by containment or oil barriers).
Retain and dispose of contaminated wash water.
Local authorities should be advised if significant spillages cannot be contained.
- Methods and materials for containment and cleaning up : Soak up with inert absorbent material.
For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container.
Clean up remaining materials from spill with suitable absorbent.
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

- Technical measures : See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.
- Local/Total ventilation : Use with local exhaust ventilation.
- Advice on safe handling : Do not breathe vapors or spray mist.
Do not swallow.
Avoid contact with eyes.
Avoid prolonged or repeated contact with skin.
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment
Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point.
Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.
Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems.
Never attempt to lift cylinder by its cap.
Do not drag, slide or roll cylinders.
Use a suitable hand truck for cylinder movement.
Take care to prevent spills, waste and minimize release to the environment.
- Conditions for safe storage : Cylinders should be stored upright and firmly secured to prevent falling or being knocked over.

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Separate full containers from empty containers.
 Do not store near combustible materials.
 Avoid area where salt or other corrosive materials are present.
 Do not expose drums to direct heat or temperature above 46°C (115°F) to avoid pressurizing and possibly distorting the drums.
 Material should not be dispensed by pouring from pail/drum shipping containers containing 5 gallons or more. The use of a drum pump is recommended for dispensing from pail/drum shipping containers with 5 gallons or more, except for smaller containers where adequate ventilation can be used to manage the exposure.
 Keep in properly labeled containers.
 Store locked up.
 Keep in a cool, well-ventilated place.
 Store in accordance with the particular national regulations.

- Materials to avoid : No special restrictions on storage with other products.
- Recommended storage temperature : < 126 °F / < 52 °C
- Storage period : > 10 y
- Further information on storage stability : The product has an indefinite shelf life when stored properly.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
2,2-Dichloro-1,1,1-trifluoroethane	306-83-2	TWA	50 ppm	US WEEL

Engineering measures : Minimize workplace exposure concentrations.
 Use with local exhaust ventilation.

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

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- Hand protection
Material : Low temperature resistant gloves
- Remarks : Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday. Breakthrough time is not determined for the product. Change gloves often!
- Eye protection : Wear the following personal protective equipment:
Safety glasses
- Skin and body protection : Skin should be washed after contact.
- Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place.
When using do not eat, drink or smoke.
Wash contaminated clothing before re-use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance : liquid
- Color : colorless
- Odor : slight, ether-like
- Odor Threshold : No data available
- pH : 7
- Melting point/freezing point : No data available
- Initial boiling point and boiling range : 82.0 °F / 27.8 °C
- Flash point : does not flash
- Evaporation rate : < 1
(CCL4=1.0)
- Flammability (solid, gas) : Not applicable
- Flammability (liquids) : Will not burn
- Upper explosion limit / Upper flammability limit : Upper flammability limit
Method: ASTM E681
None.

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Lower explosion limit / Lower flammability limit : Lower flammability limit
Method: ASTM E681
None.

Vapor pressure : 913.6 hPa (77 °F / 25 °C)

Relative vapor density : 5.5

Relative density : 1.47 (77 °F / 25 °C)

Density : 1.46 g/cm³ (77 °F / 25 °C)
(as liquid)

Solubility(ies)
Water solubility : 3.9 g/l (77 °F / 25 °C)

Partition coefficient: n-octanol/water : No data available

Autoignition temperature : No data available

Decomposition temperature : No data available

Viscosity
Viscosity, kinematic : No data available

Explosive properties : Not explosive

Oxidizing properties : The substance or mixture is not classified as oxidizing.

Particle size : Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Not classified as a reactivity hazard.

Chemical stability : Stable under normal conditions.

Possibility of hazardous reactions : None known.

Conditions to avoid : None known.

Incompatible materials : None.

Hazardous decomposition products : No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation
Skin contact

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Ingestion
Eye contact

Acute toxicity

Not classified based on available information.

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Acute oral toxicity : LD50 (Rat): 9,000 mg/kg
Method: OECD Test Guideline 401

Acute inhalation toxicity : LC50 (Rat): 32000 ppm
Exposure time: 4 h
Test atmosphere: gas

Lowest observed adverse effect concentration (Dog): 20000 ppm
Symptoms: Cardiac sensitization

No observed adverse effect concentration (Dog): 10000 ppm
Symptoms: Cardiac sensitization

Cardiac sensitisation threshold limit (Dog): 124,000 mg/m³
Symptoms: Cardiac sensitization

Acute dermal toxicity : LD50 (Rabbit): > 2,000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation

Not classified based on available information.

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Species : Rabbit
Result : No skin irritation

Serious eye damage/eye irritation

Not classified based on available information.

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Species : Rabbit
Result : No eye irritation

Respiratory or skin sensitization

Skin sensitization

Not classified based on available information.

