

FAQ - Your guide to choosing low-GWP cold room refrigerants

Commercial refrigeration engineers, OEMs and cold room owners are faced with difficult decisions as they move to lower-GWP refrigerants. We can help you make the move with confidence by answering your most urgent refrigerant questions.

By Jorg Saar, Global Application Manager, Danfoss Cooling

Refrigeration engineers, installers, OEMs, and cold room owners must make the move to low-GWP refrigerants to comply with F-Gas regulations and other refrigerant regulations.

However, uncertainty over refrigerant selection and future supply, as well as misunderstandings about component suitability, could be preventing some designers, engineers and installers from making refrigerant decisions with confidence.

To help you select and install both new and retrofitted refrigerants, we've answered some of the most common low-GWP refrigerant questions.

- Is there a simple way to select the right refrigerant?
- What refrigerants should I consider, and why?
- Will a new refrigerant force me to use new components?
- Where can I learn more?

Is there a simple way to select the right refrigerant?

There is no one-size-fits-all solution available, as no single refrigerant can operate efficiently across all temperature ranges, applications and operating conditions.

To select the right refrigerants for your applications, you'll need to consider the properties of each – and how they match up to your environments and equipment. For new systems, the process is relatively straightforward; retrofitting is potentially a little more complex.

Things to consider:

New systems	Retrofit
<ul style="list-style-type: none"> • Refrigerant availability • Refrigerant availability in the future • Component availability • Cost • Flammability • Charge limitations and safety requirements • Specific capacity • Pipe sizing • Overall system GWP • How different components impact energy efficiency 	<ul style="list-style-type: none"> • Long and short-term refrigerant availability • Capacity deviation to current refrigerant in typical temperature range • Compressor, oil and component compatibility with alternative refrigerants • Flammability (when refrigerants of A2L class or higher are used) • Discharge temperature • Glide • Superheat setting • Safety device settings • Pipe sizing

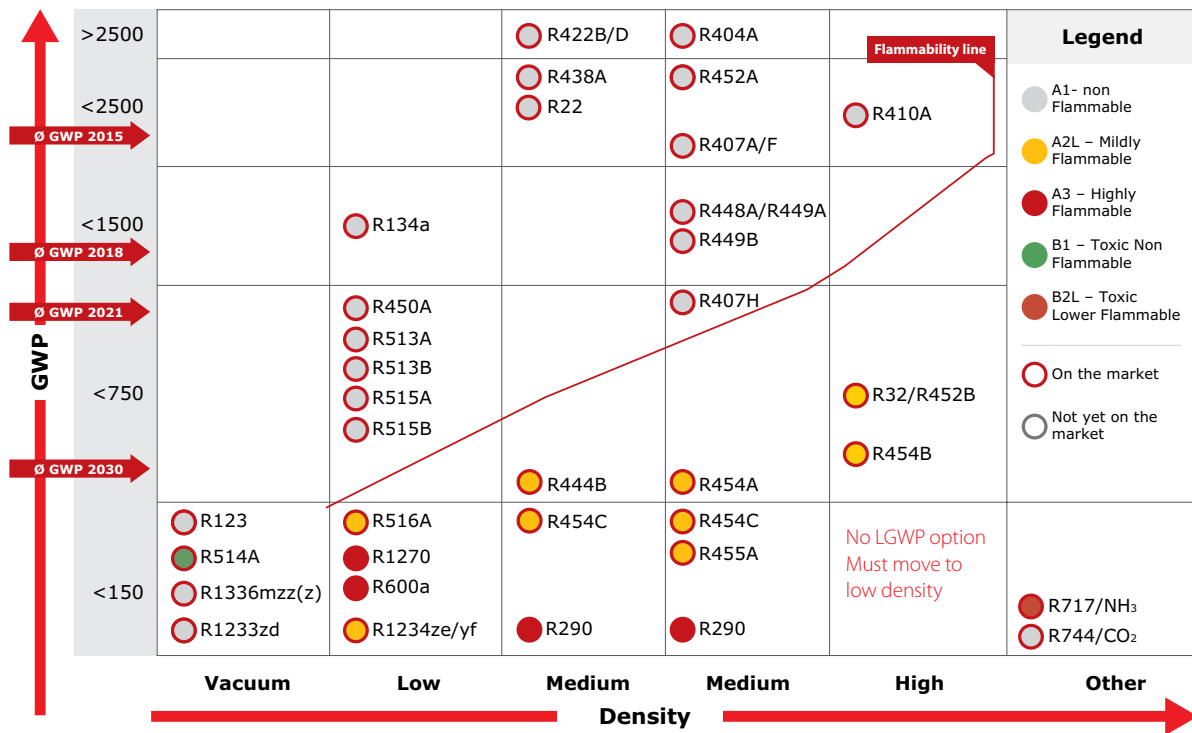
What refrigerants should I consider, and why?

