Safety Data Sheet

Halotron® II

Section 1. Identification

GHS product identifier : Halotron® II

Synonyms : HFC Blend B

Product use : Fire extinguishing agent

Restrictions on use : None known.

In case of emergency - Chemical

Hours of operation : 24 hours a day, 7 days a week

CHEMTREC Customer Number : CCN721187

Telephone number : +1 703 741 5970 (International)
+1 800 424 9300 (US & Canada)

Manufacturer / Supplier

American Pacific
10622 West 6400 North
Cedar City, UT 84721

Telephone: +1 (435) 865-5000
Fax: +1 (435) 865-5005

Use of substance/ preparation : 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 HFC-134a for commercial/industrial, military, and maritime use in certain total flooding applications as a substitute for halon 1301 (bromotrifluoromethane or "BTF").

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Liquefied gas

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Protect from sunlight. Store in a well-ventilated place.

Section 2. Hazards identification

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Other hazards which do not result in classification : None known.

Hazards identified when used : Based on known or expected use, no additional hazards are expected.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Synonyms : HFC-134a, HFC-125, CO_2

Ingredient name	Identifiers	Conc. (% w/w)	GHS Classification
norflurane	CAS: 811-97-2 EC: 212-377-0	>80	GASES UNDER PRESSURE - Liquefied gas
pentafluoroethane	CAS: 354-33-6 EC: 206-557-8	>5 - <10	GASES UNDER PRESSURE - Liquefied gas
Carbon dioxide, gas	CAS: 124-38-9 EC: 204-696-9	>5 - <10	GASES UNDER PRESSURE - Refrigerated liquefied gas

Any concentration shown as a range is to protect confidentiality or is due to batch variation. If specific chemical identify is withheld, it is to protect confidentiality.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : 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.

Skin contact : If frostbite occurs, seek medical attention immediately. Contact a physician if irritation occurs. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Vapors will have little or no effect on the eyes. However, liquid may freeze the eyes causing frostbite.

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, HFC-134a may cause increased sensitivity of the heart to adrenaline which might cause irregular heartbeats and possibly ventricular fibrillation or death.

Skin contact : At room temperature, vapors will have little or no effect on the skin. However, the liquid may freeze the skin causing frostbite.

Section 4. First aid measures

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

Over-exposure signs/symptoms

Eye contact : No specific data.

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.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes 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.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

Section 5. Fire-fighting measures

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

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst. 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.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
hydrogen fluoride
carbonyl halides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. 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.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Absorb with an inert material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Section 6. Accidental release measures

Large spill : 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)

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Protect from sunlight. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. 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.

Section 8. Exposure controls/personal protection

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
norflurane	**ACGIH TLV (United States, 1/2025) [Fluorides]** A4. TWA 8 hours: 2.5 mg/m³ (as F). **OSHA PEL (United States, 5/2018) [Fluorides]** TWA 8 hours: 2.5 mg/m³ (as F).
pentafluoroethane	**ACGIH TLV (United States, 1/2025) [Fluorides]** A4. TWA 8 hours: 2.5 mg/m³ (as F). **OSHA PEL (United States, 5/2018) [Fluorides]** TWA 8 hours: 2.5 mg/m³ (as F).
Carbon dioxide, gas	**ACGIH TLV (United States, 1/2025)** TWA 8 hours: 5000 ppm. TWA 8 hours: 9000 mg/m³. STEL 15 minutes: 30000 ppm. STEL 15 minutes: 54000 mg/m³. **OSHA PEL (United States, 5/2018)**

