



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.

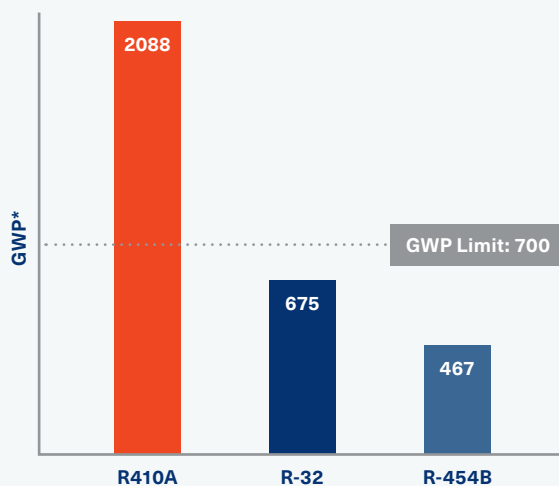
The HVAC industry is moving to next-generation refrigerants with less than 700 GWP, which can reduce GWP by 75%. R-454B has a global warming potential of 466 and is the lowest GWP refrigerant to replace R-410A.²

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 decarbonization.

A building's overall "carbon emissions" actually means "carbon dioxide equivalent emissions" (CO₂e), 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, next-generation refrigerants are a top strategy for drawing down global emissions.⁴

Trane has Your Refrigerant Transition Covered.

Trane is transitioning 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 next-generation 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 prohibits "systems", equipment charged in the field, to be installed after the manufacture deadline. 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 in the states of CA*, CO, DE, MA*, MD, ME, NJ, NY RI, VA, VT, WA (EPA refrigerant bans)	Jan 1, 2024	Install products before Jan 1, 2024*
All chillers for comfort cooling and heating	Jan 1, 2025	Install systems before Jan 1, 2025 Sell products before Jan 1, 2028
Ice rinks	Jan 1, 2025	Install systems before Jan 1, 2025 Sell products before Jan 1, 2028
Packaged units (AC/HP) and other AC (refrigerant loop closed in factory)	Jan 1, 2025	Sell products before Jan 1, 2028 No install deadline
Split systems, including ductless split systems (refrigerant loop closed in field)	Jan 1, 2025	Install systems before Jan 1, 2026
Room/wall/window AC, PTACs, PTHPs, portable AC, and residential dehumidifiers	Jan 1, 2025	Sell products before Jan 1, 2028 No install deadline
VRF >65,000 BTU/hr	Jan 1, 2026	Install before Jan 1, 2026**
Industrial process chillers with temperatures of chilled fluid >-22°F***	Jan 1, 2026	Install systems before Jan 1, 2026 Sell products before Jan 1, 2029
Data center equipment***	Jan 1, 2027	Install systems before 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

*CA and MA require building permits approved in 2023

**On 12/26/23 the EPA published an interim final rule extending the installation date of unitary split systems. EPA is considering an extension for VRF as quoted below. We expect the EPA to complete this rule by the end of 2024. "In this interim final rule, the Agency is not considering the January 1, 2026, installation compliance date applicable to VRF systems; however, EPA intends to consider VRF systems in a separate notice and comment action."

*** 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>



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

Trane equipment is designed for next-generation, lower flammability (A2L) refrigerants and meets stringent requirements. Based on our extensive years of testing, Trane can offer these assurances:

- Based on multiple years of testing, Trane documents a lower flammability limit (LFL).
- Trane has evaluated and eliminated competent ignition sources in our equipment (i.e., protected electric circuits).
- An on-board leak detection system, where needed, will mitigate any refrigerant concentrations from reaching a level capable of being ignited. Some parts of the unit may be locked and prevented from running until a resolution has been reached.



What do I need to do to prepare my facility?

New requirements 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
- Increasing refrigerant detection sensors
- Lowering the refrigerant detection limit
- Installing a Building Automation System (BAS) for faster alarming and response
- Automating equipment shutdowns
- Modifying the equipment site to ensure safe public distancing



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

Yes. International and regional codes and standards require the ability to detect refrigerant leaks and take appropriate mitigating actions. Unit controllers installed on equipment containing A2L refrigerants must have capabilities in place to effectively detect, mitigate, ventilate and notify building operators of potential refrigerant leaks. This is achieved via a sensing system (consisting of interconnected refrigerant sensor(s) and a control board) which senses any increase in refrigerant gas concentration and initiates an appropriate system response. For split systems, additional leak check requirements must be followed during commissioning.



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.

Need to know more? Contact your Trane Account Manager.



Resources

HVAC Industry Update: Industry Progress to Transition Away from High HFC Refrigerants (Trane.com)

- 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.



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