SAFETY DATA SHEET


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

IDENTIFICATION of the SUBSTANCE or PREPARATION:
CHEMICAL NAME: BROMOTRIFLUOROMETHANE

OTHER MEANS OF IDENTIFICATION/SYNONYMS: Refrigerant gas, R 13B1; F 13B1; F-13B1; FC 13B1; Fluorocarbon 1301; Freon 13B1; Freon 13B1; R 13B1; Trifluorobromomethane; Frigen 13B1; Refrigerant 13B1; Halocarbon 13B1; Monobromotrifluoromethane; R 13B1; Refrigerant 13B1; Trifluorobromomethane; Trifluorobromomethane; CF3Br; Trifluoromethyl bromide; Trifluoromonomethyl bromomethane

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: 1-707-765-765-3395
EMAIL ADDRESS: h3info@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 OF PREPARATION: October 21, 2011
DATE OF REVISION: May 22, 2019

ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2010 format. This compound has been classified in accordance with the hazard criteria of the OPR and the SDS contains all the information required by the CPR. The compound is also classified per all applicable EU Directives through EC 1907-2006, the European Union CLP EC 1272/2008 and the Global Harmonization Standard.

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, Specific Target Organ Toxicity (Inhalation-Narcotic Effect) Single Exposure Category 3, Hazardous to the Ozone Layer Category 1

U.S. OSHA Defined Hazard Classification: Simple Asphyxiant

Signal Word: Warning


Precautionary Statements:
Response: 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 1301 is colorless and odorless or with a slightly ethereal odor and is shipped as liquid under its own vapor 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. 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, but can decompose at very high temperatures forming toxic gases such as hydrogen bromide, hydrogen fluoride and bromine. Cylinders or tanks may rupture and explode if heated. Reactivity Hazards: This material 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>Bromotrifluoromethane</td>
<td>CBrF₃</td>
<td>75-63-8</td>
<td>200-887-6</td>
<td>&gt; 99%</td>
<td>EU ECHA Notified and Self-Classification</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Classification: Compressed Gas/Liquefied Gas, Acute Inhalation Toxicity Cat. 5,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>STOT (Inhalation-Narcotic Effect) SE Cat. 3, Hazardous to the Ozone Layer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Category 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hazard Statement Codes: H280, H333, H336, H420</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>U.S. OSHA Defined Classification</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Classification: May displace oxygen and cause rapid suffocation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>U.S. OSHA Hazards Not Otherwise Classified</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Classification: May cause frostbite.</td>
</tr>
</tbody>
</table>

See Section 2 for full product classification information.

SECTION 4. FIRST AID MEASURES

PROTECTION OF FIRST AID RESPONDERS: RESCUERS 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 while showering with warm water. If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. 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 large 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 AGGRAVATED 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.

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 SUBSTANCE: Bromotrifluoromethane is not combustible. Bromotrifluoromethane, in ambient total-flooding fire extinguishing systems can produce a dense fog (if relative humidity is about 50%) which may reduce visibility for a few seconds and delay evacuation in occupational areas. Containers, when involved in fire, may rupture or burst in the heat of the fire. Most cylinders have a pressure release 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 538°C (1000.4°F) irritating/toxic gases such as hydrogen bromide, hydrogen fluoride and bromine may be generated. 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 FIRE-FIGHTERS: 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 be at least 19.5% 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 material 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 1301 can create an oxygen-deficient atmosphere. Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of Helium-3 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 direct sunlight. Do not allow area where cylinders are stored to exceed 52°F and 80% relative humidity. Avoid storing cylinders in areas exposed to extremes of weather and from the dampness of the ground to prevent rusting. Cylinders should be stored on dry, well-ventilated areas away from sources of heat, ignition and direct sunlight. Do not allow area where cylinders are stored to exceed 60°F (15°C-38°C). 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 the owner.

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 use. 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 (15°C-38°C). 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.

