SAFETY DATA SHEET

Halon 1211


1. SECTION 1 – IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

IDENTIFICATION of the SUBSTANCE or PREPARATION:

PRODUCT NAME: HALON 1211

CHEMICAL NAME: BROMOCHLORODIFLUOROMETHANE

OTHER MEANS OF IDENTIFICATION/SYNONYMS: R 12B1; BCF; Chlorodifluoromonobromomethane; Flugex 12B1; Fluorocarbon 1211; Freon 12B1; Halon 1211; Methane, bromochlorodifluoro-

RELEVANT PRODUCT USE: Fire Extinguishing Material

COMPANY/UNDERTAKING IDENTIFICATION:

U.S. SUPPLIER: H3R Clean Agents, Inc.

ADDRESS: 103 H Street

Petaluma, CA, U.S.A. 94952

PHONE: 1-800-249-4289 or 415-945-0800 (8:00 a.m. to 4:30 p.m. PST)

FAX: 1-707-765-3995

EMAIL ADDRESS: h3rinfo@h3rcleanagents.com

WEB SITE: www.h3rcleanagents.com

EMERGENCY PHONE: CHEMTREC: 1-800-424-9300 or 703-527-3887 (U.S./Canada/Puerto Rico) [24-hours]

DATE PREPARATION: September 21, 2006

DATE OF REVISION: May 24, 2019

SECTION 2. HAZARD IDENTIFICATION

GLOBAL HARMONIZATION LABELING AND CLASSIFICATION: Classified in accordance with the Global Harmonization Standard under U.S., Canadian and European Union regulations. This is combination of harmonized classification, notified classification and self-classification.

Classification: Gases Under Pressure/Liquefied Gas, Acute Inhalation Toxicity Category 5, Skin Irritation Category 2, Eye Irritation Category 2A, Specific Target Organ Toxicity (Inhalation-Narcotic Effect, Irritation) Single Exposure Category 3, Hazardous to the Ozone Layer Category 1

U.S. OSHA Defined Hazard Classification: Simple Asphyxiant

Signal Word: Warning


U.S. OSHA Defined Hazard Statements: May displace oxygen and cause rapid suffocation

U.S. Hazards Not Otherwise Classified (HNOC): May cause frostbite.

Precautionary Statements:


Response: P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P362 + P364: Take off contaminated clothing and wash it before reuse. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. P337 + P313: If eye irritation persists: Get medical advice/attention. P304 + P340: If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing. P312: Call a POISON CENTER or doctor if you feel unwell.


Disposal: P501: Dispose of contents/containers in accordance with all local, regional, national and international regulations. P502: Refer to manufacturer or supplier for information on recovery or recycling.

Hazard Symbol/Pictogram: GHS04, GHS07

EMERGENCY OVERVIEW: Product Description: Halon 1211 is a colorless, liquefied gas, with a sweet odor, shipped under pressure. Health Hazards: The main acute health hazard associated with releases of this gas is asphyxiation by displacement of oxygen. This gas is heavier than air and will sink into low areas, creating an asphyxiation hazard. Exposure to this gas may cause skin, eye and respiratory irritation. The main chronic health hazard associated with releases of this gas is possible adverse effects to the central nervous system and possible cardiac sensitization and arrhythmias. Chronic skin exposure may cause dermatitis. Flammability Hazards: This gas is not flammable. Reactivity Hazards: This gas is not reactive. Environmental Hazards: This gas is a known ozone depletor and contributes to the destruction of the ozone. Emergency Response Considerations: Emergency responders must wear the proper personal protective equipment suitable for the situation to which they are responding. WARNING—If rescue personnel need to enter an area suspected of having a low level of oxygen, they should be equipped with Self-Contained Breathing Apparatus (SCBA) and appropriate personal protective equipment.
SECTION 3. COMPOSITION and INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Chemical Formula</th>
<th>CAS #</th>
<th>EINECS #</th>
<th>%</th>
<th>LABEL ELEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bromochlorodifluoromethane</td>
<td>CBrClF₂</td>
<td>353-59-3</td>
<td>206-537-9</td>
<td>&gt; 99%</td>
<td>EU ECHA Notified and Self-Classification</td>
</tr>
</tbody>
</table>

Classification: Compressed Gas/Liquefied Gas, Skin Irritation Cat. 2, Eye Irritation Cat. 2A, Acute Inhalation Toxicity Cat. 5, STOT (Inhalation-Narcotic Effect/Irritation) SE Cat. 3, Hazardous to the Ozone Layer Category 1

Hazard Statement Codes: H280, H333, H315, H319, H335, H336, H420

U.S. OSHA Defined Classification
Classification: May displace oxygen and cause rapid suffocation.

U.S. OSHA Hazards Not Otherwise Classified
Classification: May cause frostbite.

See Section 2 for full product classification information.

SECTION 4. FIRST AID MEASURES

PROTECTION OF FIRST AID RESPONDERS: RESCUEUS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. Self-Contained Breathing Apparatus should be worn if the level of oxygen cannot be determined. Rescuers should be taken for medical attention, if necessary. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary.

DESCRIPTION OF FIRST AID MEASURES: Remove victim(s) to fresh air, as quickly as possible. Take copy of label and SDS to physician or other health professional with victim(s).

Inhalation Exposure: If inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if adverse effect occurs after removal to fresh air.

Skin Exposure: If this gas contaminates the skin, immediately begin decontamination with running water. Minimum flushing is for 20 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention. Remove any clothing that may restrict circulation to any frozen area. Do not rub frozen parts as tissue damage may occur. As soon as practicable, place any affected area in warm water bath which has a temperature that does not exceed 105°F (40°C). NEVER USE HOT WATER. NEVER USE DRY HEAT. If area of frostbite is extensive, and if possible, remove clothing. Alternatively, if the fingers or hands are frostbitten, place the affected area of the body in the armpit. Encourage victim to gently exercise the affected part while being warmed. Frozen tissue is painless and appears waxy, with a possible yellow color. Frozen tissue will become swollen, painful and prone to infection when thawed. If the frozen part of the body has been thawed by the time medical attention has been obtained, cover the area with a dry sterile dressing and a bulky protective covering.

Eye Exposure: If mechanical injury occurs, cover eye with bandage and seek appropriate medical attention. If rapid release has caused frostbite, cover injured eye; an ophthalmologist should be sought as soon as possible.

Ingestion: Ingestion is an unlikely route of exposure for this gas.

MEDICAL CONDITIONS AGGREGATED BY EXPOSURE: None are anticipated.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT IF NEEDED: Administer oxygen, if necessary, and treat symptoms. This gas is an asphyxiant and can induce cardiac muscle sensitization to circulating epinephrine-like compounds. Do NOT give adrenalin or similar sympathomimetic drugs. Do NOT allow victim to exercise until 24 hours following specific exposures. Freeze burns of mucosal tissue can develop following specific exposures. Freeze burns of mucosal tissue will become swollen, painful and prone to infection when thawed. If the frozen part of the body has been thawed by the time medical attention has been obtained, cover the area with a dry sterile dressing and a bulky protective covering. Alternatively, if the fingers or hands are frostbitten, place the affected area of the body in the armpit. Encourage victim to gently exercise the affected part while being warmed. Frozen tissue is painless and appears waxy, with a possible yellow color. Frozen tissue will become swollen, painful and prone to infection when thawed. If the frozen part of the body has been thawed by the time medical attention has been obtained, cover the area with a dry sterile dressing and a bulky protective covering.

