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REFRIGERANT 22

Material Safety Data Sheet

Data prepared 01.06.2006

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Data concerning producers

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Emergency telephone number

0086 523 86552323

Product name

* REFRIGERANT 22

Chemical name

* Chlorodifluoromethane

Synonym (s)

* HCFC-22
* F-22
* R22

Formula: CHCLF2
Molecular weight: 86.5

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chlorodifluoromethane
Purity : ⩾ 99.8%
Moisture : ⩽ 0.001%
Acidity(calculated with HCL): ⩽ 0.00001%
Evapolated residue: ⩽ 0.01%

3. HAZARDS IDENTIFICATION

* Gas (liquefied).
* Presents little hazard to human health.
* In case of decomposition, releases dangerous products.

4. FIRST AID-MEASURES

Effects

Inhalation

* At high concentrations, risk of narcosis.
* At high concentrations, risk of cardiac arrhythmia.
* At high concentrations, risk of asphyxia by lack of oxygen.

Eyes contact

* (gas)
* Negligible
* (Liquefied gas)
* Severe eye irritation, watering, redness and swelling of the eyelids.
* Risk of burns (frostbite).

Skin contact

* (gas)
* Negligible
* (Liquefied gas)
* Cold sensation followed by redness or the skin.
* Risk of frostbite.

Ingestion

* Impossible risk (gas)

First aid

Inhalation

* Remove the subject from the contaminated area.
* Oxygen or cardiopulmonary resuscitation if necessary.
* Consult with a physician in case of respiratory and nervous symptoms.

Eyes contact

* Keep eyelids open to allow evaporation of product.
* Flush eyes with running water for several minutes, while keeping the eyelids wide open.
* Consult with an ophthalmologist in case of persistent pain.

Skin contact

* Allow product to evaporate.
* Rinse with lukewarm running water.
* Consult with a physician in case of persistent pain or redness.

Ingestion

General recommendations

* Risk not possible (gas).

If the subject is completely conscious:

* Negligible

If the subject is unconscious:

* Not applicable

Medical treatment

General informations

* Do not give adrenergetic drugs.

Inhalation

* Negligible

Eyes contact

* On the advice or the ophthalmologist.

Skin contact

* Usual treatment for burns.

5. FIRE-FIGHTING MEASURES

Common extinguishing means

* In case of fire in close proximity, all means of extinguishing are acceptable (subject to section below)

Inappropriate extinguishing means

* No restriction.

Specific hazards

* Non-flammable (see section 8)
* Formation of dangerous gas/vapours in case of decomposition (see section 10)
* Gas/vapours combustion possible in presence of air in very particular conditions (see section 9 and/or consult the producer)

Protective measures in case of intervention

* Evacuate all non-essential personnel.
* Wear self contained breathing apparatus when in close proximity or in confined spaces.
* When intervention in close proximity wear full protective acid resistant suit.
* After intervention, proceed to clean the equipment (take a show, remove clothing carefully, clean and check)
* Intervention only by capable personnel who are trained and aware of the hazards of the product..

Other precautions

* If safe to do so, remove the exposed containers, or cool with large quantities of water.
* Stay at safe distance in a protected location sheltered from possible projectiles.
* Never approach containers which have been exposed to fire, without cooling them sufficiently.
* As for any fire, ventilate and clean the rooms before re_entry.

6. ACCIDENTAL RELEASE MEASURES

Precautions

* Follow the protective measures given in section 8.
* Ventilate the premises.

* If safe to do so, without over exposing anyone, try to stop the leak.
* Keep away materials and products which are incompatible with the produce (see section 10)
* In case of leaking container, try to reposition it to get the leak in gaseous phase.
* Gas/vapours heavier than air may accumulate in confined spaces, causing possible oxygen depletion.

Cleanup methods

* let the product evaporate.
* Prevent the product from entering sewers or confined places.