	TWA 8 hours: 5000 ppm. TWA 8 hours: 9000 mg/m³.
1,1,1,2-Tetrafluoroethane	**CA British Columbia Provincial (Canada, 8/2025) [fluorides]** TWA 8 hours: 2.5 mg/m³ (as F). **CA Ontario Provincial (Canada, 6/2019) [Fluorides]** TWA 8 hours: 2.5 mg/m³ (as F). **CA Quebec Provincial (Canada, 2/2024) [Fluorides]** TWAEV 8 hours: 2.5 mg/m³ (as F). **CA Alberta Provincial (Canada, 3/2023) [Fluorides]** OEL 8 hours: 2.5 mg/m³ (as F).
Pentafluoroethane	**CA British Columbia Provincial (Canada, 8/2025) [fluorides]** TWA 8 hours: 2.5 mg/m³ (as F). **CA Ontario Provincial (Canada, 6/2019) [Fluorides]** TWA 8 hours: 2.5 mg/m³ (as F). **CA Quebec Provincial (Canada, 2/2024) [Fluorides]** TWAEV 8 hours: 2.5 mg/m³ (as F). **CA Alberta Provincial (Canada, 3/2023) [Fluorides]** OEL 8 hours: 2.5 mg/m³ (as F).
Carbon dioxide, gas	**CA Saskatchewan Provincial (Canada, 4/2021)** STEL 15 minutes: 30000 ppm. TWA 8 hours: 5000 ppm. **CA British Columbia Provincial (Canada, 8/2025)** TWA 8 hours: 5000 ppm. STEL 15 minutes: 15000 ppm. **CA Ontario Provincial (Canada, 6/2019)** TWA 8 hours: 5000 ppm. STEL 15 minutes: 30000 ppm. **CA Quebec Provincial (Canada, 2/2024)** TWAEV 8 hours: 5000 ppm. TWAEV 8 hours: 9000 mg/m³. STEV 15 minutes: 30000 ppm. STEV 15 minutes: 54000 mg/m³. **CA Alberta Provincial (Canada, 3/2023)** OEL 15 minutes: 54000 mg/m³. OEL 8 hours: 5000 ppm. OEL 15 minutes: 30000 ppm. OEL 8 hours: 9000 mg/m³.
norflurane	**Safe Work Australia - Workplace exposure standards for airborne contaminants (Australia, 11/2025)** TWA 8 hours: 1000 ppm. TWA 8 hours: 4240 mg/m³.
pentafluoroethane	**Safe Work Australia - Workplace exposure standards for airborne contaminants (Australia, 11/2025) [Fluorides]** TWA 8 hours: 2.5 mg/m³ (as F).
Carbon dioxide, gas	**Safe Work Australia - Workplace exposure standards for airborne contaminants (Australia, 11/2025)** STEL 15 minutes: 54000 mg/m³. STEL 15 minutes: 30000 ppm. TWA 8 hours: 9000 mg/m³. TWA 8 hours: 5000 ppm.
Carbon dioxide, gas	**Workplace Safety and Health Act (Singapore, 1/2025)** PEL (long term) 8 hours: 5000 ppm. PEL (long term) 8 hours: 9000 mg/m³. PEL (short term) 15 minutes: 54000 mg/m³. PEL (short term) 15 minutes: 30000 ppm.

Section 8. Exposure controls/personal protection

1,1,1,2-TETRAFLUOROETHANE	**ISHA articles 106 and 125 (Republic of Korea, 1/2020) [Fluorides]** TWA 8 hours: 2.5 mg/m³ (as F).
PENTAFLUOROETHANE	**ISHA articles 106 and 125 (Republic of Korea, 1/2020) [Fluorides]** TWA 8 hours: 2.5 mg/m³ (as F).
Carbon dioxide	**ISHA articles 106 and 125 (Republic of Korea, 1/2020)** STEL 15 minutes: 30000 ppm. TWA 8 hours: 5000 ppm.
Carbon Dioxide	**Japan Society for Occupational Health (Japan, 9/2025)** OEL-M 8 hours: 5000 ppm. OEL-M 8 hours: 9000 mg/m³.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid. [Compressed gas]

Color : Colorless.

Odor : Ether-like. [Slight]

Odor threshold : Not available.

pH : Not applicable.

Melting point : Not available.

Section 9. Physical and chemical properties

Boiling point : -26.1° C (-15.0° F), 1 atm (Based on primary component)

Flash point : Not applicable.

Evaporation rate : Faster than water and ether

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not applicable

Vapor pressure : 1,437.5 kPa (208.5 psig) @ 25° C (77° F)

Vapor density : 4.17 kg/m3 (0.265 lb./ft3) @, 25°C (77° F) [Air = 1]

Density : Gas: Approx. 4.17 kg/m3 (0.265 lb./ft3) @ 25°C (77° F)
Liquid: 1.19 kg/l (74.3 lb./ft3) @ 25° C (77° F)

Relative density : 3.6

Molecular weight : Approx 99.4

Solubility(ies) :

Media	Result
water	0.15% wt. at 25°C (77°F), 1 atm (Based on primary component)

Partition coefficient: n-octanol/water : 2 to 2.8

Auto-ignition temperature : >743°C (>1369.4°F) based on the primary component

Decomposition temperature : Not available.