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

SECTION 5. FIRE FIGHTING MEASURES

FLASH POINT: Not Applicable AUTOIGNITION: Not Applicable

FLAMMABLE RANGE: Not Applicable

EXTINGUISHING MEDIA: This is a non-flammable gas; use fire-extinguishing media appropriate for the surrounding materials.

UNSUITABLE FIRE EXTINGUISHING MEDIA: None known.

SPECIFIC HAZARDS ARISING FROM THE CHEMICAL: This gas does not burn; however, containers, when involved in fire, may rupture or burst in the heat of the fire. Most cylinders have a pressure relief device, which will vent contents if the cylinder is exposed to high temperatures. This gas is heavier than air, creating an asphyxiation hazard in low areas.

EXPLOSION SENSITIVITY TO MECHANICAL IMPACT: Not sensitive.

EXPLOSION SENSITIVITY TO STATIC DISCHARGE: Not sensitive.

HAZARDOUS COMBUSTION PRODUCTS: Combustion or decomposition products above 481.7°C (900°F) include hydrogen bromide, hydrogen chloride, hydrogen fluoride, free halogens, and small amounts of carbonyl halides. These by-products have a sharp irritating odor and are dangerous even in low concentrations and in sufficient concentrations can result in personal injury or death.

SPECIAL PROTECTIVE ACTIONS FOR FIREFIGHTERS: Move fire-exposed containers if it can be done without risk to firefighters. Use water spray to cool fire-exposed cylinders. Take care not to block pressure relief valves. Stay away from ends of tanks (but realize that shrapnel may travel in any direction). Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire.
SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES: Evacuate immediate area. Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Vapors from liquefied gas are initially heavier than air and spread along ground, creating an oxygen-deficient atmosphere in low-lying areas or confined spaces. Detection systems should be available to monitor for level of oxygen. The level of oxygen should be above 19.5% before personnel can be allowed in the area without SCBA.

PERSONAL PROTECTIVE EQUIPMENT: Proper protective equipment should be used.

All Releases: Minimum Personal Protective Equipment should be Level B: Self-Contained Breathing Apparatus. Note: chemically protective clothing may provide little or no thermal protection against the hazard of frostbite. The atmosphere must at least 19.5 percent Oxygen before non-emergency personnel can be allowed in the area without Self-Contained Breathing Apparatus and fire protection. If gas is leaking incidentally from the cylinder or its valve, contact your supplier.

METHODS FOR CLEAN-UP AND CONTAINMENT:

All Releases: In the event of a release of this product, operator should close the gas source, if possible, to do so safely. Evacuate area in the event of a significant release. Locate and seal the source of the leaking gas. If leak is in user’s gas handling equipment or system, close cylinder valve, and safely vent high pressure before attempting repairs. If leak is from the cylinder, cylinder valve or the valve pressure relief device (PRD), contact your supplier. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in-place or remove it to a safe area and allow the gas to be released there. Call CHEMTREC (1-800-424-9300) for emergency assistance. Or if in Canada, call CANUTEC (613-996-6666).

ENVIRONMENTAL PRECAUTIONS: All release to the environment should be avoided as this gas has an ozone depletion potential and a global warming potential. Run-off water may be contaminated by other materials and should be contained to prevent possible environmental damage.

REFERENCE TO OTHER SECTIONS: See information in Section 8 (Exposure Controls – Personal Protection) and Section 13 (Disposal Considerations) for additional information.

SECTION 7. HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING: Releases of Halon 1211 can create an oxygen-deficient atmosphere. Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations could occur without any significant warning symptoms, due to oxygen-deficiency. All work operations should be monitored in such a way that emergency personnel can be immediately contacted in the event of a release. Wearing contact lenses is not recommended when handling this gas.

Cylinder valves should be inspected regularly for physical damage or corrosion (apparent by discoloration or rust). Care should be taken to inspect the following valve locations for corrosion: neck (where valve inserts into cylinder); bonnet nut (where handle attaches to valve body). Close valve after each use and when empty.

Do not drag, roll, slide or drop cylinder. Use a suitable hand truck designed for cylinder movement. Never attempt to lift a cylinder by its cap. Secure cylinders at all times while in use. Use a pressure regulator to safely discharge product from cylinder. Use a check valve to prevent reverse flow into cylinder. Once cylinder has been connected to properly purged process, open cylinder valve slowly and carefully. If user experiences any difficulty operating cylinder valve, discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, etc.) into valve cap openings; doing so may damage valve, causing a leak to occur. Use an adjustable strap-wrench to remove over-tight or rusted caps.

Do not heat cylinders by any means to increase the discharge rate of product from the cylinder. Never apply flame or localized heat directly to any part of the cylinder. Cylinders should not be artificially cooled as certain types of steel undergo property deficiency.

CONDITIONS FOR SAFE STORAGE: Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, Inc. at www.cganet.com pamphlet CGA P-1, Safe Handling of Compressed Gases in Containers. Local regulations may require specific equipment for storage and cylinder movement. Cylinders should be stored upright and be firmly secured to prevent falling or being knocked-over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting. Cylinders should be stored in dry, well-ventilated areas away from sources of heat, ignition and direct sunlight. Do not allow area where cylinders are stored to exceed 52°F (125°F). Store containers away from heavily trafficked areas and emergency exits. Isolate from other non compatible chemicals (refer to Section 10, Stability and Reactivity). Store away from process and production areas, away from elevators, building and room exits or main aisles leading to exits. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a first-in, first-out inventory systems to prevent full containers from being stored for long periods of time. NOTE: Use only DOT or ASME code cylinders designed for compressed gas storage. Cylinders must not be recharged except by or with the consent of owner.

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA: Use the proper CGA connections, DO NOT USE ADAPTERS:

PRODUCT USE: This product is used as a fire-extinguishing agent, refrigerant gas and as a cleaning agent.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Relieve pressure before attempting repairs.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS/CONTROL PARAMETERS:

Ventilation and Engineering Controls: Forced ventilation systems for the general work area should be provided. If appropriate, install automatic monitoring equipment to detect the level of oxygen.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS #</th>
<th>OSHA PELs ppm</th>
<th>ACGIH TLVs ppm</th>
<th>NIOSH RELs ppm</th>
<th>NIOSH IDLH ppm</th>
<th>DFG MAKs ppm</th>
<th>AIHA WEELs ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halon 1211</td>
<td>353-59-3</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
</tbody>
</table>

NE = Not Established
SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION (Continued)

EXPOSURE LIMITS/CONTROL PARAMETERS (continued):

Occupational/Workplace Exposure Limits/Guidelines (continued):

International Exposure Limits: Currently, the following international exposure limits are in place components of this product. In many jurisdictions, exposure limits are similar to the U.S. ACGIH TLVs or U.S. OSHA PELs. Since a TLV or PEL has not been established for these substance, appropriate government agencies in each jurisdiction should be consulted to determine which regulations apply.