Occupational/Workplace Exposure Limits/Guidelines:

<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>
</tr>
</thead>
<tbody>
<tr>
<td>Bromotrifluoromethane</td>
<td>75-63-8</td>
<td>TWA = 1000</td>
<td>TWA = 1000</td>
<td>TWA = 1000</td>
<td>40,000</td>
<td>TWA = 1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PEAK = 8xMAK 15 min.</td>
</tr>
</tbody>
</table>

NE = Not Established
EXPOSURE LIMITS/CONTROL PARAMETERS:

INTERNATIONAL EXPOSURE LIMITS: Currently, the following international exposure limits are in place for Halon 1301 (specific country limits may become available or change—consult individual countries for most current information).

<table>
<thead>
<tr>
<th>Bromotrifluoromethane</th>
<th>Limit Value - Eight Hours</th>
<th>Limit Value - Short Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>1000 ppm, 6090 mg/m³</td>
<td>2000 ppm, 12,200 mg/m³</td>
</tr>
<tr>
<td>Austria</td>
<td>1000 ppm, 6100 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>1000 ppm, 6178 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Canada-Ontario</td>
<td>1000 ppm</td>
<td></td>
</tr>
<tr>
<td>Canada-Québec</td>
<td>1000 ppm, 6090 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>1000 ppm, 6100 mg/m³</td>
<td>2000 ppm, 12,200 mg/m³</td>
</tr>
<tr>
<td>Finland</td>
<td>1000 ppm, 6290 mg/m³</td>
<td>1300 ppm (1), 8000 mg/m³ (1)</td>
</tr>
<tr>
<td>France</td>
<td>1000 ppm, 6100 mg/m³</td>
<td>8000 ppm (1), 49,600 mg/m³ (1)</td>
</tr>
<tr>
<td>Germany (AGS)</td>
<td>1000 ppm, 6200 mg/m³</td>
<td>8000 ppm , 49,600 mg/m³</td>
</tr>
<tr>
<td>Germany (DFG)</td>
<td>1000 ppm, 6200 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td>1000 ppm, 6100 mg/m³</td>
<td>1200 ppm (1), 7200 mg/m³ (1)</td>
</tr>
<tr>
<td>Latvia</td>
<td>3000 mg/m³</td>
<td></td>
</tr>
<tr>
<td>New Zealand</td>
<td>1000 ppm, 6090 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Romania</td>
<td>5000 mg/m³</td>
<td>7000 mg/m³ (1)</td>
</tr>
<tr>
<td>Singapore</td>
<td>1000 ppm, 6090 mg/m³</td>
<td></td>
</tr>
<tr>
<td>South Korea</td>
<td>1000 ppm, 6100 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td>1000 ppm, 6195 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td>1000 ppm, 6100 mg/m³</td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>[1000 ppm], [6100 mg/m³]</td>
<td>[1200 ppm], [7430 mg/m³]</td>
</tr>
</tbody>
</table>

Remarks

Finland (1) 15 minutes average value
Germany (AGS) (1) 15 minutes average value
Germany (DFG) STV 15 minutes average value
Ireland (1) 15 minutes reference period
Romania (1) 15 minutes average value

United Kingdom The UK Advisory Committee on Toxic Substances has expressed concern that, for the OELs shown in parentheses, health may not be adequately protected because of doubts that the limit was not soundly-based. These OELs were included in the published UK 2002 list and its 2003 supplement, but are omitted from the published 2005 list. The UK Advisory Committee on Toxic Substances has expressed concern that, for the OELs shown in parentheses, health may not be adequately protected because of doubts that the limit was not soundly-based. These OELs were included in the published UK 2002 list and its 2003 supplement, but are omitted from the published 2005 list.

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). The following are U.S. NIOSH respiratory protective equipment guidelines for this gas.

BROMOTRIFLUOROMETHANE

CONCENTRATION

Up to 10,000 ppm: Any Supplied-Air Respirator (SAR).
Up to 25,000 ppm: Any SAR operated in a continuous-flow mode.
Up to 40,000 ppm: Any SAR that has a tight-fitting facepiece and is operated in a continuous-flow mode, or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece, or any SAR with a full facepiece.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.

Escape: Any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister, or any appropriate escape-type, SCBA.