Viscosity : Kinematic (104°F (40°C)): Not applicable.

Explosive properties : Not available.

Oxidizing properties : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : High temperatures, sparks and open flames.

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

Hazardous decomposition products : hydrogen fluoride
carbonyl halides

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Test	Result	Dose	Remarks
norflurane	OECD 403 [Acute Inhalation Toxicity]	Rat - Inhalation - LC50 Gas.	567000 ppm [4 hours]	
pentafluoroethane	OECD 403 [Acute Inhalation Toxicity]	Rat - Inhalation - LC50 Gas.	>800000 ppm [4 hours]	
Carbon dioxide, gas	None available.	Rat - Inhalation - LC50 Gas.	167857 ppm [4 hours]	

Conclusion/Summary : Not available.

Irritation/Corrosion

Section 11. Toxicological information

Product/ingredient name	Test	Result	Remarks
norflurane	None available. None available.	Rabbit - Skin - Not irritant Rabbit - Eyes - Not irritant	

Conclusion/Summary

Skin : Not available.

Eyes : Not available.

Respiratory : Not available.

Respiratory or skin sensitization

Product/ingredient name	Test	Result	Remarks
norflurane	None available.	Guinea pig - skin Not sensitizing	

Conclusion/Summary

Skin : Not available.

Respiratory : Not available.

Germ cell mutagenicity

Product/ingredient name	Test	Result	Remarks
norflurane	OECD 471 [Bacterial Reverse Mutation Test] OECD 473 [In vitro Mammalian Chromosomal Aberration Test] OECD 490 [490 *In vitro* Mammalian Cell Gene Mutation Tests Using the Thymidine Kinase Gene] None available.	In vitro - Bacteria Negative In vitro - Mammalian-Human Negative In vitro - Mammalian-Animal Negative In vivo - Mammalian-Animal Negative	
pentafluoroethane	OECD 471 [Bacterial Reverse Mutation Test] OECD 473 [In vitro Mammalian Chromosomal Aberration Test] OECD 476 [In vitro Mammalian Cell Gene Mutation Test] OECD 474 [Mammalian Erythrocyte Micronucleus Test]	In vitro - Bacteria Negative In vitro - Mammalian-Animal Negative In vitro - Mammalian-Animal Negative In vivo - Mammalian-Animal Negative	Based on data for a similar substance.

Conclusion/Summary : Not available.

Carcinogenicity

Product/ingredient name	Test	Result	Remarks
norflurane	OECD 453 [Combined Chronic Toxicity/ Carcinogenicity Studies]	Rat - Inhalation - NOAEL 10000 ppm Negative	

Conclusion/Summary : Not available.

Reproductive toxicity

Section 11. Toxicological information

Product/ingredient name	Test	Species	Result	Remarks
norflurane	OECD 416 [Two-Generation Reproduction Toxicity Study]	Rat - Inhalation	Maternal toxicity: Positive Fertility effects: Negative Developmental: Equivocal	WOE does not support classification
	OECD 414 [Prenatal Developmental Toxicity Study]	Rat - Inhalation	Maternal toxicity: Negative Fertility effects: Negative Developmental: Negative	
	OECD 414 [Prenatal Developmental Toxicity Study]	Rabbit - Inhalation	Maternal toxicity: Positive Fertility effects: Negative Developmental: Negative	
pentafluoroethane	OECD 414 [Prenatal Developmental Toxicity Study]	Rat - Inhalation	Maternal toxicity: Negative Fertility effects: Negative Developmental: Negative	
	OECD 414 [Prenatal Developmental Toxicity Study]	Rabbit - Inhalation	Maternal toxicity: Negative Fertility effects: Negative Developmental: Negative	
	OECD 415 [One-Generation Reproduction Toxicity Study]	Rat - Inhalation	Maternal toxicity: Negative Fertility effects: Negative Developmental: Negative	Based on data for a similar substance.

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Vapors will have little or no effect on the eyes. However, liquid may freeze the eyes causing frostbite.

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, HFC-134a may cause increased sensitivity of the heart to adrenaline which might cause irregular heartbeats and possibly ventricular fibrillation or death.

Skin contact : At room temperature, vapors will have little or no effect on the skin. However, the liquid may freeze the skin causing frostbite.