Pentfluoroethane

<table>
<thead>
<tr>
<th>Limit Value - Eight Hours</th>
<th>Limit Value - Short Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

Biological Exposure Indices (BEIs): Currently, Biological Exposure Indices (BEIs) have not been determined for this compound.

UK Minimum Exposure Limits: Currently, there are no UK Minimum Exposure limits determined for this compound.


Respiratory Protection: Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection if oxygen level is below 19.5%, or during emergency response to a release of this product. If necessary, use only respiratory protection authorized under appropriate regulations. In the U.S., oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

Eye Protection: Use approved safety goggles or safety glasses. If necessary, refer to appropriate regulations for further information.

Hand Protection: Wear leather gloves when handling cylinders of this gas. Otherwise, wear glove protection appropriate to the specific operation for which this gas is used. If necessary, refer to appropriate regulations.

Body Protection: Use body protection appropriate for task. Safety shoes are recommended when handling cylinders. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee’s feet may be exposed to electrical hazards, use foot protection, as described in appropriate country regulations and standards.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Liquefied gas under pressure.</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>165.36</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>CBrClF₂</td>
</tr>
<tr>
<td>Odor</td>
<td>Sweet</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Not determined</td>
</tr>
<tr>
<td>Specific Gravity (water = 1) @ 20°C:</td>
<td>1.83</td>
</tr>
<tr>
<td>Liquid Density @ 25°C:</td>
<td>1797 kg/mg³; 111.6 lb/ft³</td>
</tr>
<tr>
<td>Vapor Density (air = 1):</td>
<td>5.7</td>
</tr>
<tr>
<td>Gas Density</td>
<td>1.8 g/cm³</td>
</tr>
<tr>
<td>Specific Volume</td>
<td>2.46; 14.97 lb/ft³</td>
</tr>
<tr>
<td>Boiling Point @ 1 atm.:</td>
<td>-4°C (26°F)</td>
</tr>
<tr>
<td>Freezing Point:</td>
<td>-159.5°C (319.1°F)</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1):</td>
<td>Gas at room temperature.</td>
</tr>
<tr>
<td>Solubility in Water @ 25°C:</td>
<td>Negligible</td>
</tr>
<tr>
<td>Other Solubilities:</td>
<td>Not available.</td>
</tr>
<tr>
<td>Heat of Vaporization @ 113.65°K:</td>
<td>28873 x 10 + 7 J/Kmol</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>2.8 bar @ 25°C; 37.5 psi @ 70°F; 2.270 hPa @ 20°C; 275.8 kPa; 40 psia</td>
</tr>
<tr>
<td>Viscosity @ 113.65°K:</td>
<td>1.8623 x 103 Pa.S</td>
</tr>
<tr>
<td>VOC Less H2O &amp; Exempt Solvents:</td>
<td>Not applicable for gas.</td>
</tr>
<tr>
<td>Percent Volatile:</td>
<td>100%</td>
</tr>
<tr>
<td>Flash Point:</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Autoignition Temperature:</td>
<td>Not available.</td>
</tr>
<tr>
<td>Decomposition Temperature:</td>
<td>Not available.</td>
</tr>
<tr>
<td>Lower Flammable Limit (volume % in air):</td>
<td>None.</td>
</tr>
<tr>
<td>Upper Flammable Limit (volume % in air):</td>
<td>None.</td>
</tr>
<tr>
<td>Critical Temperature</td>
<td>153.8°C (308.8°F)</td>
</tr>
<tr>
<td>Critical Pressure:</td>
<td>42500 x 10⁶ Pa; 42.5 bar</td>
</tr>
<tr>
<td>Partition Coefficient:</td>
<td>Log[P of 2.1</td>
</tr>
</tbody>
</table>

WARNING PROPERTIES FOR THIS GAS: There are no good properties to act as a warning of a release. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.
CHEMICAL STABILITY: Stable.
CONDITIONS TO AVOID: Cylinders should not be exposed to temperatures in excess of 125°F (52°C).
MATERIALS WITH WHICH GAS IS INCOMPATIBLE: Metal halides. Contact with acids can evolve highly toxic hydrogen chloride.
HAZARDOUS DECOMPOSITION PRODUCTS: Combustion: Combustion or decomposition products above 900°F include hydrogen bromide, hydrogen chloride, hydrogen fluoride, free halogens, and small amounts of carbonyl halides. These by-products have a sharp irritating odor. Hydrolysis: None known.
POSSIBILITY OF HAZARDOUS REACTION OR POLYMERIZATION: Will not occur.

SECTION 10. STABILITY AND REACTIVITY

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM
HEALTH HAZARD
PHYSICAL HAZARD

SECTION 11. TOXICOLOGICAL INFORMATION

ROUTES OF ENTRY, SYMPTOMS OF ACUTE EXPOSURE:
WARNING: If rescue personnel need to enter an area in which a release of Halon 1211 has occurred, they should be equipped with Self-Contained Breathing Apparatus (SCBA) and appropriate personal protective equipment. High concentration of this gas will create an oxygen-deficient atmosphere, creating the risk of asphyxiation.

Eye Contact: Release of a high-pressure gas may result in airborne objects.
Ingestion: Ingestion of this gas is not a likely route of industrial exposure.
Inhalation: Inhalation of high concentrations of this gas may lead to heart arrhythmias. High concentrations of this gas can cause an oxygen-deficient environment. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. The skin of a victim may have a blue color. Under some circumstances of exposure, death may occur, due to the displacement of oxygen. The effects associated with various levels of oxygen are described on the following page.

CONCENTRATION OF OXYGEN: EXPOSURE SYMPTOM
20.9% Oxygen: Normal oxygen concentration in air.
15–19% Oxygen: Decreased ability to perform tasks. May impair coordination and judgment early symptoms in persons with heart, lung, or circulatory problems.
12–15% Oxygen: Breathing increases, especially in exertion. Pulse up. Impaired coordination, perception, and judgment.
10–12% Oxygen: Breathing further increases in rate and depth, poor coordination and judgment, lips slightly blue.
8-10% Oxygen: Mental failure, fainting, unconsciousness, ashen face, blueness of lips, nausea (upset stomach), and vomiting.
6–8% Oxygen: 8 minutes, may be fatal in 50–100% of cases; 6 minutes, may be fatal in 25 to 50% of cases; 4–5 minutes, recovery with treatment.
4–6% Oxygen: Coma in 40 seconds, followed by convulsion, breathing failure, death.

WARNING: Exposure to atmospheres containing 8–10% or less oxygen will bring about unconsciousness without warning and so quickly that individuals cannot help or protect themselves. Lack of sufficient oxygen may cause serious injury or death.

Inhalation may cause an increase in the sensitivity of the heart to adrenaline, which could result in irregular or rapid heartbeats.
Skin Contact: Transitory skin contact should not cause any adverse effects. Contact with rapidly expanding gases (which are released from under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain caused by frostbite can quickly subside, masking the injury.
Other Acute Health Effects: Contact with rapidly expanding gases (which are released from under high pressure) may cause frostbite. Other symptoms potentially related to misuse or inhalation abuse include anesthetic effects, including light-headedness, dizziness, confusion, incoordination, drowsiness, or unconsciousness, irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness.