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

Form: Liquefied gas
Color: Colorless
Odor: Odorless to slightly ethereal
Molecular Weight: 148.91
Molecular Formula: CBrF₃
### SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

**Boiling Point @ 760 mmHg**  
-57.8°C (-27.6°F)

**Freezing/Melting Point @ 1 atm**  
-172°C (-279.6°F)

**Gas Specific Gravity [Relative Density] (water = 1)**  
Gas

**Liquid Specific Gravity [Relative Density] (water = 1) @ 20°C**  
1.5800 g/mL

**Solubility in Water @ 25°C**  
Practically insoluble (0.03% by weight)

**Other Solubilities**  
Soluble in chloroform

**Vapor Pressure @ 20°C**  
10755 mmHg (1434 kPa)

**Vapor Density (air = 1)**  
5.7

**Odor Threshold**  
Not determined

**Critical Temperature**  
67°C (152.6°F)

**Critical Pressure**  
4032 kPa (39.8 atm)

**Liquid Viscosity @ 25°C**  
0.157 mPa.s

**Octanol/Water Partition Coefficient**  
log Kow= 1.86

**Henry's Law Constant @ 25°C**  
0.4994 atm-cu m/mole

### WARNING PROPERTIES FOR THIS GAS

The odor is not a good 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.

### SECTION 10. STABILITY AND REACTIVITY

**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:** Chemically active metals (e.g. sodium, potassium, calcium, powdered aluminum, zinc, magnesium).

**HAZARDOUS DECOMPOSITION PRODUCTS:**
- **Combustion:** Decomposes above 538°C (1000.4°F). Forms hydrogen bromide, hydrogen fluoride and free bromine. In air, carbonyl fluoride and carbonyl bromide may form. **Hydrolysis:** At high temperature and in the presence of water, this gas may form acids (by hydrolysis or by catalytic decomposition) which may attack metallic surfaces.

### POSSIBILITY OF HAZARDOUS REACTION OR POLYMERIZATION

Will not occur.

### ROUTES OF ENTRY, SYMPTOMS OF ACUTE EXPOSURE

**WARNING:** If rescue personnel need to enter an area in which a release of Halon 1301 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 below.

### CONCENTRATION of OXYGEN

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Exposure Symptom</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.9% Oxygen</td>
<td>Normal oxygen concentration in air.</td>
</tr>
<tr>
<td>15–19% Oxygen</td>
<td>Decreased ability to perform tasks. May impair coordination and may induce early symptoms in persons with heart, lung, or circulatory problems.</td>
</tr>
<tr>
<td>12–15% Oxygen</td>
<td>Breathing increases, especially in exertion. Pulse up. Impaired coordination, perception, and judgment.</td>
</tr>
<tr>
<td>10–12% Oxygen</td>
<td>Breathing further increases in rate and depth, poor coordination and judgment, lips slightly blue.</td>
</tr>
<tr>
<td>8–10% Oxygen</td>
<td>Mental failure, fainting, unconsciousness, ashen face, blueness of lips, nausea (upset stomach), and vomiting.</td>
</tr>
<tr>
<td>6–8% Oxygen</td>
<td>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.</td>
</tr>
<tr>
<td>4–6% Oxygen</td>
<td>Coma in 40 seconds, followed by convulsion, breathing failure, death.</td>
</tr>
</tbody>
</table>

**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.

**HAZARDOUS MATERIAL IDENTIFICATION SYSTEM**

<table>
<thead>
<tr>
<th>Health Hazard</th>
<th>Flammability Hazard</th>
<th>Physical Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**PROTECTIVE EQUIPMENT**

**EYES**  
See Section 8

**RESPIRATORY**  
See Section 8

**HANDS**  
See Section 8

**BODY**  
See Section 8

Hazard Scale: 0 = Minimal  1 = Slight  2 = Moderate  3 = Serious  4 = Severe  " = Chronic hazard
SECTION 11. TOXICOLOGICAL INFORMATION (Continued)

ROUTES OF ENTRY, SYMPTOMS OF ACUTE EXPOSURE (continued):

Skin Contact: Transitory skin contact should not cause any adverse effects.

Other Acute Health 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. In addition, the sudden release of a pressurized gas (such as may occur in the event of a valve failure), presents a severe hazard of mechanical injury.

Acute Exposure Target Organs: Respiratory system, skin.

ROUTES OF ENTRY, SYMPTOMS OF CHRONIC EXPOSURE:

Inhalation: No specific data are available for this gas. Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system. Inhalation of very high concentrations may cause adverse effects on the central 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 1301 is not 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 is currently no evidence of adverse effects from exposure to Halon 1301.

