



## DuPont™ FREON® 22 Refrigerant

Version 3.0

Revision Date 09.02.2010

Ref. 130000024323

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

### 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

**Product name** : DuPont™ FREON® 22 Refrigerant  
**Other names** : R-22

#### Recommended use of the chemical and restriction on use

Recommended use : Refrigerant

#### Manufacturer or supplier's details

Company : PT DuPont Agricultural Products Indonesia  
 Street address : Beltway Office Park Building A, 5th & 6th. Floor, Jalan Ampera Raya No. 9-10, Jakarta 12550, Indonesia

Telephone : +62 21-782-2555  
 Telefax : +62 21-782-2565

**Emergency telephone** : 0-800-140-1288 and +62-21-722-8641

### 2. HAZARDS IDENTIFICATION

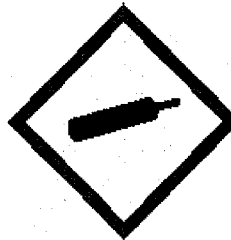
#### Product hazard category

Gases under pressure

Liquefied gas

#### Label content

Pictogram :



Signal word : Warning

Hazardous warnings : Contains gas under pressure; may explode if heated.

Hazardous prevention measures : Protect from sunlight. Store in a well-ventilated place.

#### Other hazards

Rapid evaporation of the liquid may cause frostbite.  
 Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.  
 May cause cardiac arrhythmia.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS


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**Chemical nature** : Substance

**Components**

Chemical Name	CAS-No.	Concentration
Chlorodifluoromethane	75-45-6	>99.5%

**4. FIRST AID MEASURES**

Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.

**First aid measures for different exposure routes**

Inhalation : Remove from exposure, lie down. Artificial respiration and/or oxygen may be necessary. Consult a physician.

Skin contact : Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.

Eye contact : Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Ingestion : Is not considered a potential route of exposure.

Main symptoms and hazards : No information available.

Protection of first-aiders : No information available.

Notes to physician : Do not give adrenaline or similar drugs.

**5. FIRE-FIGHTING MEASURES**

Suitable extinguishing media : No information available.

Specific hazards : pressure build-up

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Cool containers / tanks with water spray.

Specific firefighting procedures : No information available.

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

**6. ACCIDENTAL RELEASE MEASURES**

Personal precautions : Evacuate personnel to safe areas. Ventilate the area. Refer to protective measures listed in sections 7 and 8.

Environmental precautions : Should not be released into the environment.


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Methods for cleaning up : Evaporates.

**7. HANDLING AND STORAGE**
**Handling**

Technical measures/Precautions : Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.

Precautions for safe handling : No special protective measures against fire required.

**Storage**

Suitable storage conditions : Keep container tightly closed in a dry and well-ventilated place. Store in original container. Keep at temperature not exceeding 52°C.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

Engineering measures : Ensure adequate ventilation, especially in confined areas.

**Control parameters**

Chemical Name	Occupational Exposure Limits		Regulation
Chlorodifluoromethane	TWA	1,000 ppm, 3,540 mg/m <sup>3</sup>	Indonesia. Nilai Ambang Batas (NAB) zat kimia di udara tempat kerja, Standar Nasional Indonesia SNI 19-0232-2005 (02 2005)
	TWA	1,000 ppm	US. ACGIH Threshold Limit Values (2009)

Biological standards : No information available.

**Personal protective equipment**

Respiratory protection : For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Hand protection : Heat insulating gloves

Eye protection : Safety glasses

Skin and body protection : No information available.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.

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**9. PHYSICAL AND CHEMICAL PROPERTIES****Appearance (Physical state, form, colour, etc.)**

Physical state : gaseous

Form : Liquefied gas

Colour : colourless

**Odour** : slight ether-like**Odour Threshold** : no data available**pH** : neutral**Melting/freezing point**

Melting point/range : -160.0 °C (1,013 hPa)

**Boiling point/boiling range**

Boiling point/boiling range : -40.8 °C (1,013 hPa)

**Flammability (solid, gas)** : no data available**Flash point** : does not flash**Decomposition temperature** : no data available**Autoignition temperature** : 632 °C**Explosion limits**

Upper explosion limit : no data available

Lower explosion limit : not applicable

**Vapour pressure** : 7,228 hPa (12 °C)  
10,450 hPa (25 °C)  
19,423 hPa (50 °C)**Vapour density** : 3.03 (25 °C)**Density**Density : 1.210 g/cm<sup>3</sup> (20 °C) (as liquid)  
1.194 g/cm<sup>3</sup> (25 °C) (as liquid)  
0.0047 g/cm<sup>3</sup> (-40.72 °C) (1,013 hPa)  
0.0036 g/cm<sup>3</sup> (ca. 21 °C) (1,013 hPa)  
0.0035 g/cm<sup>3</sup> (25 °C) (1,013 hPa)**Viscosity** : no data available


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**Solubility**

Water solubility : 2.93 g/l (25 °C) (1,013 hPa)  
4.22 g/l (12 °C) (1,013 hPa)

Solubility in other solvents : no data available

**Partition coefficient: n-octanol/water** : log Pow: 1.13

**Volatility rate** : no data available

**10. STABILITY AND REACTIVITY**

Stability : Stable under recommended storage conditions.