Acute Exposure Target Organs: Respiratory system.

ROUTES OF ENTRY, SYMPTOMS OF CHRONIC EXPOSURE:
Inhalation: In animal tests, rats were exposed by inhalation for 21 days, dosed 6 hours per day, 5 days per week, at 3,300 ppm and no adverse effects of toxicological significance (NOAEL) were observed. At 10,000 ppm, there were signs of central nervous system depression. However, there were no signs of toxicity or histopathological changes observed and no potentiation of cardiac sensitization potential. Other animal testing resulted in cardiac sensitization at various concentrations for varying exposure times. Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.
Skin Contact: Prolonged contact may cause dermatitis (dry, red, cracked skin) due to defatting of the skin.
Chronic Exposure Target Organs: Skin, cardiac system, central nervous system.
Carcinogenic Potential: Halon 1211 is not currently listed as a carcinogen or as a potential carcinogen on EPA, NIOSH, GERMAN MAK, OSHA, NTP, IARC, or CAL/OSHA Carcinogen lists.

TOXICITY DATA: There are no toxicology data currently available for Halon 1211.
BROMOCHLORODIFLUOROMETHANE:
TCLO (Inhalation-Man) 4 ppm/1 minute: Peripheral Nerve and Sensation: paresthesia; Behavioral: hallucinations, distorted perceptions; Cardiac: EKG changes not diagnostic of specified effects
TCLO (Inhalation-Human) 295,200 mg/m²/1 minute: Peripheral Nerve and Sensation: paresthesia
LClO (Inhalation-Rat) 20 ppm/15 minutes: Behavioral: tremor, convulsions or effect on seizure threshold; Lungs, Thorax, or Respiration: respiratory depression
LClO (Inhalation-Rat) 2,140,000 mg/m²/5 minutes
LClO (Inhalation-Dog) 5 ppm/30 minutes: Behavioral: tremor, convulsions or effect on seizure threshold; Cardiac: other changes
SECTION 11. TOXICOLOGICAL INFORMATION (Continued)

**TOXICITY DATA (continued):**

**BROMOCHLORODIFLUOROMETHANE (continued):**

LC50 (Inhalation-Guinea Pig) 30 pph/2 hours: Behavioral: convulsions or effect on seizure threshold

TC50 (Inhalation-Rat) 396,000 mg/m³/10 minutes: Behavioral: general anesthetic

TC50 (Inhalation-Rat) 210 µg/m³/4 hours/12 weeks-intermittent: Blood: pigmented or nucleated red blood cells, changes in erythrocyte (RBC) count, changes in platelet count

TC50 (Inhalation-Rat) 1 pph/6 hours/3 weeks-intermittent: Behavioral: somnolence (general depressed activity)

TC50 (Inhalation-Rat) 50,000 ppm: female 6-15 day(s) after conception: Reproductive: Maternal Effects: other effects

**Mutation in Microorganisms (Bacteria-Salmonella typhimurium) 10 pph**

**ADDITIONAL TOXICOLOGICAL DATA:**

**Acute:** Inhalation-Rat: At 50,000 ppm, no effects were noted. At 75,000 ppm, slightly accelerated respiration was noted. At 100,000 ppm, mild excitement was seen. At 200,000 ppm, within 1 to 2 minutes marked excitation and some convulsions were noted. At 60 to 90 minutes, 2 of the 4 animals died. A concentration of 300,000 ppm immediately gave rise to convulsions and narcosis and all animals died within 50 min. Inhalation-Dog: At 25,000 to 75,000 ppm for 3.5 hours, there was reversible myocardial lesions and fatty degeneration of the liver.

**Chronic:** A case of occupational rhabdomyolysis in an individual susceptible to malignant hyperthermia was described. A 43-year old male was found to have a serum creatine-kinase activity of 650 international units per liter, normal range 10 to 200 international units/liter, suggesting that he was susceptible to malignant hyperthermia. His susceptibility was confirmed by in vitro testing of a muscle specimen with halothane and caffeine. The subject was subsequently employed in a factory that made fire extinguishers where one of his jobs consisted of discharging Bromochlorodifluoromethane from fire extinguishers before refilling them. Although discharging was done in open air, some gas was commonly inhaled. Eighteen months after beginning this work, he was examined for complaints of malaise and stiffness and weakness in the forearms and hands. The symptoms progressively worsened during the week and improved the weekends. Serum creatine-kinase activity was 1056 IU/l on one Saturday and 544 IU/l the following Monday. Because of the similarity in structure between Bromochlorodifluoromethane and halothane, the effects of the former on contractions of a muscle specimen were examined. Bromochlorodifluoromethane induced contractions identical to those of halothane. The patient was advised to change jobs. After he did so his symptoms immediately improved. It was concluded that the patient's rhabdomyolysis is due to recurring exposures to Bromochlorodifluoromethane. They recommended that persons susceptible to malignant hyperthermia avoid exposure to similar halogenated hydrocarbons. Inhalation-Human: At 4 to 5% for 1 minute using face mask, subjects at 30 seconds became slightly dizzy and light-headed. Over the next few seconds, these symptoms rapidly increased in severity until at 1 minute the subjects felt as though they were about to lose consciousness and exposure was stopped. Paresthesia of the fingers and other parts of the body was sometimes noted towards the end of the experiment. Heart rate rose by approximately 30% during the early stages of exposure and remained at that level throughout the experiment. Depression of the T wave was consistently observed on the ECG tracings. The subjects recovered rapidly on cessation of exposure and felt perfectly normal again sometime 15 day(s) after conception. The heart rate and the ECG reverted to normal within 1 minute. There were no delayed after effects. Inhalation-Dog: At 5,000 to 100,000 ppm resulted in cardiac sensitization above 20,000 ppm and in 10 to 0.5 minutes, depending on concentration.

**IRRITANCY OF PRODUCT:** This gas may be irritating to skin, eyes and respiratory system.

**SENSITIZATION OF PRODUCT:** Halon 1211 is not a human skin or respiratory sensitizer, but has been shown to be a cardiac sensitizer in animal studies.

**REPRODUCTIVE TOXICITY INFORMATION:** Halon 1211 is not reported to cause mutagenic, embryotoxic, teratogenic or reproductive toxicity effects in humans. No animal data are available.

SECTION 12. ECOLOGICAL INFORMATION

**ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.**

**MOBILITY:** Using a structure estimation method based on molecular connectivity indices, the Koc for Halon 1211 can be estimated to be about 49. According to a classification scheme, this estimated Koc value suggests that Halon 1211 is expected to have very high mobility in soil.