Respiratory sensitization

Not classified based on available information.

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Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Routes of exposure : Skin contact
Species : Guinea pig
Result : negative

Result : negative

Germ cell mutagenicity

Not classified based on available information.

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Germ cell mutagenicity - Assessment : Weight of evidence does not support classification as a germ cell mutagen.

Carcinogenicity

Not classified based on available information.

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Carcinogenicity - Assessment : Weight of evidence does not support classification as a carcinogen, Based on data from similar materials

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Not classified based on available information.

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Reproductive toxicity - Assessment : Weight of evidence does not support classification for reproductive toxicity

STOT-single exposure

May cause drowsiness or dizziness.

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Assessment : May cause drowsiness or dizziness.

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STOT-repeated exposure

Not classified based on available information.

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Assessment : No significant health effects observed in animals at concentrations of 1 mg/l/6h/d or less.

Repeated dose toxicity

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Species : Rat
NOAEL : 3.13 mg/l
LOAEL : 6.3 mg/l
Application Route : inhalation (vapor)
Exposure time : 70 d
Remarks : No significant adverse effects were reported

Aspiration toxicity

Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 55.5 mg/l
Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 17.3 mg/l
Exposure time: 48 h
Toxicity to algae : ErC50 (Pseudokirchneriella subcapitata (green algae)): 96.6 mg/l
Exposure time: 96 h
EbC50 (Pseudokirchneriella subcapitata (green algae)): 67.8 mg/l
Exposure time: 96 h

Persistence and degradability

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Biodegradability : Result: Not readily biodegradable.
Biodegradation: 24 %
Exposure time: 28 d

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Bioaccumulative potential

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Bioaccumulation : Bioconcentration factor (BCF): 33

Mobility in soil

No data available

Other adverse effects

Components:

2,2-Dichloro-1,1,1-trifluoroethane:

Ozone-Depletion Potential : 0.02

Where a range of ODPs is indicated, the highest value in that range shall be used for the purposes of the Protocol. The ODPs listed as a single value have been determined from calculations based on laboratory measurements. Those listed as a range are based on estimates and are less certain. The range pertains to an isomeric group. The upper value is the estimate of the ODP of the isomer with the highest ODP, and the lower value is the estimate of the ODP of the isomer with the lowest ODP.

Regulation: UNEP - Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer (Update: 2006-10-01)

Group: Annex C - Group I: HCFCs (consumption and production)

0.02

Includes all isomers of the substance, regardless of whether the isomer is explicitly listed on its own.

Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class II Substances (Update: 2007-07-01)

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Dispose of in accordance with local regulations.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.
If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG

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Not regulated as a dangerous good

IATA-DGR

Not regulated as a dangerous good

IMDG-Code

Not regulated as a dangerous good

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

Domestic regulation

49 CFR

Not regulated as a dangerous good

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Specific target organ toxicity (single or repeated exposure)

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

2,2-Dichloro-1,1,1-trifluoroethane	306-83-2	100 %
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US State Regulations

Pennsylvania Right To Know

2,2-Dichloro-1,1,1-trifluoroethane	306-83-2
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California Prop. 65

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

International Regulations

Montreal Protocol (Ozone Depleting Substances) : 2,2-Dichloro-1,1,1-trifluoroethane

**SAFETY DATA SHEET - R-123**

May 29, 2015
(Revision 01 – August 4, 2015)

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



SAFETY DATA SHEET - R-123

**May 29, 2015
(Revision 01 – August 4, 2015)**

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 %

<u>Ingredient Name</u>	<u>CAS Number</u>
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.



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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.



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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 125°F (52°C) to avoid over pressurizing the cylinder. Do not expose drums to direct heat or temperature above 115°F (46°C) 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

<u>INGREDIENT NAME</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>OTHER LIMIT</u>
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 @ 77°F (25°C)
VAPOR DENSITY (AIR = 1):	5.3 @ 77°F (25°C)
SPECIFIC GRAVITY (H ₂ O = 1):	1.47 @ 77°F (25°C)
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



SAFETY DATA SHEET - R-123

May 29, 2015
(Revision 01 – August 4, 2015)

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.



SAFETY DATA SHEET - R-123

**May 29, 2015
(Revision 01 – August 4, 2015)**

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.

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.