As we see the market today, the main replacements for R404A/R507 are R448A, R449A, R407H, R452A, R290 and less R407A/F. R290 is highly flammable and can only be used with restricted charge sizes. R290 should be used for new systems only (no retrofitting from existing R404A systems to A3 refrigerants). The main replacements for R134a are R513A and R450A. The pure HFO's R1234yf and R1234ze are also seen in increased use but are to a certain extent constrained by their flammability. R600a is recognized for decades in domestic appliances.

When retrofitting old systems, there are some key things to consider when choosing a lower-GWP refrigerant:

- How close is the new refrigerant to your current refrigerant's pressure and capacity?
- Using new A1 refrigerants with lower GWP to retrofit R404A, R507 and R134a systems*, eliminates the need to double-check requirements that come with flammable refrigerants,
- In case the new refrigerant has a higher flammability class, check charge limits and safety requirements in standards and regulations,
- Refrigerant charge limits are defined in EN 378-1:2016 table C2 and in Application Specific standards IEC 60335-2-xx series,
- Be aware that auxiliary electrical equipment could become an ignition source when using a flammable refrigerant in a new system; for more information, refer to the [Asercom guide about safety standards and components for flammable refrigerants](#)
- If you're considering a new refrigerant with high glide, please read our technical paper on [Retrofit and high glide refrigerants](#),
- Recover the old refrigerant in the system, and don't mix it with other refrigerants.

Main refrigerants at Play and GWP levels a Picture in Continuous Evolution



Will a new refrigerant force me to use new components?

In some cases, you can continue to use the same compressors, heat exchangers, valves and controls you used before. It is always necessary to check if components may need to be modified before they are ready for a new refrigerant.

Check points may include:

- Oil and compressor approval for the new refrigerant. If not replace with a compatible compressor,
- Components with gaskets must be compatible with the new refrigerant and oils,
- Thermostatic expansion valves likely need to be adjusted or even become replaced with a new version as it might need a bulb charge that's compatible with the new refrigerant to allow good superheat control,
- Electronic expansion valve controllers may need new refrigerant specific parameters. Set the new refrigerant in the superheat controller for the electric expansion valve. If the refrigerant is not in the list, use user-defined and input parameters. Please note that Danfoss controllers already include many of the lower-GWP refrigerants,
- Control devices like pressure switches might need to be adjusted to the new refrigerant pressures.

Where can I learn more?

That said, if you have specific needs and requirements from your refrigerant, you may need to investigate other flammable refrigerant options.

Danfoss offers a range of content to help cold room operators, installers and OEMs select the right low-GWP refrigerant for their needs. Our engineers are committed to low-GWP refrigerants and solutions, and can help you keep up to date with the latest solutions and developments.

For more information, view our full [low-GWP resources library](https://refrigerants.danfoss.com) at refrigerants.danfoss.com.



For the selection of components, turn to coolselector.danfoss.com