Possible hazardous reactions under specific conditions : No information available.

Conditions to avoid : The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions.

Materials to avoid : Alkali metals, Alkaline earth metals, Powdered metals, Powdered metal salts

Hazardous decomposition products : Hydrogen halides, Carbon dioxide (CO<sub>2</sub>), Carbon monoxide, Fluorocarbons, Carbonyl halides

**11. TOXICOLOGICAL INFORMATION**

Acute toxicity : Chlorodifluoromethane:

Inhalation: LC50/4 h/rat : 220000 ppm  
Central nervous system depression Hypoactivity Altered respiratory rate  
Cardiac sensitization

Skin corrosion/irritation : DuPont™ FREON® 22 Refrigerant:

Repeated or prolonged contact with the product may cause removal of natural fat from the skin resulting in non-allergic contact dermatitis and skin absorption.

Serious eye damage/eye irritation : Chlorodifluoromethane:  
irritant

Respiratory sensitization / Skin sensitization : Chlorodifluoromethane:  
Did not cause sensitization on laboratory animals.


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- Mutagenicity** : Chlorodifluoromethane:  
Experiments showed mutagenic effects in cultured bacterial cells. Did not cause genetic damage in cultured mammalian cells. Evidence suggests this substance does not cause genetic damage in animals.
- Carcinogenicity** : Chlorodifluoromethane:  
An increased incidence of tumours was observed in some laboratory animals but not in others. Overall weight of evidence indicates that the substance is not carcinogenic.
- Reproductive toxicity** : Chlorodifluoromethane:  
Evidence suggests the substance is not a reproductive toxin in animals. Animal testing showed effects on embryo-foetal development at levels equal to or above those causing maternal toxicity.
- Specific Target Organs Toxicity (Single/Repeated)** : no data available
- Aspiration toxicity** : no data available
- Other** : DuPont™ FREON® 22 Refrigerant:  
Rapid evaporation of the liquid may cause frostbite.  
Chlorodifluoromethane:  
Repeated dose toxicity: Inhalation  
Reduced body weight gain, Organ weight changes

**12. ECOLOGICAL INFORMATION**
**Ecotoxicity effects**

- Toxicity to fish** : Chlorodifluoromethane:  
static test/LC50/96 h/Zebra fish: 777 mg/l
- Other** : Chlorodifluoromethane:  
EC50/48 h/Daphnia: 433 mg/l
- Persistence and degradability** : DuPont™ FREON® 22 Refrigerant:  
According to the results of tests of biodegradability this product is not readily biodegradable.


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Bioaccumulation : no data available

Mobility in soil : no data available

Other adverse effects : DuPont™ FREON® 22 Refrigerant:  
 Dangerous for the ozone layer.  
 Global warming potential (GWP): 1700

**13. DISPOSAL CONSIDERATIONS**

Waste disposal methods : Can be used after re-conditioning.  
 Used package: Empty pressure vessels should be returned to the supplier.  
 Disposable containers: Dispose of in accordance with local regulations.

**14. TRANSPORT INFORMATION**
**IMDG**

UN-Number : 1018  
 Proper shipping name : Chlorodifluoromethane  
 Class : 2.2  
 Marine pollutant : no

**IATA\_C**

UN-Number : 1018  
 Proper shipping name : Chlorodifluoromethane  
 Class : 2.2

Matters needing attention for transportation : No information available.

**15. REGULATORY INFORMATION**

Minister of Industry Regulation No. 87/M-IND/PER/9/2009 concerning Globally Harmonized System (GHS) of Chemical Classification and Labelling.

Minister of Trade Regulation No. 44/M-DAG/PER/9/2009 concerning Procurement, Distribution and Control of Hazardous Materials.

Republic of Indonesia Government Regulation Number 74 Year 2001 Concerning Hazardous and Toxic Materials Handling.

Attachment I: Dangerous Substances Approved for Use: Chlorodifluoromethane

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**16. OTHER INFORMATION**

Literary reference : US MSDS No.: 2008FR

Department : PT DuPont Agricultural Products Indonesia  
Beltway Office Park Building A, 5th & 6th. Floor, Jalan Ampera Raya No. 9-10, Jakarta 12550, Indonesia

Responsible/issuing person : Regulatory Affairs

Revision Date : 16.03.2010

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

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