Material Safety Data Sheet

Halocarbon R-408A

Section 1. Chemical product and company identification

Product name : Halocarbon R-408A

Supplier : AIRGAS INC., on behalf of its subsidiaries
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Product use : Synthetic/Analytical chemistry.

MSDS # : 002085

Date of Preparation/ Revision : **2/26/2014.**

In case of emergency : 1-866-734-3438

Section 2. Hazards identification

Physical state : Gas. [Liquefied gas]

Emergency overview : WARNING!

CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Contains material that may cause target organ damage, based on animal data.

Contact with rapidly expanding gases can cause frostbite.

Target organs : Contains material which may cause damage to the following organs: kidneys, liver, spleen, cardiovascular system, upper respiratory tract, central nervous system (CNS).

Routes of entry : Inhalation

Potential acute health effects

Eyes : Liquid can cause burns similar to frostbite.

Skin : Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Inhalation : Acts as a simple asphyxiant.

Ingestion : Ingestion is not a normal route of exposure for gases

Potential chronic health effects

Target organs : Contains material which may cause damage to the following organs: kidneys, liver, spleen, cardiovascular system, upper respiratory tract, central nervous system (CNS).

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

Section 3. Composition, Information on Ingredients

Name	CAS number	% Volume	Exposure limits
Chlorodifluoromethane (Halocarbon 22)	75-45-6	47	**ACGIH TLV (United States, 3/2012).** TWA: 3540 mg/m³ 8 hours. TWA: 1000 ppm 8 hours. **NIOSH REL (United States, 1/2013).** STEL: 4375 mg/m³ 15 minutes. STEL: 1250 ppm 15 minutes. TWA: 3500 mg/m³ 10 hours. TWA: 1000 ppm 10 hours. **OSHA PEL 1989 (United States, 3/1989).**

			TWA: 3500 mg/m³ 8 hours. TWA: 1000 ppm 8 hours.
Halocarbon 143a (1,1,1-Trifluoroethane)	420-46-2	46	**AIHA WEEL (United States, 10/2011).** TWA: 1000 ppm 8 hours.
Pentafluoroethane (R125)	354-33-6	7	**AIHA WEEL (United States, 10/2011).** TWA: 1000 ppm 8 hours.

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training.If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus.It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact with liquid, warm frozen tissues slowly with lukewarm water. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : As this product rapidly becomes a gas when released, refer to the inhalation section.

Section 5. Fire-fighting measures

Flammability of the product : Non-flammable.

Auto-ignition temperature : Lowest known value: 632.05°C (1169.7°F) (chlorodifluoromethane).

Products of combustion : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds
carbonyl halides

Fire-fighting media and instructions : Use an extinguishing agent suitable for the surrounding fire.

Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.

Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

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 : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Methods for cleaning up : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Handling : High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty.

Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8. Exposure controls/personal protection

Engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Personal protection

Eyes : 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 or dusts.

Skin : 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.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93

Hands : 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. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn.

Personal protection in case of a large spill : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

Product name

chlorodifluoromethane	**ACGIH TLV (United States, 3/2012).** TWA: 3540 mg/m³ 8 hours. TWA: 1000 ppm 8 hours. **NIOSH REL (United States, 1/2013).** STEL: 4375 mg/m³ 15 minutes. STEL: 1250 ppm 15 minutes. TWA: 3500 mg/m³ 10 hours. TWA: 1000 ppm 10 hours. **OSHA PEL 1989 (United States, 3/1989).** TWA: 3500 mg/m³ 8 hours. TWA: 1000 ppm 8 hours.
1,1,1-trifluoroethane	**AIHA WEEL (United States, 10/2011).** TWA: 1000 ppm 8 hours.
pentafluoroethane	**AIHA WEEL (United States, 10/2011).** TWA: 1000 ppm 8 hours.

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Melting/freezing point : -103°C (-153.4°F) This is based on data for the following ingredient: pentafluoroethane. Weighted average: -126.98°C (-196.6°F)

Critical temperature : Lowest known value: 72.4°C (162.3°F) (pentafluoroethane).

Vapor density : Highest known value: 4.2 (Air = 1) (pentafluoroethane). Weighted average: 3.16 (Air = 1)

Specific Volume (ft ^{3}/lb) : 4.4

Gas Density (lb/ft ^{3}) : Weighted average: 0.24

Section 10. Stability and reactivity

Stability and reactivity : The product is stable.

