

**Challenge:**

On January 1, 2020, production of the HCFC refrigerants used in cryogenic chillers will be ended in all developed countries including the United States, Japan, and Europe. Therefore, servicing the products that contain HCFC refrigerants will be extremely difficult due to the lack of availability of HCFC refrigerants for service charge, which puts these products at risk for long term use.

**Solution:**

Brooks has made continuous investments and engineered alternate HCFC-free refrigerant solutions to ensure that our current products fully comply with all applicable international laws and industry guidelines. These products represent a long-term investment in the Polycold® brand, and Brooks' commitment to a greener environment.

**Results:**

Brooks has already been positioned to offer products with HCFC-free refrigerant blends that fully comply with global regulatory requirements, and provide cooling solutions for your process needs.

**Brooks' Solution for Global Refrigerant Compliance**

Brooks' Polycold® brand products offer a wide range of cryogenic chillers that contain HCFC-free refrigerant blends for cooling and vacuum pumping applications. These products represent the long-term investments made in the Polycold brand, as well as Brooks Automation's commitment to a greener environment. The United States Environmental Protection Agency (EPA) has approved the alternative HCFC-free refrigerant blends in these chillers under its Significant New Alternatives Policy (SNAP) Program, which was established to identify and promote the use of environmentally responsible refrigerants. Furthermore, these HCFC-free refrigerant blends represent innovations in mixed gas refrigeration technology, and have been awarded patents around the world.

Current and pending legislation within the global community regulates the types of refrigerants allowed in cryogenic chillers. The HCFC refrigerants are a concern due to their impact on the stratospheric ozone layer when allowed to escape into the atmosphere. The regulation of these HCFC refrigerants is driven by agreements made in accordance with the Montreal Protocol. Phase out dates and consumption limits for these HCFC refrigerants vary from country to country, and many national laws actually exceed the limits set by the Montreal Protocol. While some regions of the world have banned all HCFCs many years ago, effective January 1, 2020, the HCFC refrigerants will become severely more restricted in all developed countries. However, Brooks has already been positioned to offer products with HCFC-free refrigerant blends that fully comply with global regulatory requirements, and provide cooling solutions for your process needs.

**Legal Responsibility**

**Importer's Responsibility:** The importer of chiller equipment into a particular country is responsible for ensuring that it complies with all applicable regulations.

**End User's Responsibility:** Ultimately, the end user holds title to the chiller equipment and is responsible for compliance with national laws. Local authorities will look to the equipment owner to ensure legal compliance.

**Manufacturer's Responsibility:** The manufacturers of refrigerant gas are responsible for making accurate disclosures regarding compliance.

## Polycold Products That Provide HCFC-free and R-22-free Solutions

All current Brooks Polycold products listed in this table are HCFC 22-free and HCFC-free as well.

<b>Polycold® Model</b>	<b>Patented by Brooks</b>	<b>Approved by US EPA</b>	<b>R-22 Free</b>	<b>HCFC Free (EU Compliant)</b>
MaxCool 4000H	Yes	Yes	Yes	Yes
MaxCool 2500L	Yes	Yes	Yes	Yes
PFC-672 HC	Yes	Yes	Yes	Yes
PFC-552 HC	Yes	Yes	Yes	Yes
P-102	Yes	Yes	Yes	Yes
PGC-152	Yes	Yes	Yes	Yes
PCC with PT-13	Yes	Not required*	Yes	Yes
PCC with PT-14	Yes	Not required*	Yes	Yes
PCC with PT-16	Yes	Not required*	Yes	Yes
PCC with PT-30	Yes	Not required*	Yes	Yes
PCC with NF-48	Yes	Not required*	Yes	Yes
PCC with NF-50	Yes	Not required*	Yes	Yes
PCC with NF-55	Yes	Not required*	Yes	Yes
Aquatrap®	Yes	Not required*	Yes	Yes

\*The PCC and Aquatrap® product lines and their predecessor the Cryotiger® have never used chlorinated refrigerants and therefore are outside the scope of the US EPA SNAP program.

### Nonflammable Refrigerants

Brooks' HCFC-free refrigerants for the MaxCool, PFC, PGC-152, and P-102 products are free of all flammable refrigerants. Since these systems have relatively large refrigerant volumes, it is important to eliminate the use of flammable refrigerants. This is especially true for systems used in Europe since the European Pressure Equipment Directive (PED) treats flammable refrigerants in a much more restrictive manner after the PED 97/23/EC became law on May 29, 2002 and later the new PED 2014/68/EU took effect on July 20, 2016.

Brooks does use flammable refrigerants in some of its PCC products. However, due to the very small volume of these systems, they fall under PED Category I, which qualifies for an exemption since these products are covered by the Machinery and Low Voltage Directives. Any system larger than a PCC, and certainly any MaxCool / PFC-sized system, have a much greater volume and can be expected to fall into PED Category II or higher. Equipment classified as Category II or higher under the PED cannot be exempted, and must be in compliance for use in Europe.

### Refrigerant Gas versus Refrigeration Equipment

Laws enacted in the United States, the European Union and other countries typically regulate the refrigerant gas. The system hardware is not restricted by these refrigerant gas regulations. However, in the United States, Europe and other countries, other regulations specify the standards that the equipment must meet to ensure safe operation. The MaxCool 4000H, MaxCool 2500L, PFC-672 HC, and PFC-552 HC designs meet stringent US and European requirements and have been examined and approved by third parties. Safety standards that Polycold products comply with include the United States ASHRAE 15; ASHRAE 34; ASME Boiler and Pressure Vessel Code; and Europe's Directives for Machinery, Low Voltage, EMC and Pressure Equipment; in addition to EN 378.

## Frequently Asked Questions

### **How can I tell if my product has a blend containing R-22 or HCFCs?**

If your product is a Polycold brand product, then it is easy to determine if it contains R-22 or other HCFCs from the product model. If you purchased your product from a supplier other than Brooks, then we strongly encourage you to test a sample of the refrigerant, preferably from a service port at the compressor. When looking for a lab to do this analysis, we recommend choosing one that can analyze refrigerant mixtures in accordance with the ARI standard 700 or an equivalent international standard. The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) has a website showing labs certified for ARI standard 700 (<http://www.ahrinet.org/Certification/AHRI-Certification-Programs/Refrigerant-Testing-Laboratory>). If you need additional help locating an independent lab to provide this service, or arranging for this analysis, please contact Brooks and we can help locate one in your area.

### **What shall I do if I have a Polycold product that contains R-22 or HCFCs?**

Brooks encourages our customers to qualify our current products from the table above before we formally stop servicing the old products that contain HCFC refrigerants. Our current products fully comply with global regulatory requirements for refrigerants and can be used for long term.

### **How can I tell if my product that is free of R-22 or HCFCs violates any of Brooks' patents?**

Brooks Automation owns an extensive array of patents for mixed gas refrigeration and the associated refrigerants. A number of these include HCFC-free refrigerant blends. If your product is a Polycold brand product then you can be confident that it does not violate any of Brooks' patents. However, if you have purchased your product from any other manufacturer, you cannot be certain of non-violation. As always, Brooks stands willing to work with our customers to confirm non-violation of any manufacturer's product. Typically, our customers will alert Brooks of a potential violation and may even provide a sample of the manufacturer's product for analysis. Analysis of the manufacturer's product is the only way to confirm whether their product is free of R-22 or other HCFCs and whether it violates any of Brooks' patents.