ECOTOXICITY: Bromotrifluoromethane is not expected to adsorb in aquatic life.

PERSISTENCE AND BIODEGRADABILITY: If released to air, a vapor pressure of 1.22X10^4 mm Hg at 25°C indicates Bromotrifluoromethane will exist solely in the gas phase in the ambient atmosphere. Gas-phase Bromotrifluoromethane will be degraded slowly in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life of this reaction in air is estimated to be greater than 44 years. The primary decomposition process to occur in the stratosphere is UV photolysis. It has an estimated photolysis half-life of 0.499 atm-mol. If released into water, Bromotrifluoromethane is not expected to adsorb to suspended solids and sediment in the water based upon the estimated Koc. Volatilization from water surfaces is expected to be an important fate process based upon this compound's Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 1.2 hrs and 4.8 days, respectively. Based upon the high degree of stability, Bromotrifluoromethane biodegradation is expected to be slow. Hydrolysis is not expected to occur due to the lack of hydrolyzable functional groups.

POTENTIAL TO BIOACCUMULATE: An estimated BCF of 5.4 suggests the potential for bioconcentration in aquatic organisms is low.

ECOTOXICITY: Immediate adverse effect on plants would be related to oxygen-deficient environments or frost from rapidly expanding gases, unless exposure occurs in a confined space. There is currently no evidence of adverse effects from exposure to Halon 1301 on aquatic life.

OZONE-DEPLETION POTENTIAL: Halon 1301 is a Class I, Group II, Ozone Depleting Chemical per U.S. 40 CFR Part 82. Halon 1301 may contribute to global warming.
SECTION 12. ECOLOGICAL INFORMATION (Continued)

ENVIROMENTAL 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

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 1009</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. DOT Proper Shipping Name:</td>
<td>Bromotrifluoromethane or Refrigerant gas R 13B1</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>
</tbody>
</table>

Special Shipping 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. Shipments 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).

ERG (Emergency Response Guidebook) #: 126

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: 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>
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<tbody>
<tr>
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</tr>
<tr>
<td>Hazard Class Number and Description:</td>
<td>2.2 (Non-Flammable Gas)</td>
</tr>
<tr>
<td>Hazard 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>Special Provisions:</td>
<td>None</td>
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<tr>
<td>Explosive Limit &amp; Limited Quantity Index:</td>
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<tr>
<td>Excepted Quantities:</td>
<td>E1</td>
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<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 1009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name:</td>
<td>Bromotrifluoromethane or Refrigerant gas R 13B1</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>Not Applicable</td>
</tr>
<tr>
<td>Excepted Quantities:</td>
<td>E1</td>
</tr>
<tr>
<td>Passenger and Cargo Aircraft Packing Instruction:</td>
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</tr>
<tr>
<td>Passenger and Cargo Aircraft Maximum Net Quantity per Pkg.:</td>
<td>75 kg</td>
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<tr>
<td>Passenger and Cargo Aircraft Limited Quantity Packing Instruction:</td>
<td>Forbidden</td>
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<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>200</td>
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<tr>
<td>Cargo Aircraft Only Maximum Net Quantity per Pkg.:</td>
<td>150 kg</td>
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<tr>
<td>Special Provisions:</td>
<td>A19</td>
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<tr>
<td>ERG Code:</td>
<td>2L</td>
</tr>
</tbody>
</table>
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 Number: UN 1009
Name and Description: Bromotrifluoromethane or Refrigerant gas R 13B1
Class: 2.2 (Non-Flammable Gas)
Classification Code: 2A
Packing Group: Not Applicable
Labels: Class 2.2 (Non-Flammable Gas)
Special Provisions: 662
Limited Quantities: 120 mL
Excepted Quantities: Not Applicable
Packaging: Packing Instruction: P200; Special Packing Instruction: Not Applicable; Mixed Packing Instruction: MP9
Portable Tanks and Bulk Containers: Instruction: (M) T50; Special Provisions: Not Applicable
Hazard Identification Number: 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:

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: 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

Section 313: Toxic Chemical Release Reporting (40 CFR 372)
Releases of this compound do not 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

TSCA: Toxic Substances Control Act
This compound is listed in the TSCA Inventory

OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

Threshold Planning Quantity (TPQ): Not Applicable

Other U.S. Federal Regulations: None applicable.

