

SAFETY DATA SHEET

Halocarbon R-409A

Section 1. Identification

GHS product identifier : Halocarbon R-409A

Other means of identification

: R-409A

Product use

: Synthetic/Analytical chemistry.

Synonym SDS #

: R-409A : 00409A

Supplier's details

: Hudson Technologies 300 Tice Boulevard

Suite #290

Woodcliff Lake, NJ 07677

1-800-953-2244

Emergency telephone number (with 24 hours of operation)

:1-800-424-9300

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

HAZARDOUS TO THE OZONE LAYER - Category 1

GHS label elements

Hazard pictograms





Signal word : Warning

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

May cause frostbite.

May displace oxygen and cause rapid suffocation.

Harms public health and the environment by destroying ozone in the upper atmosphere.

Precautionary statements

General: Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use.

Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back-flow preventative device in the piping. Use only equipment of compatible

materials of construction. Always keep container in upright position.

Prevention: Not applicable.Response: Not applicable.

Storage : Protect from sunlight. Protect from sunlight when ambient temperature exceeds

52°C/125°F. Store in a well-ventilated place.

Disposal : Refer to manufacturer/supplier for information on recovery/recycling.

Hazards not otherwise

classified

: Liquid can cause burns similar to frostbite.

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Section 3. Composition/information on ingredients

Substance/mixture : Mixture Other means of : R-409A

identification

CAS number/other identifiers

: Not applicable. **CAS** number : 00409A **Product code**

Ingredient name	%	CAS number
Methane, chlorodifluoro-	60	75-45-6
2-Chloro-1,1,1,2-tetrafluoroethane	25	2837-89-0
1-chloro-1,1-difluoroethane	15	75-68-3

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, 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 : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If

not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. 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. In case of inhalation of decomposition products in a fire,

symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and

shoes. Get medical attention if symptoms occur. In case of contact with liquid, warm frozen tissues slowly with lukewarm water and get medical attention. Do not rub affected area. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get

medical attention if adverse health effects persist or are severe. Ingestion of liquid can cause burns similar to frostbite. If frostbite occurs, get medical attention. 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. As this product rapidly becomes a gas when

released, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact Liquid can cause burns similar to frostbite.

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may

be delayed following exposure.

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

frostbite.

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

Ingestion : Ingestion of liquid can cause burns similar to frostbite.

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Section 4. First aid measures

Over-exposure signs/symptoms

Eye contact: Adverse symptoms may include the following:

frostbite

Inhalation : No specific data.

Skin contact: Adverse symptoms may include the following:

frostbite

Ingestion : Adverse symptoms may include the following:

frostbite

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

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed.

The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments: No specific treatment.

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

be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing

media

: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing

media

: None known.

Specific hazards arising from the chemical

Hazardous thermal decomposition products

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

: Decomposition products may include the following materials:

carbon dioxide carbon monoxide halogenated compounds 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. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers

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. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

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. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

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Section 6. Accidental release measures

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 nonemergency personnel".

Environmental precautions

: Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. 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). May be harmful to the environment if released in large quantities.

Methods and materials for containment and cleaning up

Small spill

: Immediately contact emergency personnel. Stop leak if without risk.

Large spill

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

Precautions for safe handling

Protective measures

Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Do not get in eyes or on skin or clothing. Avoid breathing gas. Avoid release to the environment. Refer to special instructions/safety data sheet. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

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 a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Methane, chlorodifluoro-	ACGIH TLV (United States, 3/2012).
	TWA: 3540 mg/m ³ 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.

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Section 8. Exposure controls/personal protection

2-Chloro-1,1,1,2-tetrafluoroethane

AIHA WEEL (United States, 10/2011).

TWA: 1000 ppm 8 hours.

1-chloro-1,1-difluoroethane

AIHA WEEL (United States, 10/2011).

TWA: 1000 ppm 8 hours.

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 sideshields.