Sid Harvey item #'s R123X100 & R123X200 & R123UR

**Freon™ 123 refrigerant**

Version 3.0

Revision Date 03/15/2016

Ref. 130000024258

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Freon™ 123 refrigerant
Tradename/Synonym	:	HCFC-123 2,2-Dichloro-1,1,1-trifluoroethane R-123
Product Grade/Type	:	ASHRAE Refrigerant number designation: R-123
Product Use	:	Refrigerant, For professional users only.
Restrictions on use	:	Do not use product for anything outside of the above specified uses
Manufacturer/Supplier	:	The Chemours Company FC, LLC 1007 Market Street Wilmington, DE 19899 United States of America
Product Information	:	1-844-773-CHEM (outside the U.S. 1-302-773-1000)
Medical Emergency	:	1-866-595-1473 (outside the U.S. 1-302-773-2000)
Transport Emergency	:	CHEMTREC: +1-800-424-9300 (outside the U.S. +1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION**Product hazard category**

Specific target organ toxicity - single exposure Category 3

**Freon™ 123 refrigerant**

Version 3.0

Revision Date 03/15/2016

Ref. 130000024258

Label content

Pictogram

:



Signal word

: Warning

Hazardous warnings

: May cause drowsiness or dizziness.

Hazardous prevention
measures

: Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Use only outdoors or in a well-ventilated area.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor/ physician if you feel unwell.
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Dispose of contents/ container to an approved waste disposal plant.

Other hazards

Misuse or intentional inhalation abuse may lead to death without warning., Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
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2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	306-83-2	100 %
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SECTION 4. FIRST AID MEASURES

- General advice : Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.
- Inhalation : Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Call a physician.
- Skin contact : In case of contact, immediately flush skin with plenty of water. Get medical attention if irritation develops and persists.
- Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
- Ingestion : Material poses an aspiration hazard. If swallowed, DO NOT induce vomiting. Drink 1 or 2 glasses of water. Never give anything by mouth to an unconscious person. Call a physician. If vomiting occurs, have victim lean forward to reduce the risk of aspiration.
- Most important symptoms/effects, acute and delayed : No applicable data available.
- Protection of first-aiders : If potential for exposure exists refer to Section 8 for specific personal protective equipment.
- Notes to physician : Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.



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SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : No applicable data available.
- Specific hazards : The product is not flammable.
- Special protective equipment for firefighters : No applicable data available.
- Further information : Cool containers/tanks with water spray.

SECTION 6. ACCIDENTAL RELEASE MEASURES

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

- Safeguards (Personnel) : Ventilate spill area. Comply with Federal, State and Local regulations on reporting releases
- Environmental precautions : Prevent material from entering sewers, waterways, or low areas. Should not be released into the environment. In accordance with local and national regulations.
- Spill Cleanup : Ventilate area using forced ventilation, especially low or enclosed places where heavy vapors might collect. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).
- Accidental Release Measures : No applicable data available.



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SECTION 7. HANDLING AND STORAGE

- | | |
|-----------------------------|--|
| Handling (Personnel) | : Avoid breathing high concentrations of vapour. Use only with adequate ventilation especially for enclosed and low area where vapors can accumulate. Provide sufficient air exchange and/or exhaust in work rooms. Avoid contact of liquid with eyes and prolonged skin exposure. Decomposition will occur when product comes in contact with open flame or electrical heating elements.
Handle in accordance with good industrial hygiene and safety practice. When using do not eat, drink or smoke. Do not breathe vapours or spray mist. Avoid contact with skin, eyes and clothing. Wash hands before breaks and at the end of workday. |
| Handling (Physical Aspects) | : No applicable data available. |
| Dust explosion class | : No applicable data available. |
| Storage | : Keep containers tightly closed and in an upright position. Store in a clean, dry place. Keep away from direct sunlight. Do not heat cylinder above 52°C to avoid over pressurizing the cylinder. Do not expose drums to direct heat or temperature above 46°C (115°F) to avoid pressurizing and possibly distorting the drums.
The product has an indefinite shelf life when stored properly. |
| Storage period | : > 10 yr |
| Storage temperature | : < 52 °C (< 126 °F) |

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- | | |
|-------------------------------|--|
| Engineering controls | : Use only with adequate ventilation. Keep container tightly closed. |
| Personal protective equipment | |
| Respiratory protection | : Where there is potential for airborne exposures in excess of applicable limits, wear NIOSH approved respiratory protection. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. |
| Eye protection | : Safety glasses with side-shields Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material. |

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- Skin and body protection : Where there is potential for skin contact, have available and wear as appropriate, impervious gloves, apron, pants, jacket, hood and boots.
- Protective measures : Self-contained breathing apparatus (SCBA) is required if a large release occurs. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
- Exposure Guidelines
Exposure Limit Values

This product does not contain any exposure limits that require disclosure according to OSHA Hazard Communication Standard 2012.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance
- Physical state : liquid
 - Form : liquid
 - Color : colourless
- Odor : slight, ether-like
- Odor threshold : No applicable data available.
- pH : neutral
- Melting point/range : No applicable data available.
- Boiling point/boiling range : Boiling point
27.8 °C (82.0 °F)
- Flash point : does not flash
- Evaporation rate : < 1
(CCL4=1.0)