U.S. State Regulatory Information:

California Proposition 65: This compound is NOT listed on the California Proposition 65 lists.

CANADIAN FEDERAL REGULATIONS:

Canadian DSL Inventory Status: This compound is listed on the DSL Inventory.

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

Information contained in this Safety Data Sheet is provided to our customers so they may comply with 29 CFR 1910.1200, Hazard Communication Standard, the Canadian WHMIS Standard, and the requirements of the European Union Directives. The intent of this Material Safety Data Sheet is to provide end users of this product with the health and physical hazards associated with possible exposure to this product. All statements, technical data and recommendations are based on readily available texts and data that H&R Clean Agents, believes to be reliable and accurate. H&R Clean Agents makes no warranties, guarantees or representations of any kind with respect to this product or this data. It is the responsibility of the user to obtain and use the most recent version of this MSDS.

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc. • PO Box 1961, Hilo, HI 96721 • 800/441-3365
REFERENCES AND DATA SOURCES: Contact the supplier for information.
METHODS OF EVALUATING INFORMATION FOR THE PURPOSE OF CLASSIFICATION: Bridging principles were used to classify this product.
A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CASE #: This is the Chemical Abstract Service Number that uniquely identifies each constituent.

EXPOSURE LIMITS IN AIR:

CEILING LEVEL: The concentration that shall not be exceeded during any part of the working exposure.

DGF MAK Germ Cell Mutagen Categories: 1: Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed humans. 2: Germ cell mutagens which have been shown to increase the progeny of exposed mammals. 3A: Substances which have been induced to cause germ cell mutations in certain strains of mice, rats, and/or hamsters. 3B: Substances which are suspected of being germ cell mutagens because of their genotoxic effects in mammalian somatic cell in vivo; in exceptional cases, substances for which there are no in vivo data, but which are clearly mutagenic in vitro and structurally related to known mutagens. 4: Genotoxic substances which have not been included in any of the above categories, and for which non-genotoxic mechanisms of action are postulated. Therefore, a Category 4 for germ cell mutagens cannot apply. At some time in the future, it is conceivable that this decline could be established in an active form. 5: Germ cell mutagens, the potency of which is considered to be so low that, provided the MAK value is observed, their contribution to genetic risk for humans is expected not to be significant.

DGF MAK Pregnancy Risk Group Classification: Group A: Risk of damage to the developing embryo or fetus has been unequivocally demonstrated. Exposure of pregnant women to MAK levels, even in the evaluation organism, may be considered to be unacceptable. Group B: Risk of damage to the developing embryo (organism) has been demonstrated. Exposure of pregnant women are exposed, even when MAK and BAR values are observed. Group C: There is no reason to fear a risk of damage to the developing embryo or fetus when MAK and BAR values are observed. Group D: Classification in one of the groups A-C is not yet possible because, although the data available may indicate a trend, they are not sufficient for final evaluation.

IDLH Immediately Dangerous to Life and Health: This level represents a concentration from which escape can occur within minutes without suffering escape-preventing or permanent injury.

LOQ: Limit of Quantitation.

NIOSH: National Institute for Occupational Safety and Health Maximum Concentration Values in the workplace:

NE: Not Established. When no exposure guidelines are established, an entry of NE is made for reference.

NIC: Not Intended Change.

NIOSH CEILING: The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure (unless otherwise specified) that shall not be exceeded at any time during a workday.

NIOSH RELS: NIOSH's Recommended Exposure Limits.

PEL-Permissible Exposure Limit: OSHA's Permissible Exposure Limits. This exposure value expresses the maximum concentration of a substance in the TWA, except that for OSHA's 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 PELs that was vacated by the 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. The duration must be considered, including the 8-hour TWA, even if the 8-hour 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, usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hour TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

TWA-Time Weighted Average: Time Weighted Average exposure concentration for a representative 8-hour period.

