

# 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 pressure, 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 phaseout 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 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 are being phased out.

**FACT:** *There is no phase out date for HFCs.*

On September 26, 2016, the EPA announced that, under the EPA SNAP (Significant New Alternatives Policy) program, specific refrigerants including R134a and R410A can no longer be used in new chillers, effective January 1, 2024.

This restriction applies only to new chillers, so other HVAC products will continue to use these refrigerants for new equipment and the refrigerants will be available before and after the "de-listing" date for servicing of existing equipment. Also note that refrigerant blends like R513A, R513B and R450A are about 40% R134a, so production of R134a will continue, and supply will be abundant.

The "de-listing" of these refrigerants for specific applications should not be confused with an HFC phase-out. There is no phase-out in place yet for HFCs; it will happen eventually, and it is likely to happen gradually and over an extended period, in a similar fashion to HCFCs and CFCs.

It is safe to use R410A and R134a right up to the Jan 1, 2024 date.

**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 defined by ASHRAE Standard 34 as R123. 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.**

Many lower GWP refrigerants also 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, "total equivalent warming impact" (TEWI) measures direct and indirect emissions of greenhouse gases. More recent work has focused on the "life cycle climate performance" (LCCP) of products. LCCP is another way to measure overall environmental impact from manufacture to end of life. For more on TEWI and LCCP, please refer to these sites:

[Energy and Global Warming Impacts of HFC Refrigerants and Emerging Technologies: TEWI – III](#)

[The Role of Environmental Metrics \(GWP, TEWI, LCCP\) in the Selection of Low GWP Refrigerants](#)

As an example of how the LCCP is used, the Magnitude® Chillers have achieved an Environmental Product Declaration in accordance with ISO 14025, see the link below:

[Environmental Product Declaration: Centrifugal Chillers, Magnitude® Magnetic Bearing Chiller Models WMC and WME](#)



## 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 code officials and industry associations to innovate 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.