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Safety Data Sheet
"SDS"

1. PRODUCT IDENTIFICATION

Product Name:	**Non-Flammable HCFC POLYCOLD® Refrigerant**
Chemical Classification:	Liquefied Gas
REACH Registered Components	Ethane; Halocarbons
Product Use:	Refrigerant Gas
Manufacturer's Name:	Brooks Automation, Inc.
Address:	15 Elizabeth Drive, Chelmsford, MA 01824
Business Phone:	(978) – 262 - 2400
Responsible Person:	Brooks Automation, Inc. 15 Elizabeth Drive Chelmsford, MA 01824
SDS Preparer email:	rsp9968@comcast.net
Emergency Phone: Chemtrec North America:	**1-800-424-9300 1-703-527-3887**

2. HAZARD IDENTIFICATION

Hazard Classification
Classification of Mixture Under Regulation (EC) 1272/2008/EC (CLP/GHS) Gases under pressure, Liquefied gas H280 Contains gas under pressure; may explode if heated **Classification of the Mixture Under Directive 67/548/EEC & 1999/45/EC** Harmful: Danger of health damage by prolonged exposure through inhalation.
Label Elements
Name on Label **Non-Flammable HCFC POLYCOLD® Refrigerant** (trade name)

Label Pictograms

Signal Word:
Warning

Hazard Statements:

H280	Contains gas under pressure; may explode if heated

Precautionary Statements:

P260	Do not breathe gas
P270	Do not eat/drink while using this product
P273	Avoid release to environment
P281	Use personal protective equipment as necessary
P410+P403	Protect from sunlight. Store in a well ventilated area
P501	Dispose of contents to approved waste facility
P502	Contact manufacturer/supplier for recycle recovery information

Other Product Labels or Markings

Refrigeration Units:	***CAUTION: THIS UNIT HAS INTERNAL SYSTEMS WITH LIQUID AND GAS UNDER PRESSURE****. Store and use in a well-ventilated area where temperatures will not exceed 52 °C (125° F). Contact the manufacturer or a certified technician for the repair and maintenance of internal refrigeration systems.*
Cylinders:	***CAUTION: LIQUID AND GAS UNDER PRESSURE. CAN CAUSE RAPID SUFFOCATION. MAY CAUSE FROSTBITE.*** *Store and use with adequate ventilation. Do not get liquid in eyes, on skin or clothing. Cylinder temperature should not exceed 52 °C (125 °F). Use in accordance with the Material Safety Data Sheet.* ***FIRST AID:*** *If inhaled, administer fresh air immediately. Administer oxygen if breathing is difficult. Contact a physician. In case of frostbite, obtain immediate medical attention.* ***DO NOT REMOVE THIS PRODUCT LABEL.***

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Substance Name	Concentration (%)	CAS No.	EINECS No.
Ethane	3% - 8%	74-84-0	200-814-8

Halocarbon gases *	73% - 94%	N/A	N/A
Inert Gas	3% - 10%	N/A	N/A

* Proprietary blend of refrigerant gases with Trade Secret claim

Hazardous components according to Regulation (EC) 1272/2008, as amended

Substance Name	Hazard Class	Hazard Category	H Phrases	R Phrases*
Ethane	Extremely Flammable gas	Category 1	H220	R12
Halocarbon gases	Gases under pressure	Liquefied gas	H420 H371 H280	R59, R68/20, R48/20, R36/R37
Inert Gas	Gases under pressure	Liquefied gas	H280	R36/R37

*R Phrases under European Directive 67/548/EEC or 1999/45/EC, as amended.

