

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: HALOTRON™ II

PRODUCT USE: Halotron® II is a clean fire-extinguishing agent for flooding applications. NFPA 2001, "Standard on Clean Agent Fire Extinguishing Systems" defines a "Clean Agent" to be "electrically non-conducting, volatile, or gaseous fire extinguishant that does not leave a residue upon evaporation." Halotron™ II is a safe, effective, environmentally acceptable clean agent. It is discharged as a gas (i.e. it is volatile). It is a proprietary three component chemical blend based on HCFC-134a for commercial/industrial, military, and maritime use in certain total flooding applications as a substitute for halon 1301 (bromotrifluoromethane or "BTF").

MANUFACTURER: American Pacific Corporation, Halotron Division. 10622 West 6400 North, Cedar City, UT 84720

FOR MORE INFORMATION CALL: (435) 865-5000

IN CASE OF EMERGENCY CALL: (435) 865-5044

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
1,1,1,2-Tetrafluoroethane ("HFC-134a", C ₂ H ₂ F ₄)	811-97-2 (EC Number 212-377-0)	Greater than 70%
Pentafluoroethane ("HFC-125", C ₂ HF ₅)	354-33-6 (EC Number 206-557-8)	Less than 15%
Carbon Dioxide (CO ₂)	124-38-9 (EC Number 204-696-9)	Less than 15%

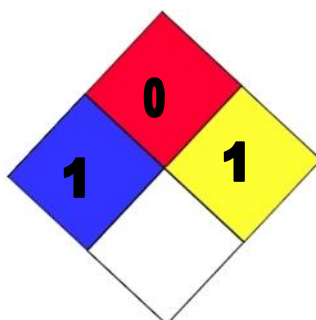
OSHA Hazard Communication Standard: This product is considered hazardous under the OSHA Hazard Communication Standard.

Synonyms: HFC Blend B

3. HAZARDS IDENTIFICATION

HEALTH	1
FIRE	0
REACTIVITY	1
PPE	B

HMIS



NFPA

HMIS PERSONAL PROTECTIVE EQUIPMENT (PPE) DESIGNATIONS:

A:	SAFETY GLASSES
B:	SAFETY GLASSES, GLOVES
C:	SAFETY GLASSES, GLOVES, SYNTHETIC APRON
D:	FACE SHIELD, GLOVES, SYNTHETIC APRON
E:	SAFETY GLASSES, GLOVES, DUST RESPIRATOR
F:	SAFETY GLASSES, GLOVES, SYNTHETIC APRON, DUST RESPIRATOR
G:	SAFETY GLASSES, GLOVES, VAPOR RESPIRATOR
H:	SPLASH GOGGLES, GLOVES, SYNTHETIC APRON, VAPOR RESPIRATOR
I:	SAFETY GLASSES, GLOVES, COMBINATION DUST AND VAPOR RESPIRATOR
J:	SPLASH GOGGLES, GLOVES, SYNTHETIC APRON COMBINATION, DUST AND VAPOR RESPIRATOR
K:	AIRLINE HOOD OR MASK, GLOVES, FULL PROTECTIVE SUIT, BOOTS
X:	SITUATIONS REQUIRING SPECIALIZED HANDLING

EMERGENCY OVERVIEW:

A colorless volatile, liquefied gas with slight ether-like odor. As with any chemical, dose and exposure are critically important variables to understand any potential treatment. Short-term exposure to high concentrations may result in central nervous system and cardiac effects.

HEALTH HAZARDS:

Inhalation: Gross overexposure may cause central nervous system effects such as dizziness, confusion, physical incoordination, drowsiness, anesthesia, or unconsciousness. At concentrations of 7.5% (v/v) or higher, based on data for the major component, HFC-134a may cause increased sensitivity of the heart to adrenaline which might cause irregular heartbeats and possibly ventricular fibrillation or death.

Eye contact: In liquid form, frostbite can occur. Vapors will have little or no effect.

Skin contact: In liquid form, frostbite can occur. Vapors will have little or no effect.