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Flammability (solid, gas)	: Liquid: Does not sustain combustion.
Upper explosion limit	: Method: None per ASTM E681
Lower explosion limit	: Method: None per ASTM E681
Vapor pressure	: 913.6 hPa at 25 °C (77 °F)
Vapor density	: 5.5 at 30°C (84°F) and 1013 hPa (Air=1.0)
Density	: 1.46 g/cm ³ at 25 °C (77 °F) (as liquid)
Specific gravity (Relative density)	: 1.47 at 25 °C (77 °F)
Water solubility	: 3.9 g/l at 25 °C (77 °F)
Solubility(ies)	: No applicable data available.
Partition coefficient: n-octanol/water	: No applicable data available.
Auto-ignition temperature	: No applicable data available.
Decomposition temperature	: No applicable data available.
Viscosity, kinematic	: No applicable data available.
Viscosity, dynamic	: No applicable data available.
% Volatile	: 100 %

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: Decomposes on heating.
Chemical stability	: Stable at normal temperatures and storage conditions.

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Possibility of hazardous reactions	:	Polymerization will not occur.
Conditions to avoid	:	No applicable data available.
Incompatible materials	:	Alkali metals Alkaline earth metals, Powdered metals, Powdered metal salts
Hazardous decomposition products	:	Carbonyl halides, Hydrogen chloride, Hydrogen fluoride

SECTION 11. TOXICOLOGICAL INFORMATION

2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)

Inhalation	:	Target Organs: Central nervous system Central nervous system effects
Inhalation Low Observed Adverse Effect Concentration (LOAEC)	:	20000 ppm , Dog Cardiac sensitization
Inhalation No Observed Adverse Effect Concentration	:	10000 ppm , Dog Cardiac sensitization
Dermal LD50	:	> 2,000 mg/kg , Rabbit
Dermal LD50	:	> 2,000 mg/kg , Rat
Oral LD50	:	9,000 mg/kg , Rat Respiratory effects Abnormal posture
Skin irritation	:	No skin irritation, Rabbit Not expected to cause skin irritation based on expert review of the properties of the substance.
Eye irritation	:	No eye irritation, Rabbit Not expected to cause eye irritation based on expert review of the properties of the substance.
Skin sensitization	:	Does not cause skin sensitisation., Guinea pig Did not cause sensitisation on laboratory animals. Not expected to cause sensitization based on expert review of the properties of the substance.

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		Does not cause respiratory sensitisation., multiple species
Repeated dose toxicity	: Inhalation Rat - vapour	No toxicological effects warranting significant target organ toxicity classification were seen below the recommended guidance values for classification.
Carcinogenicity	: Not classifiable as a human carcinogen. The observed tumors do not appear to be relevant for men.	
Mutagenicity	: Animal testing did not show any mutagenic effects. Did not cause genetic damage in cultured bacterial cells.	
Reproductive toxicity	: No toxicity to reproduction Animal testing showed no reproductive toxicity. No effects on or via lactation	
Teratogenicity	: Animal testing showed no developmental toxicity.	
Further information	: Cardiac sensitisation threshold limit : 124000 mg/m3	

Carcinogenicity

The carcinogenicity classifications for this product and/or its ingredients have been determined according to HazCom 2012, Appendix A.6. The classifications may differ from those listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or those found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest edition).

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

SECTION 12. ECOLOGICAL INFORMATION

Aquatic Toxicity

**Freon™ 123 refrigerant**

Version 3.0

Revision Date 03/15/2016

Ref. 130000024258

2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)

96 h LC50	:	Oncorhynchus mykiss (rainbow trout) 55.5 mg/l
96 h ErC50	:	Pseudokirchneriella subcapitata (green algae) 96.6 mg/l
96 h EbC50	:	Pseudokirchneriella subcapitata (green algae) 67.8 mg/l
48 h EC50	:	Daphnia magna (Water flea) 17.3 mg/l

Environmental Fate**2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)**

Biodegradability	:	24 % Not readily biodegradable.
Bioaccumulation	:	Bioconcentration factor (BCF) : 33 Bioaccumulation is unlikely.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste disposal methods - Product	:	Can be used after re-conditioning. Recover by distillation or remove to a permitted waste disposal facility. Comply with applicable Federal, State/Provincial and Local Regulations.
Contaminated packaging	:	Empty pressure vessels should be returned to the supplier.

SECTION 14. TRANSPORT INFORMATION

Not classified as dangerous in the meaning of transport regulations.

**Freon™ 123 refrigerant**

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SECTION 15. REGULATORY INFORMATION

TSCA	: On the inventory, or in compliance with the inventory
SARA 313 Regulated Chemical(s)	: 2,2-Dichloro-1,1,1-trifluoroethane
NJ Right to Know Regulated Chemical(s)	: Substances on the New Jersey Workplace Hazardous Substance List present at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): 2,2-Dichloro-1,1,1-trifluoroethane
California Prop. 65	: Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known

SECTION 16. OTHER INFORMATION

Freon™ and any associated logos are trademarks or copyrights of The Chemours Company FC, LLC. Chemours™ and the Chemours Logo are trademarks of The Chemours Company. Before use read Chemours safety information. For further information contact the local Chemours office or nominated distributors.

