SAFETY DATA SHEET

1. IDENTIFICATION

Product Identifier:	**HALOTRON® BrX (BTP)**
Synonyms:	1-propene, 2-bromo-3,3,3-trifluoro-; propene, 2-bromo-3,3,3-trifluoro-; 2-bromo-3,3,3-trifluoropropene; 2-bromo-3,3,3-trifluoroprop-1-ene; 3,3,3-trifluoro-2-bromopropene; R-1233B1
Product Code:	Reach Registration 01-2120043689-45-0000 Pre-Registration- UK-01-4566953204-1-0001
SDS compliant with regulations:	(EC) No 1907/2006 (REACH), (EC) No 1272/2008 (CLP)
Manufacturer/Supplier:	American Pacific, Halotron
Address:	10622 West 6400 North, Cedar City, UT 84721
Telephone:	+1 (435) 865-5000 Fax: +1 (435) 865-5005
Emergency Contact:	CHEMTREC Customer Number: CCN721187 US Tel: 1 (800) 424-9300 Int'l Tel: +1 (703) 741-5970

Halotron® BrX is used and marketed as a Fire Extinguishing Agent

2. HAZARDS IDENTIFICATION

Hazard Classification:

Specific target organ toxicity, single exposure – Category 3

Reproductive toxicity – Category 1B

Signal word: DANGER

Hazard Statements:

H335:	May cause respiratory irritation.
H336:	May cause drowsiness or dizziness.
H360FD:	May damage fertility or the unborn child through prolonged, repeated exposure by inhalation

Precautionary Statements:

P201	Obtain special instructions before use
P202	Do not handle until all safety precautions have been read and understood
P261:	Avoid breathing vapors/spray
P271:	Use only outdoors or in a well-ventilated area.
P280:	Wear protective gloves/protective clothing/eye protection/face protection/hearing protection
P304+P340:	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308+P313	If exposed or concerned: Get medical advice/attention.
P312:	Call a POISON CENTER or doctor/physician if you feel unwell.
P403+P233:	Store in a well-ventilated place. Keep container tightly closed.
P405:	Store locked up
P501:	Dispose of contents/container to an approved waste disposal plant

Note: Additional hazard information pertaining to this substance in the United States has been developed. See Regulatory Information in Section 15 for details.

3. COMPOSITION/INFORMATION OR INGREDIENTS

Ingredient Name	CAS Number	EC#	Weight %
2-bromo-3, 3, 3-trifluoro-1-propene (BTP)	1514-82-5	627-872-0	≥99% purity

Note: This material will contain proprietary stabilizer additives when in use in fire extinguisher hardware.

4. FIRST AID MEASURES

As a general rule, in case of doubt or if symptoms persist, always call a physician

Routes of exposure	Signs and symptoms of exposure:	Emergency and first aid procedures:
Skin:	Not expected to produce irritation or corrosivity to the skin	If significant exposure occurs, wash exposed area immediately with large amounts of water. Remove contaminated clothing and footwear. Contact a physician if irritation occurs.
Ingestion:	Not likely to occur in industrial use. Volatile liquid.	Do not induce vomiting. Call a doctor.
Eyes:	Not expected to cause irritation to the eyes.	Flush eyes with fresh water and move exposed person to a non-contaminated area. Call a doctor if irritation or effects occur.
Inhalation:	Gross overexposure may cause central nervous system effects such as dizziness, confusion, physical incoordination, drowsiness, anesthesia, or unconsciousness. At concentrations of 1.0% (v/v) or higher, may cause increased sensitivity of the heart to adrenaline, which might cause irregular heartbeats and possibly ventricular fibrillation or death.	Remove person to fresh air and keep comfortable for breathing. Call a doctor if breathing difficulties occur.