Precautions for protection of the environment

* Prevent discharges into the environment (atmosphere,)

7. HANDLING AND STORAGE

Handing

* Carry out all operations in closed piping circuits and equipment.
* Operate in a well-ventilated area.
* Prevent product vapours decomposition from contacting hot spots.
* Use only equipment materials which are compatible with the product.
* Keep away from reactive products (see section 10).

Storage

* Keep in a hermetically sealed container.
* In a ventilated, cool area.
* Keep away from heat sources.
* Keep away from reactive products (see section 10).

Other precautions

* Follow the protective measures given in section *.

Packaging

* Steel

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls

* Provide local ventilation suitable for the emission risk.
* Install the means with respect to the authorized limit values.
* Follow the protective measures given in section 7.

Authorized limit values

* Chlorzodifluoromethane

  TLV (ACGIH-USA) 1996

  TWA = 1000 ppm

  TWA = 3540 mg/m3

Respiratory protection

* Minimum need if the local exhaust ventilation is adequate.
* In case of decomposition, self-contained breathing apparatus.
* Self-contained breathing apparatus in medium confinement/insufficient oxygen/in case of large uncontrolled emissions/in all circumstances when the mask and cartridge do not give adequate protection.
* Use only respiratory protection that conforms to international/national standards.

Hand protection

* Protective gloves- chemical resistant.
* Recommended materials, Polyvinylalcohol

Eye protection

* Wear protective goggles for all industrial operations.
* If risk of splashing, chemical proof goggles/face shield.

Skin protection

* Apron/boots of neoprene if risk of splashing.

Other precautions

* Shower and eye wash stations.
* Gloves, overalls and boots have to be double layered (protection against cold temperature).
* Consult your industrial hygienist or safety manager for the selection of personal protective equipment suitable for the working conditions.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: pressurized liquefied gas.
Color/Colour: colorless/colourless
Odor/Odour: slightly ethereal.

Chang of state

* Freezing point:
  ＝ -160 ℃
* Bolling point/range (1013 mbars):
  ＝ -40.8 ℃

Flsah point

* Negligible

Flammability

* No flammability limit in air
  Remark:
  Non flammable gas.

Auto-flammability

* 635 ℃

Vapor/vapour pressure

* = 9.12 bar
  temperature 20 ℃
* = 19.56 bar
  temperature 50 ℃

Density

* Specific gravity (D 20/4)
  = 1.22

Vapor/vapour density (air=1)

* = 3.65
  temperature 20 ℃

Solubility

* Slightly soluble in:
* Water
  = 0.3% weight
  temperature 25 ℃
  Remark:
  Pressure = 1 bar
* Soluble in
* Most organic solvents

PH

* neutral

Partition coefficient F (n-octanol/water)

* log P o/w = 1.08

Viscosity

* Dynamic viscosity (liquid)
  = 0.198 mpa.s
  temperture 25 ℃

Decomposition temperature

* No data

Danger of explosion

* Remark:

See also section 10

Oxidizing properties

* Non oxidizer Critical temperature:
  = 96 ℃
* Critical pressure:
  = 49.8 bar

10. STABILITY AND REACTIYITY

Stability

* Stable under certain conditions (see below)
* Decomposition produces dangerous gases, upon contact with flames or hot metallic surfaces.

Conditions to avoid

* Heat/Sources of heat.

Materials to avoid

* Metallic powders
* Alkaline-earth metals
* Alkaline metals and their alloys

Hazardous decomposition products

* Hydrogen fluoride
* Hydrochloric acid.
* Phosgene
* Fluorophosgene

Other information

* Contact with strong bases or alkaline materials may provoke violent reactions or explosions.
* The vapor is heavier than air, disperses at ground level.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

* Oral route, LD 50, not applicable.
* Dermal route, LD 50, not applicable.
* Inhalation, LC 50, 4 hours, rat, 21.9%

Irritation

* Rabble, slightly irritant (skin)
* Rabbit, slightly irritant (eyes)

Sensitization

* Guinea Pig, Non sensitizing (skin).

