



MATERIAL SAFETY DATA SHEET

Section 1. Chemical product and company identification

Product Name: Halotron I
Synonym: Clean Agent
Manufacturer: H3R Aviation, Inc.
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 Larkspur, CA 94939
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Section 2. Hazard identification and emergency overview

Emergency overview: Colorless highly volatile liquid with a slightly sweet, ether-like odor.

Adverse health effects and symptoms: Central nervous system (CNS) depression at 0.5% in air, heartbeat irregularities above 2% concentration in air – may be fatal. Also an eye irritant, with effects from prolonged skin exposure including defatting and frostbite.

Exposure guidelines:

Ingredients	OSHA PEL	ACGIH TLV	DFG MAK *	OTHER LIMITS
2,2-dichloro-1,1,1-trifluoroethane	NR**	NR	NR	AIHA WEEL *** 50 ppm TWA
Proprietary ingredients	NR	NR	NR	NA

*German regulatory limits ** NR = Not Regulated *** American Industrial Hygiene Association (AIHA) Workplace Environmental Exposure Level (WEEL). All values are 8 hour time weighted average concentrations.

Hazard symbols: WHMIS (Canadian workplace hazardous materials identification system)

Compressed gas
High concentration may cause asphyxiation
May produce irritating fumes
Use dilution ventilation in confined areas

Section 3. Composition/information on ingredients

Name/Compound	Weight %	CAS #
2,2-dichloro-1,1,1-trifluoroethane (HCFC-123)	> 93	306-83-2
Proprietary gas mixture	< 7	Not available

Section 4. First Aid Measures

Eye Exposure: irrigate eyes at eye wash station and repeat for 15 minutes or until pain free. Seek medical attention if irritation develops or persists, or if visual changes occur.

Skin Exposure: in case of repeated contact, wash with plenty of soap and water. Use a skin moisturizer. Seek medical attention if irritation develops or persists.

Inhalation: If respiratory irritation or distress occurs remove victim to fresh air. Give artificial respiration if breathing stops. Give oxygen under qualified personnel. DO NOT give epinephrine. Seek medical attention if irritation develops or persists.

Ingestion: do not induce vomiting, or give stimulants. Seek immediate medical attention. Do not leave victim unattended. To prevent aspiration of swallowed product, lay victim on side with head lower than waist. If vomiting occurs and the victim is conscious, give water to further dilute the chemical.

Medical conditions possibly aggravated by exposure: inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema, or bronchitis. Skin contact may aggravate existing skin disease.

Section 5. Fire fighting measures

Extinguishing media: at normal pressure and temperature this product is non combustible and non flammable – product is an extinguishing agent.

Unusual fire/explosion hazards: In the heat of fire this product may decompose, releasing hydrochloric acid, and hydrofluoric acid (see Section 10).

Insensitive to mechanical impact or static discharge.

HMIS (hazardous materials identification system) rankings: health: 1, fire: 0, reactivity: 1, personal protective equipment (B): appropriate respirator above exposure limit, and eye protection (see Section 8).

Section 6. Accidental release measures

Upon release of large amounts of product into confined areas that would exceed 2% at 120° F, evacuate and ventilate. Product will produce large volumes of heavier than air vapor. Responders need SCBA or SAR level of respiratory protection (see Section 8). Large spills (cylinders of 250 lbs. or more) should be addressed by hazardous materials technicians following a site-specific emergency response plan and trained in the appropriate use of PPE. Prevent material from entering surface or ground water. Keep containers away from heat sources that might cause rupture since these containers are under pressure. Dike spill area, then use sorbents or pump product directly into drums. Handle and dispose of as a hazardous waste unless testing indicates otherwise. Clean spill area with wet vac, decontaminate with detergent and water. If product is used and/or contaminated, use PPE and containment appropriate to the nature of the mixture.

Section 7. Handling and storage

Avoid skin, eye, or respiratory exposure. Use appropriate exposure controls (proper ventilation, etc.) when maintaining extinguisher, and wash thoroughly after handling (see Section 8). Keep product in original container or extinguisher. Contents are under pressure – inspect for extinguisher rust periodically to insure container integrity. Do not mix with other extinguishing agents.

Section 8. Exposure controls/ personal protection

Respiratory protection: for extended periods of exposure (over 30 minutes), use air-purifying respirator (APR) or powered air-purifying respirator (PAPR) with organic vapor cartridges or canisters at concentrations above 50 ppm. For levels above 2000 ppm use supplied air respirator (SAR) or SCBA.

Eye protection: wear chemical goggles whenever the potential for eye exposure exists.

Skin protection: if product is expected to contact skin, use neoprene, PVC, or PVA gloves and coveralls, both to avoid contact and frostbite. Good personal hygiene practices essential, such as avoiding food, tobacco products, or other hand-to-mouth contact when handling. Wash thoroughly after handling.

Section 9. Physical and chemical properties

Appearance: colorless liquid under 81° F with a slightly sweet, ether-like odor.