Ingestion: Not likely to occur in industrial use. Highly volatile liquefied gas.

This material is NOT LISTED by OSHA, NTP, or IARC as a CARCINOGEN.

Additional region specific information

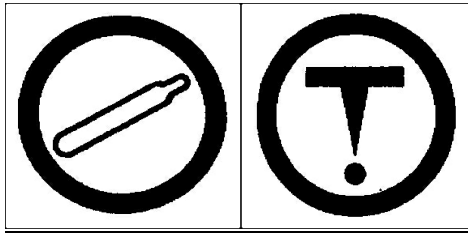
European Union:

None of the chemical ingredients are classified in the Annex I of Directive 67/548/EEC.

Canada:

Components are listed on the DSL

WHMIS Hazard Symbols



Halotron™ II Fire Extinguishing Agent:

Caution: Contains a compressed gas. High concentrations may cause cardiac arrhythmia and central nervous system depression, and possibly asphyxiation. May produce irritating fumes during use.

First Aid: See other section of this MSDS. Toxicity information is located in other sections of this MSDS.

4. FIRST AID MEASURES

Routes of exposure	Signs and symptoms of exposure:	Emergency and first aid procedures:
SKIN:	At room temperature, vapors will have little or no effect on the skin. However, the liquid may freeze the skin causing frostbite.	If Frostbite occurs, see medical attention immediately. Contact a physician if irritation occurs.
INHALATION:	Significant exposure may cause central nervous system effects such as dizziness, drowsiness, anesthesia, or unconsciousness. At concentrations of 7.5% (v/v) or higher, HCFC-134a may cause increased sensitivity of the heart to adrenaline which might cause irregular heartbeats and possibly ventricular fibrillation or death.	If experiencing breathing difficulties, move to fresh air. Apply artificial respiration if necessary. Never give anything by mouth to an unconscious person. Contact a physician if breathing difficulties occur. Note to physician: This material may make the heart more susceptible to arrhythmias. Catecholamines such as adrenaline, and other compounds having similar effects, should be reserved for emergencies and then used only with special caution.
INGESTION:	Not likely to occur in industrial use. Highly volatile.	Do not induce vomiting; Give two glasses of water. Contact a physician
EYES:	At room temperature, vapors will have little or no effect on the eyes. However, in the liquid may freeze the eyes causing frostbite.	Flush eyes with fresh tepid water. Contact a physician immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: None.

FLASH POINT METHOD: Not applicable.

AUTOIGNITION TEMPERATURE: > 743 °C (1,369 °F) based on the primary component.

EXTINGUISHING MEDIA: As needed for any surrounding combustible material. The properties of this chemical make it an ideal extinguishing media its self.

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 should not be mixed with air or pure oxygen under pressure for leak testing or any other purpose.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE:

- In the event of a spill (liquid will accumulate only in very low temperature environments; boiling point for Halotron® II is -14.9 °F [-26.1 °C]), allow for adequate ventilation, and do not re-enter an area without an SCBA until adequate ventilation (less than 5% concentration of Halotron® II) is accomplished.
- For spills that might result in overexposure, evacuate the area and use protective gear and SCBA's.
- Do not expose storage containers to radiant heat sources such as fire, as uncontrolled pressure releases may result from high temperatures.
- Recommended 1 Hr. Emergency Exposure Limit: 1000 ppm (v/v).

7. HANDLING AND STORAGE

NORMAL HANDLING: (See section 8 for recommended personal protective equipment.) Avoid prolonged contact with the skin and eyes. Avoid 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 releases.