5. FIRE FIGHTING MEASURES

Flammable Properties

Flash Point: None
Flash Point Method: ASTM D92, *Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester*
Auto-ignition Temperature: No ignitions witnessed in tests up to 1,125˚F (607°C.)
Auto-ignition Temperature Method: ASTM E659, *Standard Test Method for Auto-ignition Temperature of Liquid Chemicals*
Upper Flammability Limit (volume % in air): Not applicable
Lower Flammability Limit (volume % in air): Not applicable
Flammability Limit Method: ASTM E681, *Standard Test Method for Concentration Limits of Flammability of Chemicals (Vapors and Gases)*

Extinguishing Media: The properties of this chemical make it an ideal extinguishing media itself

Special Fire Fighting Procedures: In the case of a fire involving a bulk tank of the material, ensure that the area where the fire occurred is well ventilated before re-entering. Wear protective clothing, including a Self Contained Breathing Apparatus (SCBA), if large amounts are present. Use water spray or fog to cool storage containers to help prevent an uncontrolled pressure release of bulk tanks, if applicable.

Unusual Fire and Explosion Hazards: The concentrated agent when applied to fire can produce toxic by-products specifically hydrogen halides, which can cause damage. Avoid inhalation of these materials by evacuating and ventilating the area.

This material in air at both elevated pressure and temperature levels not commonly encountered may become combustible. Whether a mixture containing this material and air, or an oxygen enriched environment, becomes combustible depends on the inter-relationship of 1) the temperature, 2) the pressure, and 3) the proportion of oxygen. Weak combustion of vapors has been witnessed in air mixtures at pressures of 4.3 psig (19.0 psia) and 302°F (150°C)

using a fuse wire ignition source. This agent is extremely effective as a fire extinguishing agent where it is applied to a fire as a spray or stream. This material should not, however, be used in firefighting applications or other applications where mixtures in air exceeding a few psig would be expected.

6. ACCIDENTAL RELEASE MEASURES

In Case of Spill or Other Release: In the event of a large spill, allow for adequate ventilation, and do not re-enter an area without an SCBA until adequate ventilation is accomplished

- For spills that might result in overexposure, evacuate the area and use protective gear and SCBA's.
- Avoid leakage into waterways.
- Do not expose storage containers to fire, as uncontrolled pressure releases may result

Although this material is volatile and will quickly evaporate, avoid leakage into waterways. For large spills, evacuate downwind of the spills and dike to contain the spill until it evaporates

7. HANDLING AND STORAGE

Normal Handling: (See section 8 for recommended personal protective equipment.) Avoid contact with the skin and eyes. Avoid unnecessarily inhaling material and ensure that good ventilation is present when handling. Wash after handling and follow good personal hygiene and good housekeeping practices. Keep containers closed and transfer material using closed systems. Handle in a manner to minimize spills.

Storage: Store in well-ventilated place. Keep container tightly closed. Store locked up

Additional Note: Containers should be maintained in good condition. Do not allow material to remain in deteriorating containers. Because this product can volatilize, special care should be taken for over pressurization hazards if the containers are overheated or near a radiant heat source.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Ventilate indoor work areas to minimize exposure levels. Inspect and clean ventilation systems regularly. Prolonged use should occur only in areas with adequate ventilation. Keep storage containers tightly closed. Vapors are heavier than air, posing a potential hazard if large volumes are trapped in enclosed or low places.

Personal Protective Equipment: Wear protective clothing when handling a leak in a bulk storage container When handling bulk material and containers, the following are recommended: eye protection with splash protective side shields; Neoprene, nitrile or PVA gloves; and protective shoes, such as steel-toed shoes. If handled in enclosed spaces where applicable exposure limits might be exceeded, a Self Contained Breathing Apparatus (SCBA) should be used. When performing filling or servicing operations: **Perform These Activities In A Well-Ventilated Area**.

