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1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Octafluorocyclobutane

CHEMICAL FORMULA: c-C_4F_8

PRODUCT CODE:

COMPANY NAME:
PELCHEM: The Chemical Division of NECSA
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2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME OF SUBSTANCE: Octafluorocyclobutane

CONCENTRATION: >99%

SYNONYMS: Cyclobutane, Octafluoro-; Cyclooctafluorobutane; Perfuorocyclobutane; Freon C318; Refrigerant C318.

UN No: 1976

CAS-No: 115-25-3

3. HAZARDS IDENTIFICATIONS

EMERGENCY OVERVIEW
Colourless, odourless gas. Frostbite risk; asphyxiation due to oxygen displacement.
Containers may rupture or explode if exposed to heat

4. FIRST AID MEASURES

INHALATION:

SHORT TERM EXPOSURE: nausea, vomiting, irregular heartbeat, dizziness, tingling sensation, suffocation, convulsions, and coma. Trained personnel should administer supplemental oxygen.

ACUTE EXPOSURE:
May displace oxygen in the air and cause asphyxiation. The development of symptoms depends upon the degree, duration and rapidity with which the oxygen deficiency is developed. In sudden and acute asphyxia, unconsciousness is immediate. When asphyxia develops at a slow enough rate, the following symptoms may occur:

Rapid respiration, a gradual loss of balance, dizziness, feeling of tightness in the head, tingling sensation in the tongue, fingertips and toes, difficulty and weakening of speech, unnoticeable and then rapid reduction of the ability to exert physical effort and to coordinate movements, accelerated pulse rate, faulty judgement, reduced awareness of the outside world, depressed sensations, particularly touch, and frequently, heightened

mental activity and fatigue as the asphyxia progresses, and finally convulsions, deep coma and death. Rats exposed to 80% **octafluorocyclobutane** with 20% oxygen for four hours showed up signs of poisoning. Some fluorobarbons produce cardiac arrhythmias.

When safe to enter area, remove from exposure. Use a bag valve mask or similar device to perform artificial respiration (rescue breathing) if needed. Keep warm and at rest. Get medical attention immediately. Trained personnel should administer supplemental oxygen.

SKIN CONTACT:

SHORT TERM EXPOSURE: blisters, frostbite

ACUTE EXPOSURE:
No adverse effects have been reported from the gas. Wash if needed. If frostbite, freezing, or cryogenic burns occur, warm affected area in lukewarm water. If this is not available, gently wrap affected parts in blankets. Allow circulation to return naturally. Get medical attention immediately. Due to rapid evaporation, the liquid may cause frostbite with redness, tingling and pain or numbness. In more severe cases, the skin may become hard and white and develop blisters.

EYE CONTACT:

SHORT TERM EXPOSURE: frostbite, blurred vision.

ACUTE EXPOSURE:
No adverse effects have been reported from the gas. Due to rapid evaporation, the liquid may cause frostbite with redness, pain and blurred vision. It's unlikely that emergency treatment will be required. Wash with large amounts of water or normal saline until no evidence of chemical remains (at least 15 – 20 minutes). Get medical attention immediately.

INGESTION:

SHORT TERM EXPOSURE: frostbite.

ACUTE EXPOSURE:
Ingestion of a gas is unlikely. If the liquid is swallowed, frostbite damage to the lips, mouth and mucous membranes may occur. If vomiting occurs, keep head lower than hips to help prevent aspiration. Get medical attention, if needed.

NOTE TO PHYSICIAN:
For inhalation, consider oxygen.

5. FIRE-FIGHTING MEASURES

FIRE AND EXPLOSION HAZARD:
Non-flammable. Negligible fire hazard. Hydrogen fluoride and carbonyl fluoride can be produced during a fire.

EXTINGUISHING MEDIA
Carbon dioxide, regular dry chemical.
Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING
Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile). Use extinguishing agents appropriate for surrounding fire. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Do not get water directly on material. Reduce vapours with water spray. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Consider down wind evacuation if material is leaking.

6. ACCIDENTAL RELEASE MEASURES

PROTECTIVE EQUIPMENT
Self contained breathing apparatus (SCBA) and protection against potential frostbite.