4. FIRST-AID MEASURES

First Aid Measures by Routes of Exposure	
General Notes on Health Effects or Risk of Exposure:	Exposure to high concentrations may result from a release or spill in a poorly ventilated area. Inhalation of high-concentrations may result in suffocation from oxygen deprivation or other severe health effects including central nervous system depression, heart attack, and sudden death. Direct skin or eye contact with rapidly released gas may cause frostbite and severe tissue damage.
Inhalation:	Administer fresh air immediately. Use a bag valve mask or similar device to perform artificial respiration (rescue breathing) if needed. Get medical attention immediately.
Skin Contact:	Wash if needed. If frostbite, freezing, or cryogenic burns occur, warm affected area in warm water. If this is not available, gently wrap affected parts in blankets. Allow circulation to return naturally. Get medical attention immediately.
Eye Contact:	Wash with large amounts of water or normal saline until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately. Remove contact lenses if easily possible.
Ingestion:	Get medical attention immediately.

Most Significant Symptoms of Exposure by Route	
Inhalation:	The most significant route for overexposure is through inhalation of high concentrations of the gas product. A large gas release into a confined area may displace available oxygen and result in asphyxiation. A severe overexposure may cause temporary nervous system depression resulting in symptoms such as dizziness, shortness of breath, weakness, headache, confusion, and loss of coordination or consciousness. A very severe overexposure may also cause a temporary alteration of the heart's electrical activity with irregular heartbeats, inadequate circulation, and in extreme cases, cardiac arrest and death. At lower concentrations symptoms of exposure may include headaches and transient eye, nose, and throat irritation.
Skin Contact:	Contact with rapidly released gas may cause frostbite. Other direct dermal contact may result in skin de-fatting, dryness, irritation, or contact dermatitis. Symptoms of frostbite may include changes in skin color to white or grayish-yellow.
Eye Contact:	Eye contact with rapidly released gas may cause severe frostbite damage to eyes and lids. Eye irritation may occur with exposure to low concentrations.
Ingestion:	Not a likely route of exposure. Perforation of the stomach lining and nausea may develop if liquid product is ingested.
Other Potential Health Effects:	Inhalation associated with deliberate abuse, or spills occurring in poorly ventilated areas, may result in severe cardiovascular and respiratory effects, and even sudden death.
Carcinogenicity:	OSHA - No NTP - No IARC – No
Environmental Hazards	Not expected to cause aquatic damage. May harm the ozone layer.

5. FIRE FIGHTING MEASURES

Fire Extinguishing Media:	Use media appropriate for surrounding materials.
Unusual Fire and Explosion Hazards:	CAUTION: Cylinders that are exposed to heat from a fire may rupture or burst and release contents. Although this material is non-flammable, the contents can present health hazards to firefighters if involved in a fire. When involved in a fire, this material may decompose and produce toxic hydrogen fluoride and carbonyl fluoride gases.

Special Fire Fighting Procedures:	Move containers away from fire if possible without personal risk. Keep containers cool well after fire is out. Stay upwind and keep out of low areas. Ventilate closed spaces prior to entry.

6. ACCIDENTAL RELEASE MEASURES

Spill and Leak Response for Non-emergency Personnel:	Stop leak immediately if possible without personal risk. Keep people away, isolate area and deny access.
Spill and Leak Response for Emergency Personnel:	Gases may be heavier than air and spread along the ground and collect in low or confined areas (sewers, basements, tanks). Stay upwind and avoid low areas. Ventilate closed spaces prior to entry. If possible, turn leaking containers so that gas escapes rather than liquid. Water spray may be used to reduce vapor cloud drift.
Methods and Materials for Containment and Cleaning Up:	Allow product to evaporate.
Environmental Precautions:	Avoid discharge of product to the environment. Do not allow product to enter drains or watercourses.
Reference to Other Sections:	For recommendations on PPE and other exposure controls, refer to protective measures referred to in Section 8.

7. HANDLING AND STORAGE

Special Precautions for Handling Gas Cylinders:	Protect cylinders against physical damage. Do not allow temperature of storage areas to exceed 52 ^{o}C (125 ^{o}F).
Conditions for Safe Storage and Handling:	Cylinders should be stored in dry, well-ventilated areas away from sources of heat. Store cylinders away from heavy traffic or equipment operation areas and emergency exits. Confirm that storage and handling is in accordance with all current regulations and standards. Keep separated from incompatible substances (See section 10).