Emergency Overview: Halotron® BrX is a clear and colorless, or clear with a light yellow tint, volatile liquid with a slight ether-like (unstabilized), or a soured fruit (when stabilized) odor. As with any chemical, dose and exposure are critically important variables to understand any potential treatment. Gross overexposure may cause central nervous system effects such as dizziness, confusion, physical incoordination, drowsiness, anesthesia, or unconsciousness. Sustained exposure concentrations of 1.0% (v/v) or higher may cause increased sensitivity of the heart to adrenaline which might cause irregular heartbeats and possibly ventricular fibrillation or death.

Health Hazards: Time Weighted Exposure Limits (For persons regularly exposed to material):
DNEL, 8-hr = 11 ppm
US EPA TSCA, 8-hr = 1 ppm (See Section 15 for additional US regulatory information)

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	Volatile liquid
Color	Colorless to slight yellow tint, transparent
Odor	Solvent, ether-like(unstabilized), or a soured fruit odor (when stabilized)
Odor threshold	Not available
pH-value	Not applicable
Melting point	-111.2 °C
Freezing Point	-131.2 °C
Initial boiling point	34°C (93.2°F)
Flash point	None
Evaporation rate	Not available
Flammability (liquid, gas)	Not applicable under standard ambient conditions
Explosion limits	Not applicable under standard ambient conditions

Vapor pressure	82.0 kPa at 25°C (11.9 psia @ 77°F)
Vapor density	7.27 g/l at 20°C (0.45 lbs/ft3 at 68°F)
Relative density (liquid)	1.65 g/cm^3 at 20°C (103 lbs/ft^3 at 68°F)
Solubility in water	Low solubility, 1 g/l at 20°C (0.13 lbs/gallon(US) at 68°F)
Partition coefficient	$Log_{10}P_{ow} = 2.7$
Auto-ignition temperature	None determined, tested to 400° C (752°F)
Decomposition temperature	Approx. 600°C
Molecular Weight	174.95

10. STABILITY AND REACTIVITY

Stability: Normally stable when stored in a closed system free of moisture or other contamination. This material will decompose if exposed to a high radiant heat source, such as fire. This compound will slowly react with oxygen and water contamination in storage containers. Stabilizing additives are added to this material prior to final installation in equipment in order to protect the material against minor amounts of air and moisture contamination that may occur when transferring material into or between containers.

Incompatibilities: Incompatible with alkali or alkaline earth metals, and powdered metals Al, Zn, Be, etc. Avoid contact with oxidizers.

Hazardous Decomposition Products: Thermal decomposition may produce hydrogen fluoride, hydrogen bromide, and carbonyl halide. These materials are dangerous and exposure to them should be limited to the extent possible.

Hazardous Polymerization: Not determined.

11. TOXICOLOGICAL INFORMATION

Long-Term Exposure Has Not Been Fully Investigated

Cardiotox No Observable Adverse Effect Level (NOAEL), based on dog inhalation with epinephrine	0.5%vol.
Cardiotox Lowest Observable Adverse Effect Level (LOAEL), based on dog inhalation with epinephrine	1.0%vol.
AMES, Human Lymphocyte Chromosome Aberration, and Mouse Lymphoma In-Vitro Tests	Tests indicate no mutagenic response.
Acute Inhalation Test, 5%vol. for 30 minutes (rat)	No deaths and all rats normal at necropsy.
Skin Irritation	No dermal reaction or skin irritation was observed in laboratory rabbits.
Eye Irritation	Did not produce eye irritation or reaction in laboratory rabbits
14-Day Inhalation Test, 6 hours/day, 5 days/week, 2 weeks (rat)	No deaths at six doses between 5,000 and 20,000 ppm. Treatment-related effects were sluggish activity and labored breathing that returned to normal after exposure ended and lower body weights. Pathology showed irritant effects in the upper respiratory tract.
90-Day Inhalation Test, 6 hours/day, 5 days/week, with 4-week recovery period (rat)	No deaths at three doses between 200 and 3,000 ppm. Treatment-related effects were sluggish activity and labored breathing that returned to normal after exposure ended and lower body weights and food consumption. Pathology showed irritant effects in the upper respiratory tract. Changes in blood chemistry and hematology were noted that appeared to be reversible during the recovery phase. Some treated animals had pale teeth.

