



Safety Data Sheet

1. PRODUCT IDENTIFICATION

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| Product Name: | HFC POLYCOLD® Refrigerant |
| Chemical Classification: | Liquefied Gas |
| REACH Registered Components | Blend of hydrofluorocarbon and fluorocarbon refrigerants |
| 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: | info@rmec.net |
| Emergency Phone: Chemtrec North America: | 1-800-424-9300 1-703-527-3887 |

2. HAZARD IDENTIFICATION

| Hazard Classification |
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| 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 This mixture does not meet the criteria for classification under any hazard class under these directives. |
| Label Elements |
| Name on Label: HFC POLYCOLD® Refrigerant |
| Label Pictograms |



Signal Word:
Warning

Hazard Statements:
H280 Contains gas under pressure; may explode if heated

Precautionary Statements:
P281 Use personal protective equipment as necessary
P410+P403 Protect from sunlight. Store in a well ventilated area.

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. |
|--|-------------------|---------|------------|
| Proprietary blend of HFC (hydro fluorocarbon and fluorocarbon) refrigerant gases | 0% - 90% | N/A | R36/37 |

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



| Substance Name | Hazard Class | Hazard Category | H Phrases | R Phrases* |
|--|----------------------|-----------------|-----------|------------|
| Proprietary blend of HFC (hydro fluorocarbon and fluorocarbon) refrigerant gases | Gases under pressure | Liquefied gas | H280 | R36/37 |

*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 | |
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| 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 in confined areas. Overexposure may cause central nervous system depression and oxygen deficiency. Effects of overexposure may include light-headedness, giddiness, shortness of breath, headaches, and in extreme cases, irregular heartbeats, cardiac arrest, and death. Symptoms of overexposure at lower concentrations may include 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, |



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| | 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 or ozone depletion. |

5. FIRE FIGHTING MEASURES

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| 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

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| 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. |



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| 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

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| Special Precautions for Handling Gas Cylinders: | Protect cylinders against physical damage. Do not allow temperature of storage areas to exceed 52 °C (125 °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

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| 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

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| Physical State: | Odorless gas or liquid |
| Appearance and Color: | Colorless gas in normal conditions. |
| Odor Threshold: | Not available. |



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| pH: | Not applicable. |
| Freezing Point : | Less than -100°C |
| Boiling Point: | Less than -128°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 standard temperature and pressure): | 1.4 - 4.2 (Heavier than air) |
| Relative Density / Specific Gravity: | Not applicable. |
| 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 very slight, sweet odor. |

10. STABILITY AND REACTIVITY

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| 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 METAL are not compatible with this gas product and may produce violent reactions. POLYSTYRENE is not compatible with this gas product and |

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| | <p>may produce violent reactions.</p> <p>ALKALINE EARTH METALS like calcium, magnesium, sodium, potassium, lithium, and barium are not compatible with this gas and may produce violent reactions.</p> <p>EARTH METALS like silver, brass, bronze and copper may enhance the decomposition of this gas at elevated temperatures.</p> <p>OXIDIZERS may produce fire and explosion hazards.</p> |
| Hazardous Decomposition Products: | Thermal decomposition or burning of gas may produce hydrogen fluoride and carbonyl fluoride. |
| Hazardous Polymerization: | Will not polymerize. |

11. TOXICOLOGICAL INFORMATION

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| 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. |
| 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

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| Toxicity: | Specific toxic effects are not known. |
| Environmental | Gas components are expected to volatilize rapidly from soil |



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| Persistence and Degradability: | and water surfaces. Vapor phase gases are expected to degrade very slowly in the ambient atmosphere. Pentafluoroethane atmospheric lifetime - 29 years |
| 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 | None known |

13. DISPOSAL CONSIDERATIONS

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| Waste Treatment Methods: | Dispose in accordance all applicable regulations. Refer to manufacturer/supplier information on recovery/recycling. |
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14. TRANSPORT INFORMATION

| Proper Shipping Names: | |
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| For Shipments of Cylinders: | Refrigerant gases, n.o.s., 2.2, UN 1078, (contains hydrofluorocarbons). |
| 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. |



15. REGULATORY INFORMATION

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| U.S. SARA Reporting Requirements: | None. |
| U.S. SARA Threshold Planning Quantity: | Not applicable. |
| U.S. CERCLA Reportable Quantity (RQ): | Not applicable. |
| Canadian DSL/NDSL Inventory Status: | Not applicable. |
| U.S. TSCA Inventory Status: | Hydrofluorocarbon 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): | Product ingredients are not listed. |
| EINECS Number: | Refer to Section 3. |
| Canadian WHMIS Classification: | Class A: Compressed Gases |

16. OTHER INFORMATION

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| H phrases: | H280 Contains gas under pressure; may explode if heated |
| R phrases: | R36/37 |
| 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 | Description | Date | Author |
|----------|-----------------------|---------|--------|
| A | Rel per ECO 65038 | 1/17/13 | DLM |
| B | Revised per ECO 86373 | 12/7/15 | DWF |

****End of SDS****