8. EXPOSURE CONTROLS – PERSONAL PROTECTION

Occupational Exposure Limits:	None.
Monitoring Procedures:	Upon release into a confined area, monitor for presence of available oxygen.
Ventilation and Engineering Controls:	Provide local exhaust ventilation.

Respiratory Protection:	If large enough volumes of gas are released into worker-occupied areas so that available air/oxygen is displaced, then a self-contained breathing apparatus (SCBA) should be used.
Eye Protection:	Splash goggles, face shields, or safety glasses should be used for protection from rapidly expanding gas.
Hand Protection:	Wear Viton or rubber gloves if contact with gas or liquid may occur.
Body Protection:	A protective suit should be worn to prevent frostbite and skin contamination if contact with liquid or gas may occur.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Colorless gas or liquid
Appearance and Color:	Faintly sweet or slight ethereal odor.
Odor Threshold:	Not available.
pH:	Not applicable.
Freezing Point :	Less than –100^{o} C
Boiling Point:	Less than -140^{o} C
Flashpoint:	Not applicable.
Evaporation Rate:	Not available.
Flammability	Non-flammable liquefied gas
Flammable Limits (in air by volume, %)	Not applicable.
Vapor Density (range of individual components at STP:	1.4 - 4.2 (Heavier than air)
Relative Density / Specific Gravity:	1.2 – 1.5
Solubility:	Not available.
Partition Coefficient: n-octanol/water	Not available.
Auto-ignition Temperature:	Not applicable.
Decomposition Temperature:	Not applicable.
Viscosity:	Not applicable.
Explosive Properties:	Not applicable.
Oxidizing Properties:	Not applicable.

Vapor Pressure:	Not available.
How to Detect This Substance (Warning Properties):	The gas is not visible, however, rapidly released gases may cause the formation of a vapor cloud. The gas may be odorless or have a faintly sweet odor or ether-like odor.

10. STABILITY AND REACTIVITY

Reactivity:	Not reactive at normal temperatures and pressures.
Chemical Stability:	Stable at normal temperatures and pressures.
Possibility of Hazardous Reactions:	Not likely except during accidental release of gas product.
Conditions to Avoid:	Excessive heat.
Incompatible Materials:	**POWDERED ALUMINUM AND ACTIVE** METALS are not compatible with this gas product and may produce violent reactions. **POLYSTYRENE** is not compatible with this gas product and may produce violent reactions. **ALKALINE EARTH METALS** like calcium, magnesium, sodium, potassium, lithium, and barium are not compatible with this gas and may produce violent reactions. **EARTH METALS** like silver, brass, bronze and copper may enhance the decomposition of this gas at elevated temperatures. **OXIDIZERS** may produce fire and explosion hazards.
Hazardous Decomposition Products:	Thermal decomposition or burning of gas may produce hydrochloric and hydrofluoric acids, and toxic hydrogen fluoride and carbonyl halide gases.
Hazardous Polymerization:	Will not polymerize.

11. TOXICOLOGICAL INFORMATION

Toxicity Data:	Low order of toxicity.
Suspected Cancer Agent:	Not a suspected cancer agent.
Irritancy of Product:	Product may cause irritation through all routes of exposure.
Sensitization to the Product:	Weak cardiac sensitization, a potentially fatal disturbance of the heart, is caused by a heightened sensitivity to the action of epinephrine after exposure to gas components in humans.
Reproductive Toxicity Information:	No reproductive toxic effects on humans have been described for the components of this product.

Medical Conditions Aggravated by Exposure:	Cardiovascular, pulmonary, and central nervous system medical conditions may be aggravated by inhalation of this gas.
Recommendations to Physicians:	Do not administer adrenaline due to the sensitizing effect of fluorocarbons on the myocardium. Treatment of overexposure should be directed at the control of symptoms and the clinical condition. Exposure to fluorocarbon pyrolysis products should be considered in the diagnostic evaluation of occupationally related fever of short duration and unknown origin. Signs of exposure include tachycardia, hyperpnea, and pharyngeal congestion; investigation may reveal pulmonary edema and leucocytosis.
Biological Exposure Indices (BEIs):	None known.