Revision Date : 03/15/2016

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Significant change from previous version is denoted with a double bar.

Safety Data Sheet

Sid Harvey item #'s R123X100 & R123X200

SDS # Z0008



DuPont™ Suva® 123 Refrigerant

Version 2.2

Revision Date 05/05/2015

Ref. 130000024258

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : DuPont™ Suva® 123 Refrigerant
Tradename/Synonym : HCFC-123
2,2-Dichloro-1,1,1-trifluoroethane
R-123

Product Grade/Type : ASHRAE Refrigerant number designation: R-123

Product Use : Refrigerant, For professional users only.

Restrictions on use : Do not use product for anything outside of the above specified uses
Manufacturer/Supplier : DuPont
1007 Market Street
Wilmington, DE 19898
United States of America

Product Information : +1-800-441-7515 (outside the U.S. +1-302-774-1000)
Medical Emergency : 1-800-441-3637 (outside the U.S. 1-302-774-1139)
Transport Emergency : CHEMTREC: +1-800-424-9300 (outside the U.S. +1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION

Product hazard category
Specific target organ toxicity - single exposure Category 3

DuPont™ Suva® 123 Refrigerant

Version 2.2

Revision Date 05/05/2015

Ref. 130000024258

Label content

Pictogram

:



Signal word

: Warning

Hazardous warnings

: May cause drowsiness or dizziness.

Hazardous prevention measures

: Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Use only outdoors or in a well-ventilated area.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor/ physician if you feel unwell.
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Dispose of contents/ container to an approved waste disposal plant.

Other hazards

Misuse or intentional inhalation abuse may lead to death without warning., Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	306-83-2	100 %

**DuPont™ Suva® 123 Refrigerant**

Version 2.2

Revision Date 05/05/2015

Ref. 130000024258

SECTION 4. FIRST AID MEASURES

- General advice : Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.
- Inhalation : Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Call a physician.
- Skin contact : In case of contact, immediately flush skin with plenty of water. Get medical attention if irritation develops and persists.
- Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
- Ingestion : Material poses an aspiration hazard. If swallowed, DO NOT induce vomiting. Drink 1 or 2 glasses of water. Never give anything by mouth to an unconscious person. Call a physician. If vomiting occurs, have victim lean forward to reduce the risk of aspiration.
- Most important symptoms/effects, acute and delayed : No applicable data available.
- Protection of first-aiders : If potential for exposure exists refer to Section 8 for specific personal protective equipment.
- Notes to physician : Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : No applicable data available.
- Specific hazards : The product is not flammable.

**DuPont™ Suva® 123 Refrigerant**

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Special protective equipment for firefighters : No applicable data available.

Further information : Cool containers/tanks with water spray.

SECTION 6. ACCIDENTAL RELEASE MEASURES

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

Safeguards (Personnel) : Ventilate spill area. Comply with Federal, State and Local regulations on reporting releases

Environmental precautions : Prevent material from entering sewers, waterways, or low areas. Should not be released into the environment. In accordance with local and national regulations.

Spill Cleanup : Ventilate area using forced ventilation, especially low or enclosed places where heavy vapors might collect. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

Accidental Release Measures : DuPont Emergency Exposure Limits (EEL) are established to facilitate site or plant emergency evacuation and specify airborne concentrations of brief durations which should not result in permanent adverse health effects or interfere with escape. EEL's are expressed as airborne concentration multiplied by time (CxT) for up to a maximum of 60 minutes and as a ceiling airborne concentration. These limits are used in conjunction with engineering controls/monitoring and as an aid in planning for episodic releases and spills. For more information on the applicability of EEL's, contact DuPont. The DuPont Emergency Exposure Limit (EEL) for HCFC-123 is 1000 ppm for up to 60 minutes with a 1 minute not-to-exceed ceiling of 2500 ppm.

SECTION 7. HANDLING AND STORAGE

Handling (Personnel) : Avoid breathing high concentrations of vapour. Use only with adequate ventilation especially for enclosed and low area where vapors can accumulate. Provide sufficient air exchange and/or exhaust in work rooms.

**DuPont™ Suva® 123 Refrigerant**

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Revision Date 05/05/2015

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Avoid contact of liquid with eyes and prolonged skin exposure. Decomposition will occur when product comes in contact with open flame or electrical heating elements.

Handle in accordance with good industrial hygiene and safety practice. When using do not eat, drink or smoke. Do not breathe vapours or spray mist. Avoid contact with skin, eyes and clothing. Wash hands before breaks and at the end of workday.