Specific gravity: ~ 1.48 (liquid)

Vapor density: 5.3

Solubility: 0.39% by weight @ 25°C

Non –flammable

Flash point: none

Vapor pressure: liquid : ~580 mm Hg (11.2 psig) bulk tank pressure 95 psig

pH: neutral

Boiling point: 81° F

No explosive or oxidizing properties

Section 10. Stability and reactivity

Stability: stable

Incompatibles: oxidizers, powdered or abraded aluminum will cause a reaction generating heat, also reacts with alkali and alkaline earth metals.

Decomposition products: heat of fire may release hydrochloric acid, hydrofluoric acid, and carbonyl halides.

Possibility of hazardous reactions: none

Section 11. Toxicological information

Acute toxicity: 2,2-dichloro-1,1,1-trifluoroethane
LC₅₀ – 4 hour (rat): 3.2% in air,
Approximate lethal dose, oral (human): 9 g/kg body weight,
Cardiac sensitization threshold (dog): ~2.1% in air,
LOAEL (lowest observed adverse effect level): 2% in air.
Target organs in man: heart (acute), liver (chronic). This product is an irritant to the eyes, and causes defatting of the skin that can lead to contact dermatitis.

Chronic toxicity: A three week study of 6 hours/day, 7 days/week exposure to guinea pigs, dogs, and monkeys via inhalation of 1000 ppm induced mild liver damage with altered enzyme levels. A two year study of 6 hours/day and 5 days/week exposure: 300 ppm, inhalation (rat): benign testicular and liver tumor formation; 1000 ppm: benign pancreatic tumor formation, also weight loss, retinal atrophy, increased urinary fluoride levels. This product's ingredients are not considered as "probable" or "suspected" carcinogens by OSHA, IARC, or ACGIH.

Reproductive toxicity: Two generation inhalation reproductive study on rats showed no negative effects other than weight loss. Teratology testing was negative on rats and rabbits @ 5,000 and 10,000 ppm.

Section 12. Ecological information

Ecotoxicity: negative effects on vegetation, Daphnia Magna LC₅₀ = 17.3 mg/L
Rainbow Trout LC₅₀ = 55.5 mg/L Green Algae LC₅₀ = 96.6 mg/L

Octanol water partition coefficient (est): Log P_{OW} = 2.0 – 2.8

Persistence/
Degradability: degrades very slowly

Bioaccumulation: extent unknown

Mobility in soil: unknown

Section 13. Disposal considerations

This product is not a RCRA characteristically hazardous or listed hazardous waste. Dispose of according to state or local laws, which may be more restrictive than federal laws or regulations. Used product may be altered or contaminated, creating different disposal considerations.

Section 14. Transportation information

DOT shipping name: Compressed Gases, N.O.S. (contains tetrafluoromethane, argon)
DOT Class/Division: 2.2 IMCO Class: 2.2 DOT Shipping Label: Nonflammable Gas

This product is classified as a hazardous material by Transport Canada's Transportation of Dangerous Goods regulations.

Section 15. Regulatory information

International Inventory Status:

All ingredients are on the following inventories

Country(ies)	Agency	Status
United States of America	TSCA	Yes
Canada	DSL	Yes
Europe	EINECS/ELINCS	Yes
South Korea	KECL	Yes

European Risk and Safety phrases:

EU Classification: Harmful.
R Phrases: 20/21/22 Harmful if inhaled, by skin contact, or swallowed.
36 Irritating to eyes
59 Dangerous to the ozone layer
67 Vapors may cause drowsiness and dizziness

S Phrases: 3 Keep in a cool place
23/24/25 Avoid inhalation, skin, and eye contact

- 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- 36 Wear suitable protective clothing.
- 38 Where ventilation is insufficient, wear suitable respiratory equipment

U.S. federal regulatory information:

2,2-dichloro-1,1,1-trifluoroethane is under SARA reporting requirements under EPCRA Section 313 (40 CFR Part 372). This product is subject to the inventory update rule under TSCA 8(a). This product has no ingredients with SARA threshold planning quantities (TPQs) or CERCLA reportable quantities (RQs).

State regulatory information:

Chemicals in this product are covered under specific State regulations, as denoted below:

- Alaska** - Designated Toxic and Hazardous Substances: None
- California** – Permissible Exposure Limits for Chemical Contaminants: None
- Florida** – Substance List: None
- Illinois** – Toxic Substance List: None
- Kansas** – Section 302/303 List: None
- Massachusetts** – Substance List: None
- Minnesota** – List of Hazardous Substances: None
- Missouri** – Employer Information/Toxic Substance List: None
- New Jersey** – Right to Know Hazardous Substance List: None
- North Dakota** – List of Hazardous Chemicals, Reportable Quantities: None
- Pennsylvania** – Hazardous Substance List: None
- Rhode Island** – Hazardous Substance List: None
- Texas** – Hazardous Substance List: No
- West Virginia** – Hazardous Substance List: None
- Wisconsin** – Toxic and Hazardous Substances: None

California Proposition 65: No component is listed on the California Proposition 65 lists.

Section 16. Other information

This MSDS conforms to requirements under U.S., U.K., Canadian, Australian, and EU regulations or standards, and conforms to the proposed 2003 ANSI Z400.1 format.

The information herein is given in good faith but no warranty, expressed or implied, is made.

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