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

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

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.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Section 11. Toxicological information

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Product/ingredient name	Test	Result	Remarks
norflurane	OECD 453 [Combined Chronic Toxicity/ Carcinogenicity Studies]	Chronic - Rat - Inhalation - NOAEL 50000 ppm	
pentafluoroethane	OECD 413 [Subchronic Inhalation Toxicity: 90-day Study]	Sub-chronic - Rat - Inhalation - NOAEL 50000 ppm [6 hours per day]	

Conclusion/Summary : Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Section 12. Ecological information

Toxicity

Product/ingredient name	Test	Result	Species	Remarks
norflurane		Acute - LC50 450 mg/l [96 hours]	Fish - *Oncorhynchus mykiss*	
		Acute - EC50 980 mg/l [48 hours]	Crustaceans - *Daphnia magna*	
	OECD 201 [Alga, Growth Inhibition Test]	Acute - EC50 >114 mg/l [72 hours]	Algae - *Raphidocelis subcapitata*	Based on data for a similar substance.
	OECD 201 [Alga, Growth Inhibition Test]	Chronic - NOEC 13.2 mg/l [72 hours]	Algae - *Raphidocelis subcapitata*	Based on data for a similar substance.
		EC50 >730 mg/l [6 hours]	Micro-organism - *Pseudomonas putida*	
pentafluoroethane		Acute - LC50 450 mg/l [96 hours]	Fish - *Oncorhynchus mykiss*	Based on data for a similar substance.
	OECD 202 [Daphnia sp. Acute Immobilization Test and Reproduction Test]	Acute - EC50 >100 mg/l [48 hours]	Crustaceans - *Daphnia magna*	Based on data for a similar substance.
	OECD 201 [Alga, Growth Inhibition Test]	Acute - EC50 >114 mg/l [72 hours]	Algae - *Raphidocelis subcapitata*	Based on data for a similar substance.
	OECD 201 [Alga, Growth Inhibition Test]	Chronic - NOEC 13.2 mg/l [72 hours]	Algae - *Raphidocelis subcapitata*	Based on data for a similar substance.

Conclusion/Summary : Not available.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	IMDG	IATA
UN number	UN3163	UN3163	UN3163	UN3163
UN proper shipping name	Liquefied gas, N.O.S. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane, carbon dioxide)	Liquefied gas, N.O.S. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane, carbon dioxide)	Liquefied gas, N.O.S. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane, carbon dioxide)	Liquefied gas, N.O.S. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane, carbon dioxide)
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-
Environmental hazards	No.	No.	No.	No.

NAERG : 126

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not applicable.

Notice to reader : The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

Section 15. Regulatory information

United States

TSCA 5(a)2 final significant new use rules

None of the components are listed.

TSCA 5(a)2 proposed significant new use rules

None of the components are listed.

TSCA 5(e) substance consent order

None of the components are listed.

TSCA 6 final risk management

None of the components are listed.

TSCA 12(b) - Chemical export notification

Section 15. Regulatory information

None of the components are listed.

SARA 302/304

None of the components are listed.

SARA 304 RQ : Not applicable.

Canada

Canada Significant New Activity Notice : None of the components are listed.

Canadian NPRI : The following components are listed: volatile organic compounds (total)

CEPA Toxic substances : The following components are listed: hydrofluorocarbons; carbon dioxide

Singapore

Singapore - hazardous chemicals under government control

Ingredient name	Status
hydrofluorocarbons, including any mixture containing any such hydrofluorocarbons	Listed

Korea

K-REACH/CCA - Banned : None of the components are listed.

K-REACH/Article 39 (Accident Precaution Chemicals) : None of the components are listed.

Dangerous Materials Safety Management Act : Not applicable.

International regulations

Montreal Protocol on Substances that Deplete the Ozone Layer, Kigali Amendments

Ingredient name	List name	Status
HFC-134a	Montreal protocol	Annex F, Group I
HFC-125	Montreal protocol	Annex F, Group I

Stockholm Convention on Persistent Organic Pollutants

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

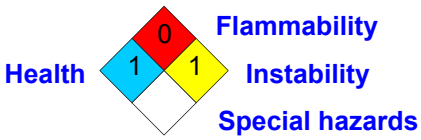
Not listed.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



National Fire Protection Association (U.S.A.)



Section 16. Other information

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations
WOE = Weight of Evidence

Indicates information that has changed from previously issued version.

Notice to reader

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