Handling (Physical Aspects)	:	No applicable data available.
Dust explosion class	:	No applicable data available.
Storage	:	Keep containers tightly closed and in an upright position. Store in a clean, dry place. Keep away from direct sunlight. Do not heat cylinder above 52°C to avoid over pressurizing the cylinder. Do not expose drums to direct heat or temperature above 46°C (115°F) to avoid pressurizing and possibly distorting the drums. The product has an indefinite shelf life when stored properly.
Storage period	:	> 10 yr
Storage temperature	:	< 52 °C (< 126 °F)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls	:	Use only with adequate ventilation. Keep container tightly closed.
Personal protective equipment		
Respiratory protection	:	Where there is potential for airborne exposures in excess of applicable limits, wear NIOSH approved respiratory protection. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Eye protection	:	Safety glasses with side-shields Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.
Skin and body protection	:	Where there is potential for skin contact, have available and wear as appropriate, impervious gloves, apron, pants, jacket, hood and boots.
Protective measures	:	Self-contained breathing apparatus (SCBA) is required if a large release occurs. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Exposure Guidelines

**DuPont™ Suva® 123 Refrigerant**

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Exposure Limit Values

2,2-Dichloro-1,1,1-trifluoroethane
AEL * (DUPONT) 50 ppm 8 & 12 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.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state : liquid
Form : liquid
Color : colourless

Odor : slight, ether-like

Odor threshold : No applicable data available.

pH : neutral

Melting point/range : No applicable data available.

Boiling point/boiling range : Boiling point
27.8 °C (82.0 °F)

Flash point : does not flash

Evaporation rate : < 1
(CCL4=1.0)

Flammability (solid, gas) : Liquid: Does not sustain combustion.

Upper explosion limit : Method: None per ASTM E681

Lower explosion limit : Method: None per ASTM E681

Vapor pressure : 913.6 hPa at 25 °C (77 °F)

Vapor density : 5.5 at 30°C (84°F) and 1013 hPa (Air=1.0)

**DuPont™ Suva® 123 Refrigerant**

Version 2.2

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Density	:	1.46 g/cm ³ at 25 °C (77 °F) (as liquid)
Specific gravity (Relative density)	:	1.47 at 25 °C (77 °F)
Water solubility	:	3.9 g/l at 25 °C (77 °F)
Solubility(ies)	:	No applicable data available.
Partition coefficient: n-octanol/water	:	No applicable data available.
Auto-ignition temperature	:	No applicable data available.
Decomposition temperature	:	No applicable data available.
Viscosity, kinematic	:	No applicable data available.
Viscosity, dynamic	:	No applicable data available.
% Volatile	:	100 %

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Decomposes on heating.
Chemical stability	:	Stable at normal temperatures and storage conditions.
Possibility of hazardous reactions	:	Polymerization will not occur.
Conditions to avoid	:	No applicable data available.
Incompatible materials	:	Alkali metals Alkaline earth metals, Powdered metals, Powdered metal salts
Hazardous decomposition products	:	Carbonyl halides, Hydrogen chloride, Hydrogen fluoride

SECTION 11. TOXICOLOGICAL INFORMATION

2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)

Inhalation	:	Target Organs: Central nervous system Central nervous system effects
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**DuPont™ Suva® 123 Refrigerant**

Version 2.2

Revision Date 05/05/2015

Ref. 130000024258

Inhalation Low Observed Adverse Effect Concentration (LOAEC)	:	20000 ppm , Dog Cardiac sensitization
Inhalation No Observed Adverse Effect Concentration	:	10000 ppm , Dog Cardiac sensitization
Dermal LD50	:	> 2,000 mg/kg , Rabbit
Dermal LD50	:	> 2,000 mg/kg , Rat
Oral LD50	:	9,000 mg/kg , Rat Respiratory effects Abnormal posture
Skin irritation	:	No skin irritation, Rabbit Not expected to cause skin irritation based on expert review of the properties of the substance.
Eye irritation	:	No eye irritation, Rabbit Not expected to cause eye irritation based on expert review of the properties of the substance.
Skin sensitization	:	Does not cause skin sensitisation., Guinea pig Did not cause sensitisation on laboratory animals. Not expected to cause sensitization based on expert review of the properties of the substance. Does not cause respiratory sensitisation., multiple species
Repeated dose toxicity	:	Inhalation Rat - vapour No toxicological effects warranting significant target organ toxicity classification were seen below the recommended guidance values for classification.
Carcinogenicity	:	Not classifiable as a human carcinogen. The observed tumors do not appear to be relevant for men.
Mutagenicity	:	Animal testing did not show any mutagenic effects. Did not cause genetic damage in cultured bacterial cells.

