

Myths and Facts of HVAC Refrigerants

A global commitment to a healthy, sustainable environment is changing the refrigerant landscape for the HVAC industry. Navigating that change has become difficult as regulatory activity, media scrutiny, and competitive forces combine to create a complex landscape of messages. At Daikin, we are committed to solving the problem of climate change by innovating rigorously and responsibly, and creating candid, fact-based dialog to help you make the most informed decisions possible.

Myth: HCFCs are not being phased out.

FACT: HCFCs, including R123, are being phased out.

Limitations on HCFC production began in 2004. The Montreal Protocol established a phase-down schedule that mandates the 100 percent phase-out of HCFCs, including R123, in new equipment by January 1, 2020. It allows 0.5 percent of base-level consumption to service existing HVAC equipment until January 1, 2030.

The U.S. schedule for meeting the Montreal Protocol phase-out requirements is summarized in the following table, provided by the EPA.

U.S. Action to Meet the Montreal Protocol Phase out Schedule			
Year to Be Implemented	Implementation of HCFC Phase out through Clean Air Act Regulations	Year to Be Implemented	Percent Reduction in HCFC Consumption and Production from Baseline
2003	No production or import of HCFC-141b	2004	35.0%
2010	No production or import of HCFC-142b and HCFC-22, except for use in equipment manufactured before January 1, 2010	2010	75.0%
2015	No production or import of any other HCFCs, except as refrigerants in equipment manufactured before January 1, 2020	2015	90.0%
2020	No production or import of HCFC-142b and HCFC-22	2020	99.5%
2030	No production or import of any HCFCs	2030	100.0%

[Phaseout of Class II Ozone-depleting Substances](https://www.epa.gov/ods-phaseout/phaseout-class-ii-ozone-depleting-substances)
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Myth: A little ODP is OK. **FACT:** *No amount of ODP is OK.*

Stratospheric ozone protects us from ultraviolet rays. Ozone is depleted by chlorine-containing compounds that reach the upper atmosphere. Because CFCs and HCFCs contain chlorine, which has ozone depletion potential (ODP), the Montreal Protocol originally focused on phasing out CFCs and HCFCs. It mandates that all refrigerants with ODP will be phased out for new equipment by January 1, 2020.

The next-generation refrigerants will require essentially zero ODP and low global warming potential (GWP).

Myth: Europe has banned R134a.

FACT: *Europe has not banned R134a for chillers.*

Europe has banned certain types of HFCs in highly emissive applications like automobiles, where mobility makes cooling systems more susceptible to leaks. In these applications, there is a limit of 150 on the refrigerant's GWP. Today in Europe, there is no restriction for chiller applications on HFCs with GWP less than 2500, including R410A or R134a.

Myth: HFCs should not be used today.

FACT: *Regulatory activity is underway for HFCs, but they remain the right choice for HVAC equipment today.*

Two significant regulatory actions have occurred recently:

1. On October 15, 2016, negotiators from more than 170 countries agreed to amend the Montreal Protocol to implement the phase down of HFCs to about 10 percent of current levels by 2036 (referred to as the Kigali Amendment). Developing countries will phase down HFCs at a slower rate through the next decade. Daikin Applied fully supports the Kigali Amendment and will continue to invest in technology to increase efficiency, use alternative refrigerants, and reduce impact to global climate change. This amendment still requires ratification by the US Senate. After ratification, the US Congress may be required to pass laws to establish the mechanisms to meet the requirements of the Kigali Amendment.

2. Separately, the EPA acted to “de-list” the use of R134a and R410A in new chiller applications effective Jan 1, 2024, under the SNAP (Significant New Alternatives Policy) program. However, on Jan. 26, 2018, the United States Court of Appeals for the District of Columbia Circuit made its final ruling that invalidates certain HFC de-listings based on the EPA’s legal right to regulate replacement refrigerants and foam blowing agents under SNAP. While this decision did not directly address the SNAP delisting of R-134a in Chiller applications it is expected that EPA will shortly announce that this action was vacated. While the decision has been appealed to the Supreme Court, this does not affect the action of the Appeals Court. We expect a guidance document from the EPA shortly.

The regulatory complexity makes it easy to confuse the implications:

- There is no established legal authority for EPA to phase down HFCs in the United States.
- Today, R410A and R134a represent the best choices for use in positive pressure equipment.

Myth: A chiller’s R123 can be switched out for R1233zd.

FACT: R1233zd is not a retrofit alternative for R123.

R1233zd is an A1 refrigerant with essentially zero ODP and very low GWP. However, it is not a “drop-in” for R123; the equipment must be redesigned to use R1233zd because R1233zd requires higher pressures and operates at a different volumetric capacity than R123. New R1233zd chillers will require ASME code construction of the heat exchangers.

There is no such thing as a true “drop-in” alternative for R123. The identified retrofit alternative for R123 is R514A, which will require some changes to the equipment to operate. R514A carries the same undesirable higher toxicity “B” designation as R123 (as defined by ASHRAE Standard 34). R514A will also reduce the capacity of an existing R123 machine.

Myth: Lower GWP is always better.

FACT: A lower GWP can come with trade-offs.

Some lower GWP refrigerants can have lower efficiency than the refrigerants we are using today. For chillers, the vast majority of impact on climate change will come from generating electricity to run the equipment, versus refrigerant emissions. Containment is also critical: there is no direct impact on global warming from refrigerants as long as they are contained and not released into the atmosphere.

A better indicator of the global warming impact than GWP is to focus on “life cycle climate performance” (LCCP) of products. LCCP is a way to measure overall environmental impact from manufacture to end of life. For more on LCCP, please refer to this site:

[Life Cycle Climate Performance Guideline: International Institute of Refrigeration \(http://bit.ly/2iMFUaE\)](http://bit.ly/2iMFUaE)

Daikin’s Magnitude® chillers have achieved an Environmental Product Declaration in accordance with ISO 14025, which relies heavily on the LCCP methodology for evaluation. See the link below for additional details:

[Environmental Product Declaration: Centrifugal Chillers, Magnitude® Magnetic Bearing Chiller Models WMC and WME \(http://bit.ly/2jJqmIM\)](http://bit.ly/2jJqmIM)

Conclusion

The facts on HCFCs prove that HFCs and R1233zd represent the best choices for new equipment today. At Daikin, we are working directly with standards and code bodies and industry associations to provide for the use of next-generation refrigerants with essentially zero ODP and reduced GWP. We are investing in the development of equipment and building systems that reduce our environmental impact. Daikin fully supports bringing HFC refrigerants into the Montreal Protocol framework; this model has been successful for CFCs and HCFCs. We are prepared, and want to help prepare you, to drive the future.

For more information, please contact your local Daikin Sales Representative by calling 800-432-1342.