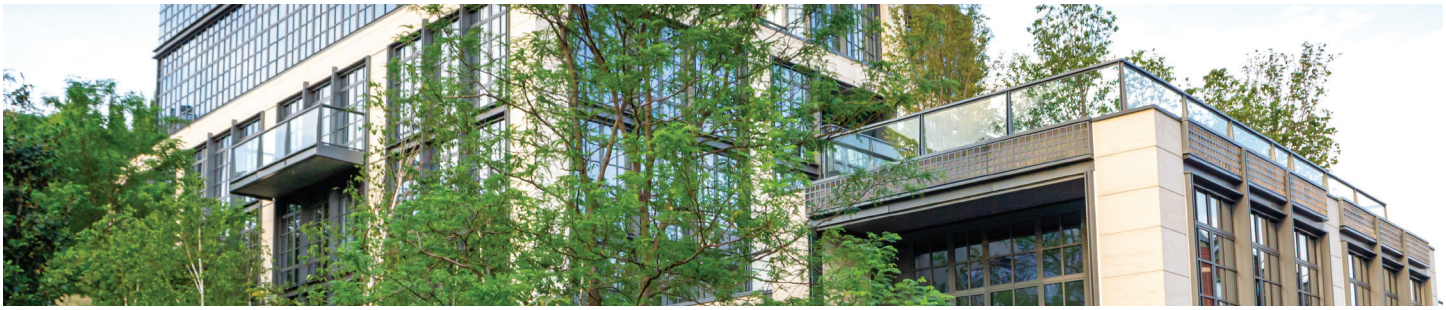


Refrigerant Transition Overview

Buildings need to do better for the planet. And they will.



Within the HVAC industry, transitioning to low global warming potential (GWP) refrigerants continues to be one of the most effective decarbonization activities globally. To protect our climate and reduce emissions from hydrofluorocarbons (HFCs), the American Innovation & Manufacturing (AIM) Act directs the U.S. Environmental Protection Agency (EPA) to phase down the supply of HFCs.

The evolution of refrigerants is an ongoing journey. Trane uses the right refrigerants at the right time.

Scientists first observed ozone depletion in the late 1970s and identified chlorofluorocarbon (CFC) refrigerants as one of the causes.[1] Since then, the HVAC industry has made step-changes in lower GWP refrigerant use. As refrigerants have evolved, Trane has made it a priority to help our customers optimize energy efficiency and comfort for their buildings while contributing less to climate change. We are actively helping customers prepare for the reduced supply and bans of the HFCs commonly used today.

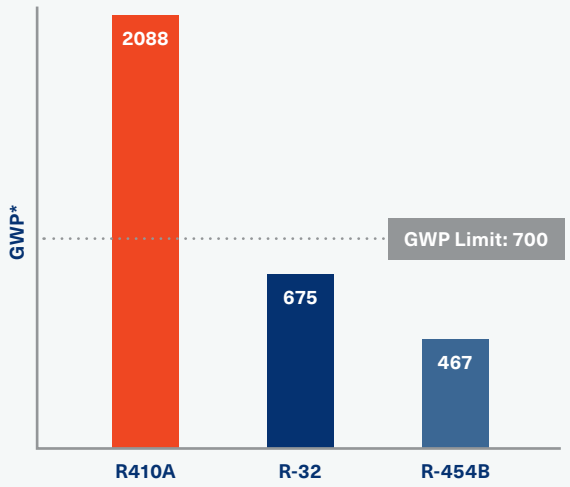
The HVAC industry has transitioned to next-generation refrigerants with GWP values below 700, which can reduce GWP by approximately 75%. For example, R-454B has a global warming potential of 466 and is among the lowest-GWP refrigerants used to replace R-410A in many comfort cooling applications.

Trane has invested over 15 years and $500M to determine the best low-GWP refrigerants for our equipment and systems.

Our refrigerant selection approach is rigorous, unbiased and balanced.

We are thoughtfully engineering our product changeovers to deliver the performance you've come to expect while prioritizing the climate.

- Decisions are based on extensive research and application knowledge.
- We consider factors for optimizing GWP and energy efficiency, as well as upholding safety standards.
- Our choices optimize HVAC operating costs and comfort benefits with lowering emissions.
- Trane has no stake in the refrigerant business. We do not profit from the sale of any refrigerant.



* *GWP values reported are per the Fourth Assessment Report (AR4) of the IPCC (Intergovernmental Panel on Climate Change)*

This is a climate priority: Here's what you need to know about refrigerants and reducing carbon emissions.

A building's overall "carbon emissions" actually means "carbon dioxide equivalent emissions" (CO_2e), which includes refrigerants.[3]

Most common HFC refrigerants for heating and cooling emit gases that can have 1,000 to 9,000 times greater capacity to warm the atmosphere than carbon dioxide. Thus, lower-GWP refrigerants are a top strategy for drawing down global emissions.[4]

Trane has Your Refrigerant Transition Covered.

Trane has transitioned our products to refrigerants that regulators have deemed more sustainable. As you undergo your own transitions, here's how we can help.

1. **Assess your equipment needs.**
When there's a choice, we can help you select the right refrigerant for your needs.

2. **Mitigate site risks.**
In some cases, units containing lower-GWP refrigerants require site modifications. We can help you understand how to bring your site into compliance.