Chronic toxicity

* Inhalation, after a single exposure, dog, ⩾ 5% v/v air, cardiac sensitization, following adrenergic stimulation..
* Inhalation, after prolonged exposure, rat, Target organ, salivary glands, 5 % v/v air, carcinogenic effect.
* No mutagenic effect.
* Inhalation, rat, Target organ: eyes, 5% v/v air, teratogenic effect, .High does.
* Inhalation, after prolonged exposure, mouse, no carcinogenic effect,
* Inhalation, after prolonged exposure, rat, no carcinogenic effect.

Comments

* Not hazardous in normal conditions of handling and use

12. ECOLOGICAL INFORMATION

Acute ecotoxicity

* Result: no data.

Chronic ecotoxicity

* Result: no data

Mobility

* Air, Henry's law constant (H) ca. 26 kpa. m3/mol.
  Result: considerable volatility.
  Conditions: 20 ℃/calculated value.
* Water, evaporation, t (100) = 3 day(s).
  Conditions: 20℃/saturated solution.
* Soil/sediments, adsorption, log KOC from 1.25 to 1.76
  Conditions: calculated value.

Abiotic degradation

* Air, indirect photo-oxidation, t 1/2 = 9.6 year (s).
  Conditions: sensitizer: OH radicals.
  Degradation's products: Carbon dioxide/hydrochloric acid/fluorhydric acid.
* Air, photolysis, ODP = 0.055
  Result: limited effect on stratospheric ozone.
  Reference value for CFC 11: ODP = 1
* Air, greenhouse effect, GWP = 0.36.
  Reference value for CFC11: GWP = 1.
* Water/soil, hydrolysis, t 1/2 from 25 to 40 year (s).

Result: non-significant hydrolysis.
Conditions: pH 8/25.℃

Biotic degradation

* Aerobic, test : ready biodegradability/ closed bottle, degradation
  Result: non-readily biodegradable.

Potential for bioaccumulation

* Bioconcentration : log Po/w ＝ 1.08
  Result: non-bioaccumulable.

Comments

* Product is persistent in air (atmospheric lifetime: 14 years)
* Product is not significantly hazardous for the aquatic environment as:
* Considerable volatility.
* No bioaccumulation.

13. DISPOSAL CONSIDERATIONS

Waste treatment

* Dispose in compliance with local/federal and national regulations.
* It is recommended to contact the producer for recycling / recovery.

Packaging treatment

* To avoid treatments, as far as possible, use dedicated containers.

14. TRANSPORT INFORMATION

UN Number: 1018

IATA class: 2.2
Hazard label: NON FLAMMABLE GAS
PSN
CHLORODIFLUOROMETHANES

IMDG Class: 2.2
Hazard label: COMPRESSED GAS NON FLAMMASLE
Placard: 1018
MFAG 350
EmS 2-09
IMDG Name:
CHLORODIFLUOROMETHANE

ADR/ADNR Class 2, 2° A
Hazard ;able 2
Placard: 20/1018
ADR/ADNR Name:

CHLORODIFLUOROMETHANE

RID Class	2, 2° A
Hazard label :	2 + 13
Placard:	20/1018

ADR/RID Name:
CHLORODIFLUOROMETHANE

15. REGULATORY INFORMATION

EEC Labelling

* Hazardous substance name
  Chlorodifluoromethane
* Not dangerous according to Dir. 92/32/EEC.
* Labelling following Dir. 93/21/ EEC – Section 5.2.2.2

Phrases R

59 Dangerous for the ozone layer.

16. OTHER INFORMATION

Reason for update

* Update:
* Sections 14 – 16

The information given corresponds to the current state of our knowledge and experience of the product, and is not exhaustive. this applies to product which conforms to the specification, unless otherwise stated. In the case of combinations and mixtures one must make sure that no new dangers can arise. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and protection of human welfare and the environment.