12. ECOLOGICAL INFORMATION

Toxicity:	Specific toxic effects are not known.
Environmental Persistence and Degradability:	Gas components are expected to volatilize rapidly from soil and water surfaces. Vapor phase gases are expected to degrade very slowly in the ambient atmosphere.
Bioaccumulative Potential:	Bioconcentration in organisms or aquatic life is expected to be low.
Mobility in Soil	Unknown
Results of PBT and vPvB Assessment	Not applicable
Other Adverse Effects	May harm ozone layer.

13. DISPOSAL CONSIDERATIONS

Waste Treatment Methods:	Dispose in accordance all applicable regulations. Refer to manufacturer/supplier information on recovery/recycling. This product contains HCFC compounds that have the potential to decompose the stratospheric ozone layer. This material should not be released to the environment if it can be prevented. Contact the product vendor for recycling information or a local waste disposal company for disposal options.

14. TRANSPORT INFORMATION

Proper Shipping Names:	
For Shipments of Cylinders:	Refrigerant gases, n.o.s., 2.2, UN 1078, (contains Halocarbons, Ethane and Inert Gases).
For Shipments of Refrigeration Units:	Units contain less than 25 pounds (12 kg) of non-flammable, non-toxic refrigerant gas. In accordance with Section 173.307 (a) (4) (i) of 49 CFR, units are not subject to the requirements of Hazardous Materials Regulations.
U.N. Hazard Class Number:	2.2 (Non-Flammable Gas).
U.N. Identification Number:	UN 1078 for shipments of cylinders.
Packing Group:	Not applicable.
North American Emergency Response Guidebook Number (1996):	126
Marine Pollutant:	Not applicable.
Canada Transportation of Dangerous Goods Regulations:	This material is considered a dangerous good. Use the above information to prepare Canadian shipments.
U.S. DOT 49 CFR, Parts 100 – 105:	This material is regulated as a hazard material (HM) under DOT regulations.
IATA/ICAO/IMDG Regulations:	This material is considered a dangerous good (DG) and is to be shipped in accordance with these regulations for international shipments.
IATA/ICAO/IMDG Emergency Response Guidelines:	Follow 2013/2014 Edition of the IATA/ICAO Emergency Response Guidance for aircraft incidents involving dangerous goods.

15. REGULATORY INFORMATION

U.S. SARA Reporting Requirements:	This product contains HCFC compounds that require disclosure and reporting under Section 313 of Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR part 372.
U.S. SARA Threshold Planning Quantity:	Not applicable.
U.S. CERCLA Reportable Quantity (RQ):	The product ingredients are not listed as “Hazardous Substances” in 40 CFR Part 302.

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Canadian DSL/NDSL Inventory Status:	Some product ingredients are listed.
U.S. TSCA Inventory Status:	Halocarbon gas constituents are listed on the TSCA inventory.
U.S. State Regulatory Information:	This product is subject to state worker and community Right-to-Know Acts.
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65):	Some product ingredients are listed.
EINECS Number:	Refer to Section 3.
Canadian WHMIS Classification:	Class A: Compressed Gases

16. OTHER INFORMATION

H phrases:	H280 Contains gas under pressure; may explode if heated H373 May cause damage to organs (Liver, CNS) through prolonged exposure H420 May damage public health by destroying the ozone layer
R phrases:	R48/20, R68/20, R36/37, R59
Uses and Restrictions:	Only use product in accordance with its intended use. Cylinders should never be refilled without permission from the owner.
U.K. Legislation:	Control of Substances Hazardous to Health as amended.

REVISION HISTORY

Revision	ECO No.	Date	Author
13	56700	August, 2012	RMEC
A	62118	9/30/12	DLM
B	82515	4/14/15	RPalermo / ECBrett

****End of SDS****