

R-123: A Responsible Refrigerant Choice Made Even Better By Trane Technology

Most balanced environmentally responsible refrigerant choice for centrifugals

- **R-123 has near-zero ozone depletion potential and very low global warming potential --** Ozone depletion and global warming are both environmental imperatives.
- **R-123 excels in direct and indirect global warming –** R-123 has the lowest global warming index of all common fluorocarbons. And because it's a low-pressure refrigerant, leak rates are really low. At the same time, 95% of a typical chiller's global warming potential is the CO₂, which is created through energy consumption. Trane's R-123 chiller is the most energy efficient and releases the least amount of CO₂.

Scientific community and third parties support R-123

- **United Nations Environment Programme Review (March 2003):** "... HCFC-123 has a favourable overall impact on the environment that is attributable to ... 1) a low ODP, 2) a very low GWP; a very short atmospheric life; 4) extremely low emissions of current designs of HCFC-123 chillers; 5) the highest efficiency of all current options... these studies recommend consideration of a phase out exemption of HCFC-123"
- **Science Symposium in Prague, Czech Republic (November 2004):** "...For example, R-123 could be allowed in specific air conditioning applications where its use promotes superior energy efficiency and assures near-zero refrigerant emissions."
- **United States Green Building Council (USGBC)** recently released the LEED existing building standard (EB) allowing a one-point credit for R-123 chillers with low leak rates. Trane's R-123 chillers meet this standard!

R-123 will be available for the long-term

- **Montreal Protocol phase out schedule protects R-123 stock –** Because it phases out Kg/ODP – **not pounds of refrigerant** – there's no limit on the amount of R-123 that can be produced between now and 2030. Here's how the U.S. Environmental Protection Agency plans to meet its Kg/ODP reduction targets:

1/1/2004	35% achieved by eliminating R-141b in 1/1/2003
1/1/2010	65% will be achieved by eliminating R-22 in new equipment
1/1/2020	99.5% will be achieved by eliminating R-123 in new equipment plus other HCFCs
1/1/2030	100% HCFC reduction
- **Recycled, recovered and stockpiled R-123 can be used forever –** and past experience with large chiller refrigerant phase outs shows that there's more than enough refrigerant. A conservative estimate says that there will be more than 30 times the volume needed to handle the service needs of R-123 between 2020 and 2030
- **Refrigerant manufacturers have said that they will continue producing R-123 –** and need to because R-123 is a significant feedstock in R-125, which is used to make R-410A and R-407C



Trane's Centrifugal Chiller Technology is Unparalleled

Trane's R-123 chiller is the most efficient on the market

- **Trane's direct drive, multi-stage compressor and hermetic motor technology**, to make our centrifugal chillers **up to 18 percent more efficient** than the next best product on the market. Other centrifugal chillers on the market use gear drive and single stage compressors that limit performance capabilities.

Trane technology has unparalleled advantages

- **Hermetic motor ...**
 - Longer motor life
 - Sustained energy efficiency (motor does not get dirty or dusty)
 - No added heat to the equipment room
 - Reliability
- **Direct drive ...**
 - No gear box with associated efficiency loss and compressor complexity
 - Operates at 3,600 RPM for sound and reliability
 - Minimal number of bearings
- **Multi-stage compressor ...**
 - Improved energy efficiency at part load and full load
 - Better operating range and stability (avoids surge)
 - Lower turndown ratio
- **Low pressure ...**
 - Minimal leak rates
 - Use of an automated purge to detect leaks before they impact efficiency
 - Safer because of lower risk of asphyxiation

Trane offers industry's first leak-tight warranty

- **Trane guarantees that our centrifugal chillers will leak less than 0.5%** of R-123 refrigerant, which is only a fraction of federal allowable limits. If it leaks more, Trane will replace the refrigerant for free.
- **Our leak-tight warranty is available for free** for the first five years of ownership. Plus, we offer a service contract with the same leak guarantee for the life of the machine.

Current Trane R-123 owners are making a huge environmental impact

- If all centrifugal chillers sold in one year operated at the same efficiency as Trane's R-123 chiller, greenhouse gas emissions would be reduced by:
 - Over 770 million pounds of CO₂
 - Over 1.1 million pounds of NO_x
 - Over 480,000 pounds of SO₂

This is equivalent to planting nearly 1.4 million trees per year