Additional Note: Approved US DOT shipping containers are a normal safe method of storage. 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. Protective shoes, such as steel-toed shoes, should be worn in addition to the other specified personal protective equipment (PPE) when handling bulk containers. Eye protection with splash protective side shields should be used when any possibility of splash or spray exists

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Ventilate as necessary 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 storage container (does not apply to fire protection equipment servicing, other than safety goggles and gloves if large volumes can be exposed to skin).
- Neoprene, PVC or PVA gloves should be worn when handling material for prolonged periods.
- Respiratory protection is not normally needed. However, 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.**

TIME WEIGHTED EXPOSURE LIMITS: (For persons regularly exposed to material)

- Occupational exposure limits have not been established for the blended material.
 - Workplace Environmental Exposure Level, WEEL (AIHA) (8 hrs.) for the primary component, HFC-134a: 1000 ppm (v/v)
 - Workplace Environmental Exposure Level, WEEL (AIHA) (8 hrs.) for HFC-125: 1000 ppm (v/v)

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless	PHYSICAL STATE: Compressed Gas	VAPOR PRESSURE OF LIQUID ALONE: 208.5 psig (1,437.5 kPa) @ 77 °F, 25 °C	RELATIVE DENSITY (AIR=1): 3.6	ODOR: Slight ether-like odor
OCTANOL/WATER PARTITION COEFFICIENT (Log P_{ow}): 2.0-2.8	MOLECULAR WEIGHT: Approx. 99.4	BOILING POINT AT 1 ATM.: -26.1 °C (-15.0 °F) (Based on primary component)	LIQUID DENSITY: 74.3 lb./ft ³ (1.19 kg/l) @ 77 °F, 25 °C	GAS DENSITY: Approx. 4.17 kg/m ³ (0.265 lb./ft ³) @ 77 °F, 25 °C
EVAPORATION RATE: Faster than water and ether		FLASH POINT: None		

10. STABILITY AND REACTIVITY

STABILITY: Normally stable (will decompose if exposed to a high radiant heat source, such as fire). The material is intended for use as a fire extinguishant.

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 and carbonyl halide. These materials are dangerous and exposure to them should be limited to the extent possible.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

TOXIC PROPERTIES OF COMPONENTS: Acute toxicity is low.

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- For 1,1,1,2-Tetrafluoroethane (CAS # 811-97-2):
 - Approximate Lethal Concentration (RAT, 4 hr.): Greater than 50% (v/v) (Inhalation)
 - Cardiotoxic LOAEL (Lowest Observed Adverse Effect Level): 7.5% (v/v)
 - Cardiotoxic NOAEL (No Observed Adverse Effect Level): 5.0% (v/v)
 - Toxicological testing was performed on HFC-134a by the Program for Alternative Fluorocarbon Toxicity Testing (PAFT). Data from acute toxicity studies in this program demonstrated that HFC-134a has very low toxicity by inhalation, is not a developmental toxicant, nor is it genotoxic.
 - Long-term exposure in a two-year study, at a concentration of 50% (v/v) produced an increase in late-life occurring benign testicular tumors, testicular hyperplasia and testicular weight. In this study, there was no effect at 10 % (v/v).
 - Reproductive data on male mice showed no change in reproductive performance. There is no evidence of any genetic damage in bacterial or mammalian cell cultures, or in animals.
- For Pentafluoroethane (CAS # 354-33-6):
 - Approximate Lethal Concentration (RAT, 4 hr.): Greater than 70% (v/v) with supplemental oxygen, (Inhalation)
 - Cardiotoxic LOAEL (Lowest Observed Adverse Effect Level): 10% (v/v)
 - Cardiotoxic NOAEL (No Observed Adverse Effect Level): 7.5% (v/v)
 - Toxicological testing was performed on HFC-125 by the Program for Alternative Fluorocarbon Toxicity Testing (PAFT). Data from acute toxicity studies in this program demonstrated that HFC-125 has very low toxicity by inhalation, is not a developmental toxicant, nor is it genotoxic.
 - In animal testing, this material has not caused developmental toxicity nor has it caused genetic damage in test subject bacterial or cell cultures. This material has not been tested for its ability to cause permanent genetic damage in reproductive cells or mammals.