**PERSISTENCE AND BIODEGRADABILITY:** Photodegradation: > 50% after 14 years. If released to air, a vapor pressure of 2.07X10^-3 mm Hg at 25°C indicates Halon 1211 will exist solely in the gas phase in the ambient atmosphere. Gas phase Bromochlorodifluoromethane will slowly be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be greater than 44 years. Halon 1211 absorbs very little UV radiation above 290 nm and is not expected to photolyze at a significant rate in the ambient atmosphere. Volatilization from moist soil surfaces is expected to be an important fate process based upon an estimated Henry's Law constant of 9.4X10^-2 atm-cu m/mole. Halon 1211 will volatilize rapidly from dry soil surfaces since it exists as a gas in the ambient environment. If released into water, Halon 1211 is not expected to adsorb to suspended solids and sediment based upon the estimated Koc. Volatilization from water surfaces is expected to be an important fate process based upon this compound's estimated Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 1.3 hrs and 5.1 days, respectively. Given its high degree of halogenation, it is not expected to be an important degradation pathway for Halon 1211.

**POTENTIAL TO BIOACCUMULATE:** An estimated BCF of 5.8 was calculated for Halon 1211, using an estimated log Kow of 1.9 and a regression-derived equation. According to a classification scheme, this BCF suggests the potential for bioconcentration in aquatic organisms is low.

**ECOTOXICITY:** There is currently no evidence of adverse effects from exposure to Halon 1211 on aquatic life. Immediate adverse effect on plants would be related to oxygen-deficient environments or frost from rapidly expanding gases.

**OZONE-DEPLETION POTENTIAL:** Halon 1211 is rated as 3 (compared to trichlorofluoromethane nominally 1). Halon 1211 is a Class I ozone depleting chemical (40 CFR Part 82). Halon 1211 may contribute to global warming.

**ENVIRONMENTAL EXPOSURE CONTROLS:** Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

**RESULTS OF PBT and vPvB ASSESSMENT:** No data available. PBT and vPvB assessments are part of the chemical safety report required for some substances in European Union Regulation (EC) 1907/2006, Article 14.
SECTION 13. DISPOSAL CONSIDERATIONS

PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING: Wear proper protective equipment when handling waste materials.

UNUSED PRODUCT / EMPTY CONTAINER: Do not dispose of residual product. Return used product in cylinders to: H3R Clean Agent Specialists, Inc.

DISPOSAL INFORMATION: Relative to the environment, this material has an ozone depletion potential and a global warming potential. Refer to the regulations of the U.S. EPA or the State-specific regulations for proper waste disposal, regulations of Canada and its Provinces, or regulations of EU member states.

U.S. EPA WASTE NUMBER: Not applicable.

EUROPEAN (EWC) WASTE CODES: 16 05 04* gases in pressure containers (including halons) containing dangerous substances

SECTION 14. TRANSPORT INFORMATION

The following classification applies when this product is supplied as a fire extinguisher.

U.S. SHIPPING INFORMATION: This gas is classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

<table>
<thead>
<tr>
<th>UN Identification Number:</th>
<th>UN 1044</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. DOT Proper Shipping Name:</td>
<td>Fire extinguisher with compressed or liquefied gas</td>
</tr>
<tr>
<td>Hazard Class Number and Description:</td>
<td>2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Packing Group:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Placard (When required):</td>
<td>Class 2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Special Provisions:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Explosive Limit &amp; Limited Quantity Index:</td>
<td>0.125 L</td>
</tr>
<tr>
<td>ERAP Index:</td>
<td>None</td>
</tr>
<tr>
<td>Passenger Carrying Ship Index:</td>
<td>None</td>
</tr>
<tr>
<td>Passenger Carrying Road Or Rail Vehicle Index:</td>
<td>75 L</td>
</tr>
</tbody>
</table>

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This gas is classified as dangerous goods, per the International Air Transport Association.

<table>
<thead>
<tr>
<th>UN Identification Number:</th>
<th>UN 1044</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name/Description:</td>
<td>Fire extinguisher with compressed or liquefied gas</td>
</tr>
<tr>
<td>Hazard Class or Division:</td>
<td>2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Hazard Label(s) Required:</td>
<td>Class 2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Packing Group:</td>
<td>None</td>
</tr>
<tr>
<td>Excepted Quantities:</td>
<td>E0</td>
</tr>
<tr>
<td>Passenger and Cargo Aircraft Packing Instruction:</td>
<td>213</td>
</tr>
<tr>
<td>Passenger and Cargo Aircraft Maximum Net Quantity per Pkg.:</td>
<td>75 Kg</td>
</tr>
<tr>
<td>Passenger and Cargo Aircraft Limited Quantity Packing Instruction:</td>
<td>Forbidden</td>
</tr>
<tr>
<td>Passenger and Cargo Aircraft Limited Quantity Maximum Net Quantity per Pkg.:</td>
<td>Forbidden</td>
</tr>
<tr>
<td>Cargo Aircraft Only Packing Instruction:</td>
<td>213</td>
</tr>
<tr>
<td>Cargo Aircraft Only Maximum Net Quantity per Pkg.:</td>
<td>150 Kg</td>
</tr>
<tr>
<td>Special Provisions:</td>
<td>A19</td>
</tr>
<tr>
<td>ERG CODE:</td>
<td>2L</td>
</tr>
</tbody>
</table>

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): This gas is classified as dangerous goods, per the International Maritime Organization.

<table>
<thead>
<tr>
<th>UN No.:</th>
<th>1044</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name:</td>
<td>Fire extinguisher with compressed or liquefied gas</td>
</tr>
<tr>
<td>Hazard Class Number:</td>
<td>2.2</td>
</tr>
<tr>
<td>Packing Group:</td>
<td>None</td>
</tr>
<tr>
<td>Special Provisions:</td>
<td>225</td>
</tr>
<tr>
<td>Limited Quantities:</td>
<td>120 mL</td>
</tr>
</tbody>
</table>
INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (continued):

<table>
<thead>
<tr>
<th>Excepted Quantities:</th>
<th>E0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packing:</td>
<td>Instructions: P003; Provisions: PP91</td>
</tr>
<tr>
<td>IBCs:</td>
<td>Instructions: None; Provisions: None</td>
</tr>
<tr>
<td>Tanks:</td>
<td>Instructions: None; Provisions: None</td>
</tr>
<tr>
<td>EmS:</td>
<td>F-C, S-V</td>
</tr>
<tr>
<td>Stowage Category:</td>
<td>Category A.</td>
</tr>
<tr>
<td>Segregation:</td>
<td>None.</td>
</tr>
</tbody>
</table>

Marine Pollutant: This gas does not meet the criteria of a Marine Pollutant.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This gas is classified by the Economic Commission for Europe to be dangerous goods.

<table>
<thead>
<tr>
<th>UN Number:</th>
<th>UN 1044</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name and Description:</td>
<td>Fire extinguisher with compressed or liquefied gas</td>
</tr>
<tr>
<td>Class:</td>
<td>2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Classification Code:</td>
<td>6A</td>
</tr>
<tr>
<td>Packing Group:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Labels:</td>
<td>Class 2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Special Provisions:</td>
<td>225, 594</td>
</tr>
<tr>
<td>Limited Quantities:</td>
<td>120 mL</td>
</tr>
<tr>
<td>Excepted Quantities:</td>
<td>E0</td>
</tr>
</tbody>
</table>

Packing Instruction: P003; Special Packing Instruction: PP91; Mixed Packing Instruction: MP9

PORTABLE TANKS AND BULK CONTAINERS:

Hazard Identification Number: None

The following classification applies when this product is charged with nitrogen, carbon dioxide or air.