**DuPont™ Suva® 123 Refrigerant**

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- Reproductive toxicity : No toxicity to reproduction
Animal testing showed no reproductive toxicity.
No effects on or via lactation
- Teratogenicity : Animal testing showed no developmental toxicity.
- Further information : Cardiac sensitisation threshold limit : 124000 mg/m3

Carcinogenicity

The carcinogenicity classifications for this product and/or its ingredients have been determined according to HazCom 2012, Appendix A.6. The classifications may differ from those listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or those found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest edition).

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

SECTION 12. ECOLOGICAL INFORMATION**Aquatic Toxicity****2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)**

- 96 h LC50 : Oncorhynchus mykiss (rainbow trout) 55.5 mg/l
- 96 h ErC50 : Pseudokirchneriella subcapitata (green algae) 96.6 mg/l
- 96 h EbC50 : Pseudokirchneriella subcapitata (green algae) 67.8 mg/l
- 48 h EC50 : Daphnia magna (Water flea) 17.3 mg/l

Environmental Fate**2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)**

- Biodegradability : 24 %
Not readily biodegradable.
- Bioaccumulation : Bioconcentration factor (BCF) : 33
Bioaccumulation is unlikely.

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SECTION 13. DISPOSAL CONSIDERATIONS

Waste disposal methods - Product : Can be used after re-conditioning. Recover by distillation or remove to a permitted waste disposal facility. Comply with applicable Federal, State/Provincial and Local Regulations.

Contaminated packaging : Empty pressure vessels should be returned to the supplier.

SECTION 14. TRANSPORT INFORMATION

Not classified as dangerous in the meaning of transport regulations.

SECTION 15. REGULATORY INFORMATION

TSCA : On the inventory, or in compliance with the inventory

SARA 313 Regulated Chemical(s) : 2,2-Dichloro-1,1,1-trifluoroethane

NJ Right to Know Regulated Chemical(s) : Substances on the New Jersey Workplace Hazardous Substance List present at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): 2,2-Dichloro-1,1,1-trifluoroethane

California Prop. 65 : Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known

SECTION 16. OTHER INFORMATION

SUVA® is a registered trademark of E. I. du Pont de Nemours and Company
® DuPont's registered trademark
Before use read DuPont's safety information.



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For further information contact the local DuPont office or DuPont's nominated distributors.

Revision Date : 05/05/2015

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Significant change from previous version is denoted with a double bar.



The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

DuPont
Material Safety Data Sheet

Page 1

2191FR "SUVA"-123 REFRIGERANT
Revised 7-APR-2004

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

"SUVA" is a trademark of DuPont.

Corporate MSDS Number : DU002798
CAS Number : 306-83-2
Formula : CHCl₂CF₃
CAS Name : 2,2-dichloro-1,1,1-trifluoroethane (HCFC-123)

Company Identification

MANUFACTURER/DISTRIBUTOR

DuPont Fluoroproducts
1007 Market Street
Wilmington, DE 19898

PHONE NUMBERS

Product Information : 1-800-441-7515 (outside the U.S.
302-774-1000)
Transport Emergency : CHEMTREC 1-800-424-9300(outside U.S.
703-527-3887)
Medical Emergency : 1-800-441-3637 (outside the U.S.
302-774-1000)

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
*ETHANE, 2,2-DICHLORO-1,1,1-TRIFLUORO- (HCFC 123)	306-83-2	100

* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

HAZARDS IDENTIFICATION

Potential Health Effects

HCFC-123

Inhalation of high concentrations of vapor is harmful and may cause heart irregularities, unconsciousness, or death. Intentional misuse or deliberate inhalation may cause death without warning. Vapor reduces oxygen available for

(HAZARDS IDENTIFICATION - Continued)

breathing and is heavier than air. Product causes mild eye irritation. Decomposition products are hazardous.

HEALTH HAZARDS:

Eye contact may cause irritation with discomfort, tearing, or blurring of vision.

Overexposure by inhalation may cause liver damage with altered enzyme levels, and temporary nervous system depression with anesthetic effects such as dizziness, weakness, headache, confusion, incoordination, and loss of consciousness. With overexposure (>2%), possibly temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation.

Increased susceptibility to the effects of this material may be observed in persons with pre-existing disease of the central nervous system, cardiovascular system, and liver.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

INHALATION

If high concentrations are inhaled, immediately remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT

In case of contact, flush with water. Get medical attention if irritation is present.

EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION

Material poses an aspiration hazard. If swallowed, do not induce vomiting. Immediately give 2 glasses of water. Never give anything by mouth to an unconscious person. Call a physician.

(FIRST AID MEASURES - Continued)

If vomiting occurs naturally, have victim lean forward to reduce the risk of aspiration.