Incompatibility with various substances : The following materials are not compatible with chlorofluorocarbons or fluorocarbons, the components of this gas mixture: sodium, potassium, calcium, zinc, magnesium, powdered aluminum, and other active metals.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
chlorodifluoromethane	LD Oral	Rat	>43200 µg/kg	-
	LC50 Inhalation Gas.	Rat	35 pph	15 minutes
1,1,1-trifluoroethane	LC50 Inhalation Gas.	Rat	>54 pph	4 hours
	LC50 Inhalation Vapor	Rat	1080000 ppm	1 hours
pentafluoroethane	LC50 Inhalation Vapor	Rat	2910 g/m³	4 hours

Chronic effects on humans : **CARCINOGENIC EFFECTS**: Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [chlorodifluoromethane].
Contains material which may cause damage to the following organs: kidneys, liver, spleen, cardiovascular system, upper respiratory tract, central nervous system (CNS).

Other toxic effects on humans : No specific information is available in our database regarding the other toxic effects of this material to humans.

Specific effects

Carcinogenic effects : No known significant effects or critical hazards.

Mutagenic effects : No known significant effects or critical hazards.

Reproduction toxicity : No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

Not available.

Products of degradation : Products of degradation: carbon oxides (CO, CO_2) and water, halogenated compounds.

Environmental fate : Not available.

Environmental hazards : No known significant effects or critical hazards.

Toxicity to the environment : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation.Return cylinders with residual product to Airgas, Inc.Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN3163	Liquefied Gas, n.o.s. (1,1,1-Trifluoroethane, Chlorodifluoromethane)	2.2	Not applicable (gas).		-
TDG Classification	UN3163	Liquefied Gas, n.o.s. (1,1,1-Trifluoroethane, Chlorodifluoromethane)	2.2	Not applicable (gas).		**Explosive Limit and Limited Quantity Index** 0.125 **Passenger Carrying Road or Rail Index** 75
Mexico Classification	UN3163	Liquefied Gas, n.o.s. (1,1,1-Trifluoroethane, Chlorodifluoromethane)	2.2	Not applicable (gas).		-

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Section 15. Regulatory information

United States

U.S. Federal regulations :

TSCA 8(a) CDR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): All components are listed or exempted.
TSCA 12(b) annual export notification: chlorodifluoromethane

SARA 302/304: No products were found.
SARA 311/312 Hazards identification: Sudden release of pressure, Delayed (chronic) health hazard

Clean Water Act (CWA) 307: No products were found.

Clean Water Act (CWA) 311: No products were found.

Clean Air Act (CAA) 112 regulated flammable substances: No products were found.

Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

SARA 313

		Product name	CAS number	Concentration
Form R - Reporting requirements	:	Chlorodifluoromethane (Halocarbon 22)	75-45-6	47
Supplier notification	:	Chlorodifluoromethane (Halocarbon 22)	75-45-6	47

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations :

Connecticut Carcinogen Reporting: None of the components are listed.
Connecticut Hazardous Material Survey: None of the components are listed.
Florida substances: None of the components are listed.
Illinois Chemical Safety Act: None of the components are listed.
Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.

Massachusetts Spill: None of the components are listed.
Massachusetts Substances: The following components are listed: CHLORODIFLUOROMETHANE
Michigan Critical Material: None of the components are listed.
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: The following components are listed: CHLORODIFLUOROMETHANE; HALTRON 22
New Jersey Spill: None of the components are listed.
New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.
New York Acutely Hazardous Substances: The following components are listed: Chlorodifluoromethane
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: The following components are listed: METHANE, CHLORODIFLUORO-
Rhode Island Hazardous Substances: None of the components are listed.

Canada

WHMIS (Canada) : Class A: Compressed gas.

CEPA Toxic substances: The following components are listed: Volatile organic compounds; Chlorofluorocarbon; Volatile organic compounds
Canadian ARET: None of the components are listed.
Canadian NPRI: The following components are listed: Volatile organic compounds; HCFC-22; Volatile organic compounds
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

Section 16. Other information

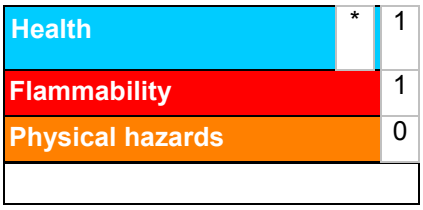
United States

Label requirements : CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

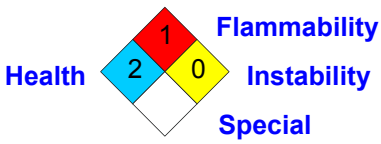
Canada

Label requirements : Class A: Compressed gas.

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



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



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.