U.S. SHIPPING INFORMATION: This gas is classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

<table>
<thead>
<tr>
<th>UN Identification Number:</th>
<th>UN 1058</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. DOT Proper Shipping Name:</td>
<td>Liquefied gas, non-flammable, charged with nitrogen, carbon dioxide or air</td>
</tr>
<tr>
<td>Hazard Class Number and Description:</td>
<td>2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>U.S. DOT Shipping Label(s) Required:</td>
<td>Class 2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Packing Group:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Placard (When required):</td>
<td>Class 2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Special Shipping Information:</td>
<td>Cylinders should be transported in a secure position in a well-ventilated truck (never transport in passenger compartment of a vehicle). Ensure cylinder valve is properly closed, valve outlet cap has been reinstalled, and valve protection cap is secured before shipping cylinder.</td>
</tr>
<tr>
<td>Caution:</td>
<td>Compressed gas cylinders shall not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with the owner’s written consent is a violation of Federal law (49 CFR 173.301).</td>
</tr>
<tr>
<td>ERG (Emergency Response Guidebook) #:</td>
<td>126</td>
</tr>
<tr>
<td>Special Provisions:</td>
<td>T50 Portable tanks - Applies to various liquefied compressed gases: Consult the regulations for specific requirements Sec. 172.102 Special Provision Portable Tank Code T50.</td>
</tr>
</tbody>
</table>

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This product is classified as Dangerous Goods, per regulations of Transport Canada. The use of the above U.S. DOT information from the U.S. 49 CFR regulations is allowed for shipments that originate in the U.S. For shipments via ground vehicle or rail that originate in Canada, the following information is applicable.

<table>
<thead>
<tr>
<th>UN Identification Number:</th>
<th>UN 1058</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name:</td>
<td>Liquefied gas, non-flammable, charged with nitrogen, carbon dioxide or air</td>
</tr>
<tr>
<td>Hazard Class Number and Description:</td>
<td>2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Packing Group:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Excepted Quantities:</td>
<td>E1</td>
</tr>
<tr>
<td>Hazard Shipping Label(s) Required:</td>
<td>Class 2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Special Provisions:</td>
<td>38</td>
</tr>
<tr>
<td>Explosive Limit &amp; Limited Quantity Index:</td>
<td>0.125 L</td>
</tr>
<tr>
<td>Excepted Quantities:</td>
<td>E1</td>
</tr>
<tr>
<td>ERAP Index:</td>
<td>None</td>
</tr>
<tr>
<td>Passenger Carrying Ship Index:</td>
<td>None</td>
</tr>
<tr>
<td>Passenger Carrying Road or Rail Vehicle Index:</td>
<td>75 L</td>
</tr>
</tbody>
</table>

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This gas is classified as dangerous goods, per the International Air Transport Association.

<table>
<thead>
<tr>
<th>UN Identification Number:</th>
<th>UN 1058</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name/Description:</td>
<td>Liquefied gas, non-flammable, charged with nitrogen, carbon dioxide or air</td>
</tr>
<tr>
<td>Hazard Class or Division:</td>
<td>2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Hazard Label(s) Required:</td>
<td>Class 2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Packing Group:</td>
<td>None</td>
</tr>
<tr>
<td>Excepted Quantities:</td>
<td>E1</td>
</tr>
<tr>
<td>Passenger and Cargo Aircraft Packing Instruction:</td>
<td>200</td>
</tr>
<tr>
<td>Passenger and Cargo Aircraft Maximum Net Quantity per Pkg.:</td>
<td>75 kg</td>
</tr>
<tr>
<td>Passenger and Cargo Aircraft Limited Quantity Packing Instruction:</td>
<td>Forbidden</td>
</tr>
<tr>
<td>Passenger and Cargo Aircraft Limited Quantity Maximum Net Quantity per Pkg.:</td>
<td>Forbidden</td>
</tr>
</tbody>
</table>
SECTION 14. TRANSPORT INFORMATION (Continued)

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (continued):
Cargo Aircraft Only Packing Instruction: 200
Cargo Aircraft Only Maximum Net Quantity per Pkg.: 150 kg
Special Provisions: A19
ERG CODE: 2L

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO):
This gas is classified as dangerous goods, per the International Maritime Organization.

UN No.: 1058
Proper Shipping Name: Liquefied gas, non-flammable, charged with nitrogen, carbon dioxide or air
Hazard Class Number: 2.2
Packing Group: None
Special Provisions: None
Limited Quantities: 120 mL
Excepted Quantities: E1
Packing: Instructions: P200; Provisions: None
IBCs: Instructions: None; Provisions: None
Tanks: Instructions: None; Provisions: None
EmS: F-C, S-V
Stowage Category: Category A.
Segregation: None
Marine Pollutant: This gas does not meet the criteria of a Marine Pollutant.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):
This gas is classified by the Economic Commission for Europe to be dangerous goods.

UN No.: 1058
Name and Description: Liquefied gas, non-flammable, charged with nitrogen, carbon dioxide or air
Class: 2
Classification Code: 2A
Packing Group: None
Labels: 2.2
Special Provisions: 662
Limited Quantities: 120 mL
Excepted Quantities: E1
Packing Instructions: P200
Special Packing Instructions: None
Mixed Packing Provisions: MP9
Portable Tank and Bulk Container: Instructions: (M); Special Provisions: None
Hazard Identification No.: None

The following shipping classification applies when the product is supplied in types of cylinders other than fire extinguishers:

U.S. SHIPPING INFORMATION:

UN Identification Number: UN 1974
U.S. DOT Proper Shipping Name: Chlorodifluorobromomethane or Refrigerant gas R12B1
Hazard Class Number and Description: 2.2 (Non-Flammable Gas)
U.S. DOT Shipping Label(s) Required: Class 2.2 (Non-Flammable Gas)
Packing Group: Not Applicable
Placard (When required): Class 2.2 (Non-Flammable Gas)
ERG (Emergency Response Guidebook) #: 126

Special Packing Information: Cylinders should be transported in a secure position in a well-ventilated truck (never transport in passenger compartment of a vehicle). Ensure cylinder valve is properly closed, valve outlet cap has been reinstalled, and valve protection cap is secured before shipping cylinder.

Caution: Compressed gas cylinders shall not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with the owner’s written consent is a violation of Federal law (49 CFR 173.301).