3. **Practice safe handling and documentation.**
Trane's fully certified mechanical service technicians will provide professional refrigerant handling in compliance with EPA Section 608. We can provide accurate leak rate calculations and provide accurate recordkeeping and reporting on refrigerant activity. All records are easily accessible, on demand.

4. **Manage leak detection.**
We can discuss whether constant remote monitoring makes sense for your application.



Ask the Trane Experts

Industry transitions can be confusing. Trane has the answers you need.

What is the timing for this transition to refrigerants with less than 700 GWP?

The EPA allows "products", equipment charged in the factory, to be sold up to 3 years after manufacture deadline.

Application	Manufacture Deadline > 700 GWP	Installation & Sell-Through Deadlines > 700 GWP
All chillers for comfort cooling and heating	Jan 1, 2025	Sell products before Jan 1, 2028
Ice rink chillers (for most states)	Jan 1, 2025	Sell products before Jan 1, 2028
Packaged units (AC/HP) and other AC products including Room/wall/window AC, PTACs, PTHPs, portable AC, and residential dehumidifiers. (circuit sealed in factory)	Jan 1, 2025	Sell products before Jan 1, 2028*
Split systems, including ductless split systems (refrigerant loop closed in field)	Jan 1, 2025	No install deadline
VRF >= 65,000 BTU/hr	Jan 1, 2026	Install before Jan 1, 2027**
Industrial process chillers with temperatures of chilled fluid >-22°F***	Jan 1, 2026	Sell products before Jan 1, 2029
Data center equipment***	Jan 1, 2027	Sell products before Jan 1, 2030
Industrial process refrigerant chillers with temperatures of chilled fluid -58°F to -22°F*** (no mandate if <-58°F)	Jan 1, 2028	Install systems before Jan 1, 2028 Sell products before Jan 1, 2031

**New York no longer allows sale or install of R-410A equipment as of 1/1/26*
***On June 26, 2024, EPA extended the installation deadline for VRF >= to 65,000 Btu/hr until Jan 1, 2027.*
**** CA (replacement and new installations) and WA (new installations) transition January 1, 2025.*
IPR (Industrial Process Refrigeration) – CA has different requirements starting in 2024, Contact Account Manager for more information

Sources:
https://www.epa.gov/system/files/documents/2023-10/technology-transitions-final-rule-fact-sheet-2023.pdf
https://www.federalregister.gov/documents/2023/12/26/2023-28500/phasedown-of-hydrofluorocarbons-technology-transitions-program-residential-and-light-commercial-air
https://www.epa.gov/system/files/documents/2026-05/fact-sheet-san-12166-technology-transitions-frm.pdf

What are Trane's refrigerant selections by application?

Application	Equipment Type	New Refrigerant
Low Pressure	Centrifugal chillers, Heat Pump screw chillers	R-514A, R-1233zd(E)
Medium Pressure	Air- and water-cooled screw and magnetic bearing chillers, Modular chillers	R-513A, R-515B
High Pressure	Air and water-cooled scroll chillers, Modular chillers, Unitary, Mini-splits and Residential	R-454B (low flammability)
High Pressure	VRF	R-32 (low flammability)

Do I need to worry about using low-GWP refrigerants in my system? Are they safe?

Trane equipment is designed for low-GWP, low flammability (A2L) refrigerants and meets safety UL requirements. Based on our extensive years of testing, Trane can offer these assurances:

- Trane has evaluated and eliminated competent ignition sources in our equipment (i.e., protected electric circuits).
- A refrigerant leak detection system, where needed, will initiate mitigation actions as required by the UL safety standard.

What do I need to consider to prepare my facility?

New requirements outlined in ASHRAE Standard 15 and UL product safety standards are intended to maintain human safety during a refrigerant leak. Depending on the site, refrigerant and equipment type, safety modifications may include the following:

- Improving ventilation
- Adding leak detection systems
- Installing a Building Automation System (BAS) for faster alarming and response
- Automating equipment shutdowns

Will either R-454B or R-32 be a drop-in replacement for existing units using R-410A?

No. In fact, drop-in replacements do not exist. The EPA and industry safety standards specifically prohibit the use of flammable refrigerants in equipment that was originally designed for nonflammable refrigerants like R-410A.

Do we need to change the way we operate and control equipment with next-generation A2L refrigerants?

Yes. Codes and standards require the ability to detect refrigerant leaks and take appropriate mitigation actions. Equipment with 4 lbs or more of A2L refrigerant per circuit require a refrigerant detection system installed from factory.

Need to know more? Contact your Trane Account Manager.

Learn More at trane.com/decarbonization



1 *The Montreal Protocol on Substances That Deplete the Ozone Layer. U.S. Department of State, Office of Environmental Quality. Web.*

2 *Phasedown of Hydrofluorocarbons: Restrictions on the Use of Certain Hydrofluorocarbons Under the American Innovation and Manufacturing Act of 2020, Federal Register (A Rule by the Environmental Protection Agency on October 24, 2023.) Web.*

3 *Andrew Lieper, Refrigerants and their Contribution to Global Warming, Net Zero Carbon Guide. Web.*

4 *Refrigerant Management, Project Drawdown. Web.*

5 *Restrictions on the Use of Certain HFCs under Subsection (i) of the AIM Act, EPA.gov. Web.*

Trane – by Trane Technologies (NYSE: TT), a global climate innovator – creates comfortable, energy efficient indoor environments through a broad portfolio of heating, ventilating and air conditioning systems and controls, services, parts and supply. For more information, please visit *trane.com or tranetechnologies.com.*

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