METHOD OF CLEANUP
Allow gas to dissipate and monitor oxygen levels.

7. HANDLING AND STORAGE

TECHNICAL STORAGE MEASURES
Cylinders can be constructed from steel or aluminium.

STORAGE CONDITIONS
Store in a dry, well ventilated area away from sources of heat and incompatible materials.

INCOMPATIBLE PRODUCTS
Polystyrene, alkali, alkaline earth metals and other reactive metals

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

APPROPRIATE ENGINEERING MEASURES:
If required, the oxygen levels in the area of use should be monitored.

VENTILATION:
Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION:
Wear splash resistant safety goggles with a face shield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

SKIN PROTECTION:
Wear appropriate protective, cold insulting clothing when handling the liquid.

HAND PROTECTION:
Wear insulated or leather gloves when cylinder is cold.

RESPIRATION:
Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use. Any supplied-air respirator with full-face piece that is operated in a pressure-demand or other positive-pressure mode.

For Unknown Concentrations or Immediately Dangerous to Life or Health – Any supplied-air respirator with full face piece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full-face piece.

9. PHYSICAL AND CHEMICAL PROPERTIES

FORM: Gas
BOILING POINT: 21°F (-6° C)
ODOUR: Odourless
TASTE: Tasteless
MOLECULAR FORMULA:
C4 – F8
MOLECULAR WEIGHT:
200.04
MELTING POINT:
-39°C
DENSITY:
1100 kg/m^3 at 0°C
8.66 g/L @ 21°C
COLOUR:
Colourless
VAPOUR PRESSURE:
2052 mmHg @ 21.1 C
VAPOUR DENSITY:
7.33 (air = 1)
SOLVENT SOLUBILITY:
Soluble: ether
WATER SOLUBILITY:
0.014%
VISCOSITY
0.012 cP @ 25°C

10. STABILITY AND REACTIVITY

REACTIVITY:
Stable at normal temperatures and pressure.

CONDITIONS TO AVOID:
Protect from physical damage and heat. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES:
Polystyrene, alkaline, alkaline earth metals. Metals may catalyse decomposition at elevated temperatures.

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition products: halogenated compounds, oxides of carbon.
May decompose in presence of alloys that contain more than 2% magnesium.
Decomposition products are hydrogen fluoride and carbonyl fluoride.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:
78 pph/2 hour(s) inhalation-mouse LCLo; 861 gm/m3/4 hour(s) –17 week(s) intermittent inhalation-mouse TCLo.

MUTAGENIC DATA:
Sex chromosome loss and non disjunction – Drosophila melangaster inhalation 99 pph 10 minute(s).

ADDITIONAL DATA:
Stimulants such as epinephrine may induce ventricular fibrillation.

CARCINOGEN STATUS:
OSHA: N NTP: N IARC: N

12. ECOLOGICAL INFORMATION:

MOBILITY: Gas will dissipate in well-ventilated areas.

PERSISTENCE/DEGRADABILITY /BIOACCUMULATION : Not available.

ECOTOXICITY: Will be related to an oxygen deficient environment.

13. DISPOSAL CONSIDERATIONS

SAFE AND PREFERRED DISPOSAL METHODS:
Contact manufacturer.

CONTAMINATED PACKAGING:
Contact manufacturer.

14. TRANSPORT INFORMATION

UN NO: 1976

ADR/RID: **Class:** 2.2	**Label:** Non-flammable compressed gas **Item number:** 2°A **BULK PACKAGING:** 49 CFR 173.314, 315 **NON-BULK PACKAGING:** 49 CFR 173.304	**Proper shipping name:** Octafluorocyclobutane
IMDG: **Class:** 2.2	**Label:** Non-flammable gasses	**Proper shipping name:** Octafluorocyclobutane
IATA: **Class:** 2.2	**PASSENGER AIRCRAFT OR RAILCAR:** 75kg **CARGO AIRCRAFT ONLY:** 150kg **Labels:** Non-flammable compressed gas	**Proper shipping name:** Octafluorocyclobutane

15. REGULATORY INFORMATION

APPLICABLE REGULATIONS:
Refer to country of destination.

SAFETY AND RISK PHRASES:
Refer to country of destination.

16. OTHER INFORMATION

No other information is currently available for this record.

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