Special Provisions: T50 Portable tanks - Applies to various liquefied compressed gases: Consult the regulations for specific requirements Sec. 172.102 Special Provision Portable Tank Code T50.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:

UN Identification Number: UN 1974
Proper Shipping Name: Chlorodifluorobromomethane or Refrigerant gas R12B1
Hazard Class Number and Description: 2.2 (Non-Flammable Gas)
Packing Group: Not Applicable
Hazard Shipping Label(s) Required: Class 2.2 (Non-Flammable Gas)
Special Provisions: None
Explosive Limit & Limited Quantity Index: 0.125 L
Excepted Quantities: E1
ERAP Index: None
Passenger Carrying Ship Index: None
Passenger Carrying Road or Rail Vehicle Index: 75 L
SECTION 14. TRANSPORT INFORMATION (Continued)

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA):

- **UN Identification Number:** UN 1974
- **Proper Shipping Name/Description:** Chlorodifluorobromomethane or Refrigerant gas R12B1
- **Hazard Class or Division:** 2.2 (Non-Flammable Gas)
- **Hazard Label(s) Required:** Class 2.2 (Non-Flammable Gas)
- **Packing Group:** None
- **Excepted Quantities:** E1
- **Passenger and Cargo Aircraft Packing Instruction:** 200
- **Passenger and Cargo Aircraft Maximum Net Quantity per Pkg.:** 75 kg
- **Passenger and Cargo Aircraft Limited Quantity Packing Instruction:** Forbidden
- **Passenger and Cargo Aircraft Limited Quantity Maximum Net Quantity per Pkg.:** Forbidden
- **Cargo Aircraft Only Packing Instruction:** 200
- **Cargo Aircraft Only Maximum Net Quantity per Pkg.:** 150 kg
- **Special Provisions:** None
- **ERG Code:** 2L

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO):

- **UN No.:** 1974
- **Proper Shipping Name:** Chlorodifluorobromomethane or Refrigerant gas R12B1
- **Hazard Class Number:** 2.2
- **Packing Group:** None
- **Limited Quantities:** 120 mL
- **Excepted Quantities:** E1
- **Packing:** Instructions: P200; Provisions: None
- **IBCs:** Instructions: None; Provisions: None
- **Tanks:** Instructions: T50; Provisions: None
- **EmS:** F-C, S-V
- **Stowage Category:** Category A.
- **Segregation:** None.
- **Marine Pollutant:** This gas does not meet the criteria of a Marine Pollutant.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):

- **UN NO.:** 1974
- **Name and Description:** Chlorodifluorobromomethane or Refrigerant gas R12B1
- **Class:** 2
- **Classification Code:** 2A
- **Packing Group:** None
- **Labels:** 2.2
- **Special Provisions:** None
- **Limited Quantities:** 120 mL
- **Excepted Quantities:** E1
- **Packing Instructions:** P200
- **Special Packing Instructions:** None
- **Mixed Packing Provisions:** MP9
- **Portable Tank and Bulk Container:** Instructions: (M) T50; Special Provisions: None
- **Hazard Identification No.:** 20

TRANSPORT IN BULK ACCORDING TO THE IBC CODE: See the information under the individual jurisdiction listings for IBC information.

ENVIRONMENTAL HAZARDS: This gas does not meet the criteria of environmentally hazardous according to the criteria of the UN Model Regulations (as reflected in the IMDG Code, ADR, RID, and ADN); this gas is not specifically listed in Annex III under MARPOL 73/78.

SECTION 15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

EPA - ENVIRONMENTAL PROTECTION AGENCY:

- **CERCLA:** Comprehensive Environmental Response, Compensation, and Liability Act of 1990 (40 CFR Parts 117 and 302)
  - Reportable Quantity (RQ): Not Applicable
- **SARA TITLE III:** Superfund Amendment and Reauthorization Act
  - Sections 302/304: Emergency Planning and Notification (40 CFR Part 355)
    - Extremely Hazardous Substances: Halon 1211 is not listed.
    - Threshold Planning Quantity (TPQ): Not Applicable
    - Reportable Quantity (RQ): Not Applicable
  - Sections 311/312: Hazardous Chemical Reporting (40 CFR Part 370)
    - IMMEDIATE: HEALTH: No PRESSURE: Yes DELAYED HEALTH: No REACTIVITY: No FIRE: No
    - Releases of Halon 1211 require reporting under Section 313.
- **CLEAN AIR ACT:**
  - Section 112 (r): Risk Management Programs for Chemical Accidental Release (40 CFR Part 68)
    - Threshold Planning Quantity (TPQ): Not Applicable
SECTION 15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS (continued):

TSCA: Toxic Substances Control Act
Halon 1211 is listed in the TSCA Inventory

OSHA - Occupational Safety And Health Administration:
Threshold Planning Quantity (TPQ): Not Applicable

Other U.S. Federal Regulations:
Requirements under (40 CFR Part 82) may be applicable as Halon 1211 is designated as an ozone-depleting compound.

U.S. State Regulatory Information:
California Proposition 65: Halon 1211 is NOT listed on the California Proposition 65 lists.

CANADIAN FEDERAL REGULATIONS:
Canadian DSL Inventory Status: Halon 1211 is listed on the DSL Inventory
Other Canadian Regulations: Halon 1211 is not on the CEPA Priorities Substances Lists.
Canadian CEPA Regulations: This compound is not on the CEPA Priorities Substances Lists.

Canadian WHMIS HPR 2015 Classification and Symbols: See the following section for classification and symbols under WHMIS.

EUROPEAN REGULATIONS:
Safety, Health, and Environmental Regulations/Legislation Specific for The Product: Currently, there is no specific legislation pertaining to this product.


SECTION 16. OTHER INFORMATION

EXPOSURE LIMITS IN AIR (continued):
PEL-Permissible Exposure Limit: OSHA’s Permissible Exposure Limits. This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register; 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, “Vacated 1989 PEL,” is placed next to the PEL that was vacated by Court Order.

SKIN: Used when there is a danger of cutaneous absorption.
STEL-Short Term Exposure Limit: Short Term Exposure Limit, usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

SKIN: Used when there is a danger of cutaneous absorption.

STEL-Short Term Exposure Limit: Short Term Exposure Limit, usually a 15-minute time-weighted average exposure that should not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

TLV-Threshold Limit Value: An airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour.

TWA-Time Weighted Average: Time Weighted Average exposure concentration for a complete workday (TWA) or an 8-hour period (TWA) and a 40-hour workweek.0

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS: This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

HEALTH HAZARD: 0 (Minimal Hazard). No significant health risk, irritation of skin or eyes not anticipated. Skin Irritation: Essentially non-irritating. Pit or Draise = “0.” Eye Irritation: Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = “0.” Oral Toxicity LD <5000 mg/kg. Dermal Toxicity LD or Rabbit <200 mg/kg. Inhalation Toxicity 4-hrs LC <20 mg/L.; 1 (Slight Hazard). Minor reversible injury may occur; slightly or mildly irritating. Skin Irritation: Slightly or mildly irritating. Eye Irritation: Slightly or mildly irritating. Oral Toxicity LD or Rabbit >500-5000 mg/kg. Dermal Toxicity LD or Rabbit >1000-2000 mg/kg. Inhalation Toxicity LC or 4-hrs Rat >2-20 mg/L.; 2 (Moderate Hazard). Temporary or transitory injury may occur. Skin Irritation: Moderately irritating; primary irritant; sensitizer. Pit or Draise > 0 < 5. Eye Irritation: Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0 < 25. Oral Toxicity LD or Rat > 50-500 mg/kg. Dermal Toxicity LD or Rabbit > 200-1000 mg/kg. Inhalation Toxicity LC or 4-hrs Rat or Rabbit > 0.2-5 mg/L.; 3 (Severe Hazard). Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. Skin Irritation: Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. Pit or Draise > 8-9 with destruction of tissue. Eye Irritation: Corrosive, irreversible destruction of ocular tisue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. Oral Toxicity LD or Rat >1-5 mg/kg. Dermal Toxicity LD or Rabbit > 20-200 mg/kg. Inhalation Toxicity LC or 4-hrs Rat > 0.05-0.5 mg/L.; 4 (Severe Hazard). Life-threatening; major or permanent damage may result from single or repeated exposure. Skin Irritation: Not appropriate. Do not rate as a “4”, based on skin irritation alone. Eye Irritation: Not appropriate. Do not rate as a “4”, based on eye irritation alone. Oral Toxicity LD or Rat, Dermal Toxicity LD or Rabbit < 1 mg/kg. Inhalation Toxicity LC or 4-hrs Rat < 0.05 mg/L.; 5 (Extreme Hazard).
HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