Reproductive Toxicity, inhalation test, 6 hours/day, 7 days/week, up to 8 weeks (rat)	In two reproductive screening tests, male and female rats were exposed daily for 2 weeks prior to pairing, during pairing, during gestation, and up to days 10 of lactation. Six doses were administered between 50 and 3000 ppm. Offspring did not exhibit any gross malformations. Treatment-related effects of repeat exposure on reproductive performance and development were seen in male and female rats at concentrations at 175 ppm and above. There is not clear evidence of reproductive/development effects in the absence of other non-specific consequences and there is interspecies and mechanistic information that raises doubt about human relevancy.

12. ECOLOGICAL INFORMATION

Aquatic toxicity:
96 h LC50: Oncorhynchus mykiss (rainbow trout) 31.6 mg/l (nominal)
96 h ErI50: Pseudokirchneriella subcapitata (green algae) >800 mg/l (nominal)
96 h EbI50: Pseudokirchneriella subcapitata (green algae) >800 mg/l (nominal)
48 h EC50: Daphnia magna (Water flea) 83.0 mg/l (nominal)
NOTE: Nominal concentrations represent quantities added to the test samples. This material is volatile and rapidly partitions out of test samples.

Environmental Fate:
Biodegradability: Not readily biodegradable in water. Reacts quickly with gas-phase OH radicals in the atmosphere and has a short atmospheric lifetime (7.0 days at latitudes 30°N to 60°N). Anticipated rapid partitioning to the atmospheric compartment followed by degradation
Bioaccumulation: Bioaccumulation is unlikely.
The material is a volatile organic compound and should not be permitted to be mixed with ground or drinking water and should be handled, used, and disposed of responsibly in accordance with regulations in the Country, Province, State, County, and locality where it is used.

13. DISPOSAL CONSIDERATIONS

Dispose of contents in accordance with all federal, state, and local regulations for products of this type

The manufacturer assumes no liability for the use of this product in a manner that causes environmental or other harm.

14. TRANSPORT INFORMATION

U.S. DOT Shipping Name: Not regulated as a hazardous material by DOT by ground or vessel (49CFR)
International Maritime Organization (IMO): Not regulated
International Air Transport Association (IATA): Not regulated

15. REGULATORY INFORMATION

This material does NOT trigger section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986. The material is not listed on the Consolidated List of Chemicals Subject to the Emergency Planning and Community Right to Know Act and Section 112 (R) of the Clean Air Act.

TSCA Listed: Yes
This substance is subject to a TSCA 5e Consent Order. The Hazard Communication portion of that February, 2016 Consent Order requires these additional statements: This substance may cause cardiac sensitization and reproductive effects to unprotected workers from repeated inhalation exposures. When using this substance use respiratory protection, or maintain workplace airborne concentrations at or below an 8-hour time-weighted average of 1 ppm, avoid skin contact and use skin protection.

16. OTHER INFORMATION

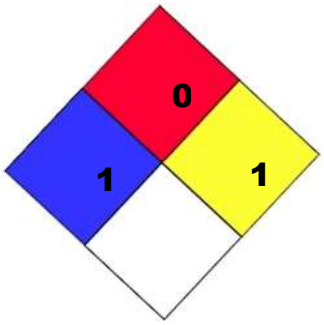
Hazardous Materials Identification System (HMIS) ratings (scale 0 – 4)

Health Hazard	**2***
Fire Hazard	**0**
Reactivity	**1**
PPE	**X**

X - Consult your supervisor or S.O.P. for SPECIAL handling directions

* Long-term, repeated exposure to the material without proper handling procedures could cause a health problem.

National Fire Protection Association (NFPA) ratings (scale 0 – 4)



The user is responsible for evaluating the safety and environmental consequences of any intended uses. The manufacturer assumes no liability for any usages that result in adverse consequences.

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