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 or dermatitis is anticipated. Skin Irritation: Essentially non-irritating. P.I. Draize = 0. Eye Irritation: Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = 0. Toxicity LD₅₀, Rat ≤ 5000 mg/kg. Dermal Toxicity LD₅₀ or Rabbit ≥ 500 mg/kg. Inhalation Toxicity LD₅₀ or Rabbit ≥ 5000 mg/kg. Dermal Toxicity LC₅₀ or Rabbit ≥ 2000 mg/kg. Inhalation Toxicity LC₅₀ or Rabbit ≥ 500 mg/m³. TWA or REL: < 0.05 mg/L. NEC: Not Established. When no exposure guidelines are established, an entry of NE is made for reference.

1: Slightly or mildly irritating.

2: Moderate to severely irritating and/or corrosive; reversible corneal opacity; corneal irritation or irritation persisting for more than 21 days. Draize ≥ 0 but with effects irreversible in 21 days. Toxicity LD₅₀ or Rabbit ≥ 150 mg/kg. Dermal Toxicity LD₅₀ or Rabbit ≥ 200 mg/kg. Inhalation Toxicity LC₅₀ or Rabbit ≥ 0.05 mg/L; 4: Severely irritating and/or corrosive; major or permanent damage to the eye; may cause blindness; requires repeated or continuous 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 LD₅₀ or Rat ≤ 1 mg/kg. Dermal Toxicity LD₅₀ or Rabbit ≤ 50 mg/kg. not-toxic Toxicity LC₅₀ or Rabbit ≤ 0.05 mg/L.

3: Strongly irritating.

4: Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize ≥ 8 with effects irreversible in 21 days. Toxicity LD₅₀ or Rabbit ≥ 500 mg/kg. Dermal Toxicity LD₅₀ or Rabbit ≥ 5000 mg/kg. Inhalation Toxicity LC₅₀ or Rabbit ≥ 0.5 mg/L. TWA or REL: ≥ 0.05 mg/L.

5: Hazardous to life or health.

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HALON 1301

DEFINITIONS OF TERMS

MATERIALSCSA: This is the Chemical Abstract Service Number that uniquely identifies each constituent.

HALON 1301

SAFETY PRACTICE Catalog Number 1301
DEFINITIONS OF TERMS (Continued):

FLAMMABILITY HAZARD:

0 Materials that will not burn under typical fire conditions, including exposure to fire or heating, such as concrete, stones, sand, etc.

1 Materials that will not burn in air when exposed to a temperature of 161°F (72°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 require considerable preheating, under all ambient conditions, before ignition. Examples of primary skin irritants or sensitizers. 2 Materials that will burn in air when exposed to a temperature of 161°F (72°C) for a period of 5 minutes in accordance with Annex D. Liquids, solids, and semisolids having a flash point at or above 93°F (34°C) (i.e., Class IIIB liquids). Liquids with a flash point greater than 35°F (2°C) that do not sustain combustion when tested using the Method of Testing for Sustained Combustibility (ASTM D 1978-85). 3 Materials that will readily vaporize at atmospheric pressure and normal temperatures and pressures. 4 Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°F (121°C) below 0.1 W/mL. 5 Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°F (121°C) below 0.01 W/mL. 6 Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°F (121°C) below 1.0 W/mL. 7 Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°F (121°C) below 100 W/mL. 8 Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.

FLAMMABILITY LIMITS IN AIR:

Autoignition Temperature: The minimum temperature required to initiate combustion in air without an external source of ignition. Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°F (121°C) below 0.01 W/mL. 9 Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.

INSTABILITY HAZARD:

0 Materials that in themselves are normally stable, even under fire conditions, but not to an extent that will result in the production of heat of reaction and reaction rate at 250°F (121°C) below 0.01 W/mL. 1 Materials that do not exhibit an exotherm at temperatures less than or equal to 50°F (15°C) for a period of 10 minutes in accordance with Annex D. 2 Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°F (121°C) below 0.01 W/mL and below 10 W/mL. 3 Materials that are rated by the closed cup flash point of the solvent. 4 Materials that have a flash point of the solvent. 5 Materials that do not exhibit an exotherm at temperatures less than or equal to 50°F (15°C) for a period of 10 minutes in accordance with Annex D. 6 Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°F (121°C) below 1.0 W/mL. 7 Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°F (121°C) below 100 W/mL. 8 Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.