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

: 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.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Liquefied gas]

Color : Not available.

Melting/freezing point : -130.8°C (-203.4°F) This is based on data for the following ingredient: 1-chloro-1,

1-difluoroethane. Weighted average: -163.81°C (-262.9°F)

Critical temperature : Lowest known value: 96.2°C (205.2°F) (chlorodifluoromethane).

Odor : Not available.
Odor threshold : Not available.

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Section 9. Physical and chemical properties

: Not available. : Not available. Flash point **Burning time** : Not applicable. : Not applicable. **Burning rate** : Not available. **Evaporation rate** Flammability (solid, gas) : Not available. : Not available. Lower and upper explosive

(flammable) limits

Vapor pressure : Not available.

Vapor density : Highest known value: 3.5 (Air = 1) (1-chloro-1,1-difluoroethane). Weighted average: 3.

1 (Air = 1)

Gas Density (lb/ft 3) : Weighted average: 0.12

Relative density : Not applicable. : Not available. **Solubility** : Not available. Solubility in water Partition coefficient: n-: Not available.

octanol/water

Auto-ignition temperature : Not available. **Decomposition temperature** : Not available. **SADT** : Not available. : Not applicable. **Viscosity**

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 : No specific data.

Incompatibility with various

substances

: Highly reactive or incompatible with the following materials: metals and moisture.

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.

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Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
2-Chloro-1,1,1, 2-tetrafluoroethane	LC50 Inhalation Gas.	Rat	600000 ppm	1 hours
	LC50 Inhalation Vapor	Rat	2050000 mg/m ³	4 hours

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
Methane, chlorodifluoro-	-	3	-

Reproductive toxicity

Not available.

Teratogenicity

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 : Liquid can cause burns similar to frostbite.

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may

be delayed following exposure.

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

frostbite.

Ingestion: Ingestion of liquid can cause burns similar to frostbite.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact: Adverse symptoms may include the following:

frostbite

Inhalation : No specific data.

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Section 11. Toxicological information

Skin contact: Adverse symptoms may include the following:

frostbite

Ingestion: Adverse symptoms may include the following:

frostbite

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

Short term exposure

Potential immediate : Not available.

effects

Potential delayed effects: Not available.

Long term exposure

Potential immediate : Not available.

effects

Potential delayed effects : Not available.

Potential chronic health effects

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.
 Teratogenicity : 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.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	LogPow	BCF	Potential
Methane, chlorodifluoro-	1.11 to 1.16	-	low
1-chloro-1,1-difluoroethane	1.6		low

Mobility in soil

Soil/water partition coefficient (Koc)

: Not available.

Other adverse effects : No known significant effects or critical hazards.

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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. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN3163	UN3163	UN3163	UN3163	UN3163
UN proper shipping name	Liquefied Gas, N.O.S. (chlorodifluoromethane, 1-chloro-1,2,2, 2-tetrafluoroethane)	Liquefied Gas, N.O.S. (chlorodifluoromethane, 1-chloro-1,2,2, 2-tetrafluoroethane)	Liquefied Gas, N.O.S. (chlorodifluoromethane, 1-chloro-1,2,2, 2-tetrafluoroethane)	Liquefied Gas, N.O.S. (chlorodifluoromethane, 1-chloro-1,2,2, 2-tetrafluoroethane)	Liquefied Gas, N.O.S. (chlorodifluoromethane 1-chloro-1,2,2, 2-tetrafluoroethane)
Transport hazard class(es)	2.2	2.2	2.2	2.2	2.2
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	-	Explosive Limit and Limited Quantity Index 0.125 Passenger Carrying Road or Rail Index 75	-	-	-

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

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: Not available. to Annex II of MARPOL 73/78 and the IBC Code

Section 15. Regulatory information

U.S. Federal regulations

: TSCA 8(a) CDR Exempt/Partial exemption: Not determined

TSCA 12(b) annual export notification: chlorodifluoromethane; 1-chloro-1, 1-difluoroethane

United States inventory (TSCA 8b): All components are listed or exempted.