- For Carbon Dioxide (CAS # 124-38-9):
 - Approximate Lethal Concentration: 17% (v/v) within 1 minute (inhalation)
 - Unconsciousness: 7 to 10% (v/v) for longer than 3 minutes (Inhalation)
 - Hearing and visual disturbances: 6% (v/v) for 1 to 2 minutes (inhalation)
 - Headache, dizziness, increased blood pressure, uncomfortable dyspnea: 4 to 5 % (v/v) for 5 to 10 minutes (inhalation)
 - Sustained inhalation of extremely high concentrations of the gas (10% or above) could cause unconsciousness or death.

Carcinogen: IARC: NO

NTP: NO

OSHA: NO

12. ECOLOGICAL INFORMATION

This material is a substitute for halon fire extinguishants (brominated CFCs). This material will not impact stratospheric ozone and has a lower global warming potential than the halon 1301 it is primarily intended to replace. The material is a mixture of volatile organic compounds (although exempted from reporting as a VOC under U.S. regulation 40 CFR Part 51.100(s)) and should not be permitted to be mixed with ground or drinking water and should be handled, used, and disposed responsibly in accordance with regulations in the Country, Province, State, County, and locality where it is used.

13. DISPOSAL CONSIDERATIONS

Observe all federal, state, and local regulations for products of this type when accomplishing disposal.

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

14. TRANSPORT INFORMATION

US DOT SHIPPING NAME: UN1956, Compressed Gases, N.O.S., 2.2 (contains Pentafluoroethane, Carbon Dioxide)
US DOT SHIPPING LABEL: Nonflammable Gas
IMCO CLASS: 2.2

It is recommended that DOT approved transport containers and carriers be used for shipment of this product.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: All components Listed on the TSCA Inventory.

OTHER TSCA ISSUES: None

SARA TITLE III/CERCLA "Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients. Listed only for Section 313 notification

INGREDIENT NAME	SARA/CERCLA RQ (lb)	SARA EHS TPQ (lb)
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SECTION 313 SUPPLIER NOTIFICATION: This material does NOT trigger Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986. The materials are 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.

Spills or releases resulting in the loss of any ingredient at or above its RQ (For those compounds where an RQ exists) require immediate notification to the National Response Center [(800) 424-8802], to the state where you are located, and to your Local Emergency Planning Committee or Fire Department.

SARA 313 TOXIC CHEMICALS: The following ingredients are SARA 313 "Toxic Chemicals" and may be subject to annual reporting requirements. CAS numbers and weight percents are found in Section 2

INGREDIENT NAME	SARA/CERCLA RQ (lb)	SARA EHS TPQ (lb)
N/A	Not listed, Section 313 only	Section 313

No ingredients listed in this section.

STATE RIGHT-TO-KNOW In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

None of the components are listed under California Proposition 65

INGREDIENT NAME	SARA/CERCLA RQ (lb)	SARA EHS TPQ (lb)
Halotron II	Examine local regulations to determine	Examine local regulations to determine

ADDITIONAL REGULATORY INFORMATION:**Regulations**

Listed in the Toxic Substances Control Act (TSCA) Inventory: Yes, all components are on the TSCA Inventory
Listed on EPA SARA (313) Hazard Class,
811-97-2 (1,1,1,2-Tetrafluoroethane) and 124-38-9 (Carbon Dioxide) are listed in Canadian DSL.
None of the chemical ingredients are classified in the Annex I of Directive 67/548/EEC, European Union

Information about limitation of use: This blend is intended solely for use as a fire-extinguishing agent and should not be used for other purposes without contact and technical discussion with the manufacturer.

16. OTHER INFORMATION

CURRENT ISSUE DATE: 02 January 2013

PREVIOUS ISSUE DATE: 13 November 2009

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING: In section 14

CHANGED SEQUENCE ORDER (UN Number First)

Change H2 MSDS From: Compressed Gases, N.O.S., 2.2, UN1956 (contains Pentafluoroethane, Carbon Dioxide)

Change H2 MSDS to read: UN1956, Compressed Gas, N.O.S., 2.2 (contains Pentafluoroethane, Carbon Dioxide)

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

IMPORTANT: The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling and storage. Other factors may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as a recommendation to infringe any existing patents or violate any Federal, Other National Governmental Entity, State, Provincial, or local laws.