FLAMMABILITY HAZARD: (Minimal Hazard-Materials that will not burn in air when exposed to a temperature of 815.5°F [552°C] for a period of 5 minutes.)

1 (Slight Hazard): Materials that do not become a fire hazard or great danger to life or property when exposed to a temperature of 815.5°F [552°C] for a period of 5 minutes. Other ordinary combustible materials (e.g. wood, paper, etc.).

2 (Moderate Hazard): Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree of heating may not be significant hazards in ordinary combustible structures. However, such materials may be used as fire retardants. Materials that cause severe, but reversible irritation to the respiratory tract, eyes and skin. Materials that, under emergency conditions, can cause toxic effects, such as central nervous system poisoning, convulsions, collapse, unconsciousness, and/or shock.

3 (Severe Hazard): Materials that will burn if exposed to a temperature of 815.5°F [552°C] for a period of 5 minutes. Toxic gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 30 mg/L but less than or equal to 100 mg/L. Materials whose LC₅₀ for acute dermal toxicity is greater than 20 mg/kg but less than or equal to 10 mg/kg.

4 (Slight Hazard): Materials that will float and will generally burn or explode when exposed to a temperature of 1211°F [650°C] for a period of 5 minutes in accordance with Annex D. 1 Materials that must be preheated before ignition can occur. Materials in this degree required considerable preheating, under ambient temperature conditions, before ignition and combustion can occur. Materials that, under emergency conditions, can cause toxic effects, such as central nervous system poisoning, convulsions, collapse, unconsciousness, and/or shock.

5 (Severe Hazard): Materials that will burn if exposed to a temperature of 130°F [54°C] for a period of 5 minutes. Liquid substances that, under emergency conditions, can cause toxic effects, such as central nervous system poisoning, convulsions, collapse, unconsciousness, and/or shock. Materials that cause severe, but reversible irritation to the respiratory tract, eyes and skin. Materials that, under emergency conditions, can cause toxic effects, such as central nervous system poisoning, convulsions, collapse, unconsciousness, and/or shock.

DEFINITION OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

HAZARD HAZARD: (continued): Materials that, under emergency conditions, will offer no hazard beyond that of ordinary combustible materials; Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LC₅₀ for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg.

1 (Slight Hazard): Materials that, under emergency conditions, will offer no hazard beyond that of ordinary combustible materials; Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LC₅₀ for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg.

2 (Moderate Hazard): Materials that, under emergency conditions, can cause toxic effects, such as central nervous system poisoning, convulsions, collapse, unconsciousness, and/or shock. Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 30 mg/L but less than or equal to 100 mg/L. Materials whose LC₅₀ for acute dermal toxicity is greater than 20 mg/kg but less than or equal to 10 mg/kg.

3 (Severe Hazard): Materials that, under emergency conditions, can cause toxic effects, such as central nervous system poisoning, convulsions, collapse, unconsciousness, and/or shock. Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 30 mg/L but less than or equal to 100 mg/L. Materials whose LC₅₀ for acute dermal toxicity is greater than 20 mg/kg but less than or equal to 10 mg/kg.

4 (Slight Hazard): Materials that, under emergency conditions, can cause toxic effects, such as central nervous system poisoning, convulsions, collapse, unconsciousness, and/or shock. Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 30 mg/L but less than or equal to 100 mg/L. Materials whose LC₅₀ for acute dermal toxicity is greater than 20 mg/kg but less than or equal to 10 mg/kg.

5 (Severe Hazard): Materials that, under emergency conditions, can cause toxic effects, such as central nervous system poisoning, convulsions, collapse, unconsciousness, and/or shock. Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 30 mg/L but less than or equal to 100 mg/L. Materials whose LC₅₀ for acute dermal toxicity is greater than 20 mg/kg but less than or equal to 10 mg/kg.
DEFINITION OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):
INSTABILITY HAZARD: 0 Materials that in themselves are normally stable, even under fire conditions: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) below 0.01 W/mL. Materials that do not exhibit an exotherm at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. 1 Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL. 2 Materials that readily undergo violent chemical change at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL. 3 Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. 4 Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) of 1000 W/mL or greater. Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.

FLAMMABILITY LIMITS IN AIR:
Much of the information related to fire and explosion is derived from the National Fire Protection Association (NFPA). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:
Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: LD₅₀ - Lethal Concentration (gas) which kills 50% of the exposed animals; LC₅₀ - Lethal Concentration (solids) which kills 50% of the exposed animals; ppm concentration expressed in parts of material per million parts of air or water; mg/m³ concentration expressed in weight of substance per volume of air; mg/kg quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include TDLo, the lowest dose to cause a symptom and TCLo, the lowest concentration to cause a symptom; TDₐ, LDₐ, and LDₐ, or TC, TCLo, LCₐ, and LCₐ, the lowest dose (or concentration) to cause lethal or toxic effects.

TOXICOLOGICAL INFORMATION (continued):
Cancer Information: The sources are IARC - the International Agency for Research on Cancer; NTP - the National Toxicology Program, RTECS - the Registry of Toxic Effects of Chemical Substances, OSHA and CAL/OSHA. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other Information: BEI - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

REPRODUCTIVE TOXICITY INFORMATION:
A mutagen is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical that causes damage to a developing embryo (i.e., within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance that interferes in any way with the reproductive process.

ECOLOGICAL INFORMATION:
EC is the effect concentration in water. BCF = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. TLₐ = median threshold limit; Coefficient of Oil/Water Distribution is represented by log Kow or log Koc, and is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:
U.S. and CANADA:
ACGIH: American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. This section explains the impact of various laws and regulations on the material. EPA is the U.S. Environmental Protection Agency. NIOSH is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (OSHA). WHMIS is the Canadian Workplace Hazardous Materials Information System. DOT and TC are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act (SARA); the Canadian Domestic/Non-Domestic Substances List (DSL/NDSL); the U.S. Toxic Substance Control Act (TSCA); Marine Pollutant status according to the DOT; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund); and various state regulations. This section also includes information on the precautionary warnings which appear on the material's package label. OSHA - U.S. Occupational Safety and Health Administration.