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Section 15. Regulatory information

Clean Air Act Section 112

: Not listed

(b) Hazardous Air Pollutants (HAPs)

Clean Air Act Section 602

: Not listed

Class I Substances

Clean Air Act Section 602

Listed

Class II Substances

DEA List I Chemicals

: Not listed

(Precursor Chemicals)

DEA List II Chemicals

: Not listed

(Essential Chemicals)

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Methane, chlorodifluoro-		No.	Yes.	No.	No.	No.
2-Chloro-1,1,1,2-tetrafluoroethane		No.	Yes.	No.	No.	No.
1-chloro-1,1-difluoroethane		Yes.	Yes.	No.	No.	No.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	1-chloro-1,2,2,2-tetrafluoroethane		60 25 15
Supplier notification	1-chloro-1,2,2,2-tetrafluoroethane		60 25 15

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

State regulations

Massachusetts : The following components are listed: CHLORODIFLUOROMETHANE; DIFLUORO-

1-CHLOROETHANE

New York : The following components are listed: Chlorodifluoromethane

New Jersey : The following components are listed: 2-CHLORO-1,1,1,2-TETRAFLUOROETHANE;

ETHANE, 2-CHLORO-1,1,1,2-TETRAFLUORO-; CHLORODIFLUOROMETHANE; HALTRON 22; CHLORODIFLUOROETHANE; 1-CHLORO-1,1-DIFLUOROETHANE

Pennsylvania: The following components are listed: METHANE, CHLORODIFLUORO-; ETHANE,

1-CHLORO-1,1-DIFLUORO-

Canada inventory : Not determined.

International regulations

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Section 15. Regulatory information

International lists

: Australia inventory (AICS): All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.

Japan inventory: All components are listed or exempted. **Korea inventory**: All components are listed or exempted. **Malaysia Inventory (EHS Register)**: Not determined.

New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.

Philippines inventory (PICCS): All components are listed or exempted.

Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule

I Chemicals

: Not listed

Chemical Weapons

Convention List Schedule

II Chemicals

: Not listed

Chemical Weapons Convention List Schedule

III Chemicals

: Not listed

Canada

WHMIS (Canada) : Class A: Compressed gas.

CEPA Toxic substances: The following components are listed: Hydrochlorofluorocarbons; Chlorofluorocarbon; Chlorofluorocarbon

Canadian ARET: None of the components are listed.

Canadian NPRI: The following components are listed: HCFC-124 (all isomers); HCFC-

22; HCFC-142b

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.

California Prop. 65: This product does not contain any chemicals known to the State of California to

cause cancer, birth defects or other reproductive harm.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

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



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

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



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Section 16. Other information

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

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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 73/78 = International Convention for the Prevention of Pollution from Ships,

1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)

UN = United Nations ACGIH – American Conference of Governmental Industrial

Hygienists

AIHA - American Industrial Hygiene Association

CAS - Chemical Abstract Services

CEPA - Canadian Environmental Protection Act

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

(EPA)

CFR - United States Code of Federal Regulations

CPR – Controlled Products Regulations DSL – Domestic Substances List GWP – Global Warming Potential

IARC – International Agency for Research on Cancer ICAO – International Civil Aviation Organization

Inh – Inhalation

LC – Lethal concentration LD – Lethal dosage

NDSL – Non-Domestic Substances List

NIOSH - National Institute for Occupational Safety and Health

TDG - Canadian Transportation of Dangerous Goods Act and Regulations

TLV - Threshold Limit Value

TSCA - Toxic Substances Control Act

WEEL - Workplace Environmental Exposure Level

WHMIS - Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Other special considerations

: WARNING: Contains (Halocarbon R-409A), a substance which harms the public health

erations and environment by destroying ozone in the upper atmosphere.

Notice to reader

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Section 16. Other information

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.

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