Notes to Physicians

THIS MATERIAL MAY MAKE THE HEART MORE SUSCEPTIBLE TO ARRHYTHMIAS. Catecholamines such as adrenaline, and other compounds having similar effects, should be reserved for emergencies and then used only with special caution.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point : No flash point

Flammable Limits in air, % by Volume:

LEL : None per ASTM E681

UEL : None per ASTM E681

Autoignition: Not determined

Extinguishing Media

Use media appropriate for surrounding material.

Fire Fighting Instructions

Cool tank/container with water spray. Self-contained breathing apparatus (SCBA) is required if drums rupture and contents are spilled under fire conditions.

Water runoff should be contained and neutralized prior to release.

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 spill area.

(ACCIDENTAL RELEASE MEASURES - Continued)

DuPont Emergency Exposure Limits (EEL) are established to facilitate site or plant emergency evacuation and specify airborne concentrations of brief durations which should not result in permanent adverse health effects or interfere with escape. EEL's are expressed as airborne concentration multiplied by time (CxT) for up to a maximum of 60 minutes and as a ceiling airborne concentration. These limits are used in conjunction with engineering controls/monitoring and as an aid in planning for episodic releases and spills. For more information on the applicability of EEL's, contact DuPont.

The DuPont Emergency Exposure Limit (EEL) for HCFC-123 is 1000 ppm for up to 60 minutes with a 1 minute not-to-exceed ceiling of 2500 ppm.

Initial Containment

Dike spill. Prevent material from entering sewers, waterways, or low areas.

Spill Clean Up

Collect on absorbent material and transfer to steel drums for recovery/disposal. Comply with Federal, State, and local regulations for reporting releases.

HANDLING AND STORAGE

Handling (Personnel)

Avoid breathing high concentrations of vapor. Provide adequate ventilation for storage, handling, and use, especially for enclosed or low spaces. Avoid contact of liquid with eyes and prolonged skin exposure.

Handling (Physical Aspects)

Do not allow product to contact open flame or electrical heating elements because dangerous decomposition products may form.

Storage

Store in a clean, dry place.

Do not heat above 52 deg C to avoid over pressurizing the container.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use only with adequate ventilation. Keep container tightly closed. Vapors are heavier than air posing a hazard of asphyxia if they are trapped in enclosed or low places.

Personal Protective Equipment

EYE/FACE PROTECTION

Wear safety glasses or coverall chemical splash goggles.

RESPIRATORS

Where there is potential for airborne exposures in excess of applicable limits, wear NIOSH approved respiratory protection.

PROTECTIVE CLOTHING

Where there is potential for skin contact have available and wear as appropriate impervious gloves, apron, pants, and jacket.

Exposure Guidelines

Exposure Limits

"SUVA"-123 REFRIGERANT

PEL (OSHA)	: None Established
TLV (ACGIH)	: None Established
AEL * (DuPont)	: 50 ppm, 8 & 12 Hr. TWA
WEEL (AIHA)	: 50 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

Physical Data

Boiling Point	: 27.6 C (81.7 F) @ 760 mm Hg
Vapor Pressure	: 13 psia @ 25 C (77 F)
Vapor Density	: 5.3 (Air=1.0)
% Volatiles	: 100 WT%
Evaporation Rate	: <1 (CCl4=1.0)
Solubility in Water	: 0.39 WT% @ 25 C (77 F)
pH	: Neutral
Odor	: Ether (slight).
Form	: Liquid.
Color	: Clear, Colorless.
Liquid Density	: 1.46 g/cm ³ @ 25 C (77 F)

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 hydrochloric and hydrofluoric acids, and possibly carbonyl halides.

These materials are toxic and irritating. Contact should be avoided.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Animal Data

HCFC-123

Dermal ALD, rabbit: >2000 mg/kg
Oral ALD, rat: 9000 mg/kg
Inhalation 4 hour, LC50, rat: 32,000 ppm

Animal testing indicates that 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 exposure by inhalation 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

(TOXICOLOGICAL INFORMATION - Continued)

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.

ECOLOGICAL INFORMATION

Ecotoxicological Information

AQUATIC TOXICITY:
Slightly toxic.
96 hour LC50 - Fathead minnows: > 77 mg/L

DISPOSAL CONSIDERATIONS

Waste Disposal

Recover by distillation or remove to a permitted waste disposal facility. Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.

TRANSPORTATION INFORMATION

Shipping Information

Not regulated as a hazardous material by DOT or IMO.

Shipping Containers

Tank Cars.
Tank Trucks.
Pails.
Drums.

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 : No

HAZARDOUS CHEMICAL LISTS

SARA Extremely
Hazardous Substance - No
CERCLA Hazardous Substance - No
SARA Toxic Chemical - See Components Section

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.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : MSDS Coordinator

(Continued)

> : DuPont Fluoroproducts
Address : Wilmington, DE 19898
Telephone : (800) 441-7515

Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS