# The EU F-gas Regulation Revision

## What does it mean for your business?

Refrigerants are an integral part of heat pump and air conditioning technology. Like our systems and products, refrigerants have also continually evolved to adapt to new requirements for efficiency and, above all, environmental protection.

This leaflet aims give you an **insight in Daikin's refrigerant strategy** for the European market and more background on the **F-gas Regulation** so you can confidently prepare for the future.

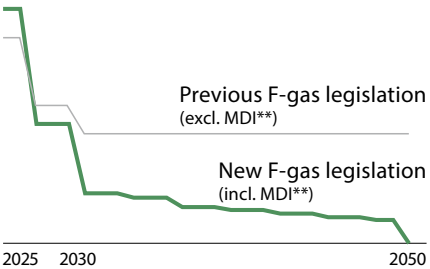
# What is the EU F-gas Regulation?

The EU F-gas Regulation is a set of rules within the European Union designed to control and reduce the consumption of hydrofluorocarbons (HFCs) in Europe. The regulation encourages using more sustainable alternatives, such as lower global warming potential (GWP) refrigerants and re-use practices, to mitigate climate change. The latest revision came into force on 11 March 2024.

# Key elements of the 2024 EU F-gas Revision

- A stricter phase-down path from 2025 onwards and a phase-out of virgin HFCs by 2050, with a planned review in 2030
- Stricter GWP limits for specific types of products (see page 5)
- Products placed on the market before a GWP limit comes into force can continue to be sold, installed, operated and serviced throughout their entire lifetime (see page 6)

**Stricter F-gas Regulation phase down**
(tonnes $CO_2$ equivalent)




** scope has changed, the MDI (metered dose inhalers) sector is now also in scope of the HFC phase down

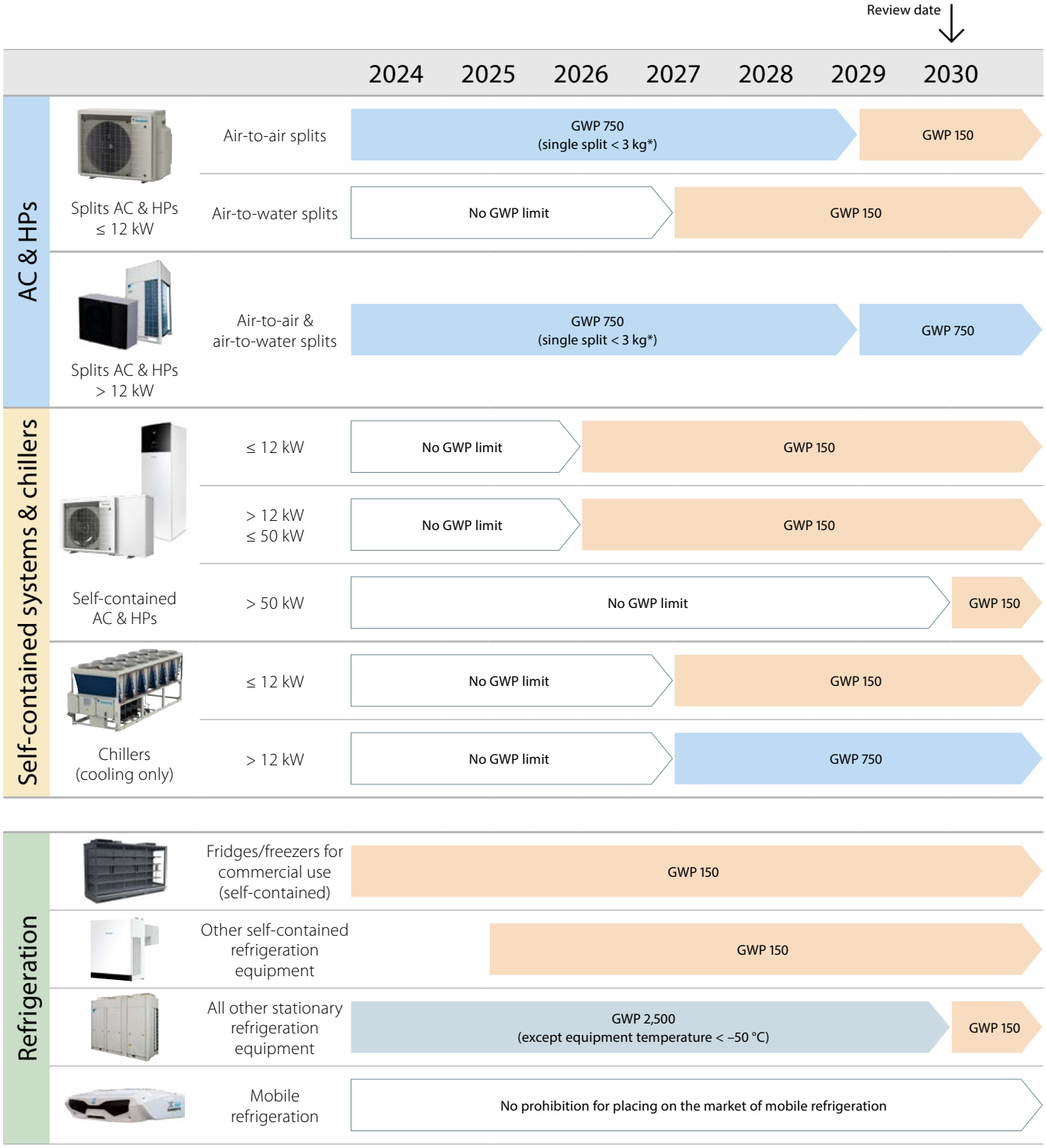
Find **more information** and access to our **frequently asked questions** on our F-gas web page!

# F-gas phase down – a phased approach

While introducing GWP limits, the EU clearly indicates that different applications move at different speeds of transition.

Smaller self-contained and split systems with lower refrigerant charges, as well as chillers, are the first ones to move below the 150 GWP limit, from 2026/2027 onwards. For larger systems the change is expected later towards 2030 or beyond.

**Review date**
In 2030, there will be an evaluation by the EU Commission to determine whether the post-2030 product bans are technologically feasible. Depending on this report, amendments are still possible to bans taking effect after 2030.




* Existing ban from 2014 F-gas regulation. Above 3 kg refrigerant: no GWP limit

Watch the **complete overview on product bans** on our F-gas web page!

# Our strategy: a balanced refrigerant choice per application

There is no one-size-fits-all refrigerant, as different applications present different challenges.

Daikin's strategy is to choose the ideal refrigerant for each application by balancing safety, energy efficiency, environmental impact and cost over the entire life cycle of a product, always in line with current regulations.

## Environmental impact

- Lower global warming potential
- In line with the F-gas Regulation GWP bans and quota phase down

## Safety

- Related to transport, storage, installation, recovery & recycling
- Toxicity or flammability characteristics for application

## Future readiness

- Contribute to reducing overall system operation and maintenance costs
- Potential to be recycled and reused

## Affordability

- Ease of installation
- Cost of equipment and safety precautions

## Refrigerant outlook for Europe

In order to meet a wide range of safety and performance requirements and to continue to drive the decarbonisation of the building sector, different refrigerants (fluorinated and non-fluorinated) are needed. In the table below you can find our most important future refrigerants for Europe.

| Refrigerant | R-32 | R-290 | R-454C | R-744 ($CO_2$) |
|---|---|---|---|---|
| GWP | 675 | 0.02* | 145.5* | 1 |
| Energy efficiency | +++ | +++ | +++ | ++ |
| Safety | ▪ Lower flammable (AL2)<br>▪ Refrigerant and hydrosplit connection possible<br>▪ Suitable in all applications | ▪ Highly flammable (A3)<br>▪ Limitations based on refrigerant amount<br>▪ Suitable only in special applications | ▪ Lower flammable (AL2)<br>▪ Refrigerant and hydrosplit connection possible | ▪ Not flammable (A1)<br>▪ Suitable in all applications<br>▪ High pressure |
| Affordability | € | €€<br>▪ Additional safety precautions<br>▪ Bigger dimensions to keep efficiency | €€<br>▪ More materials required<br>▪ Bigger dimensions to keep efficiency | €€<br>▪ More materials required |
| Recommended applications | All | Residential and light commercial applications, self-contained refrigeration | | Commercial applications, other refrigeration equipment |

* GWP values in accordance with revised F-gas Regulation (EU 2024/573)

# Sit back and relax:
# Daikin takes care of the products

The F-gas Regulation has raised questions for many, like "What do I need to pay attention to?" and "How do I ensure that the products can be installed?"

At Daikin, we handle these concerns by ensuring that **every product we offer fully complies with the regulation. This means that the products we offer you can be sold, operated, maintained and repaired till the end of their lifetime, without any worries**.

## Daikin's portfolio is ready
## The right refrigerant for the right application

| | Daikin product group | Transition away from → | Future-proof today's installations → | Next-generation technology |
|---|---|---|---|---|
| Air to air | Split / Sky Air | **R-410A** GWP: 2,087.5 | **R-32** GWP: 675 | < 3.5 kW: **R-290** GWP: 0.02<br>3.5–12 kW: **R-454C** GWP: 145.5<br>> 12 kW: **R-744** GWP: 1 |
| | VRV | **R-410A** GWP: 2,087.5 | **R-32** GWP: 675 | **R-744** GWP: 1 |
| Air to water | Daikin Altherma | **R-410A** GWP: 2,087.5 | **R-32** GWP: 675 | **R-454C** GWP: 145.5<br>**R-290** GWP: 0.02 |
| | Chillers and heat pumps | **R-410A** GWP: 2,087.5<br>**R-134a** GWP: 1,430 | **R-32** GWP: 675 | **R-290** GWP: 0.02<br>**R-454C** GWP: 145.5 |
| Cold chain refrigeration | Commercial refrigeration | **R-410A** GWP: 2,087.5<br>**R-448A** GWP: 1,386<br>**R-449A** GWP: 1,396.2<br>**R-134a** GWP: 1,430 | **R-290** GWP: 0.02<br>**R-744** GWP: 1 | **R-290** GWP: 0.02<br>**R-744** GWP: 1 |
| | Industrial refrigeration | Different A1 and A2L refrigerants | **R-744** GWP: 1<br>**R-717** GWP: 0 | **R-744** GWP: 1<br>**R-717** GWP: 0 |
| | Transport refrigeration | **R-134a** GWP: 1,430<br>**R-404A** GWP: 3,921.6 | **R-452A** GWP: 2,139.4 | **R-290** GWP: 0.02<br>**R-744** GWP: 1 |

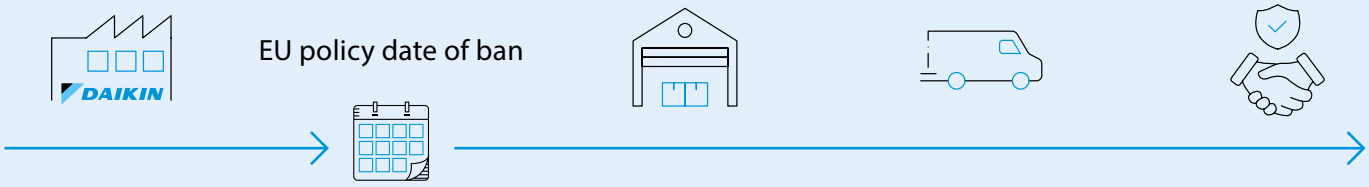
Find out more about **our outlook on refrigerants** in Europe here!

# Sales, maintenance and repair of products

A ban of certain refrigerants doesn't mean a complete ban on selling, installing and operating systems.

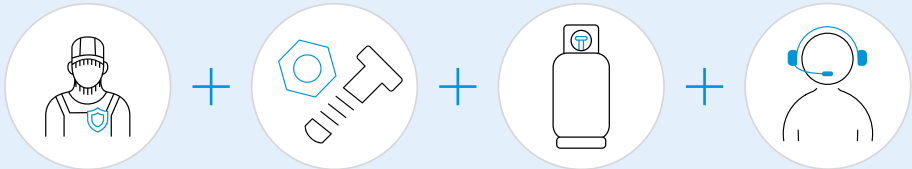
- All concerned **equipment already placed on the market** (in stock by Daikin, wholesalers or installers) proir to the start of a ban **can still be sold out**.
- If it is not possible to install a compliant system for **safety reasons**, the ban does not apply.
- Daikin **spare parts and technical support** are guaranteed for the lifetime of the systems.

## You can still sell, operate, maintain and repair products after the ban




- End of EU production/import
- Last placement on the EU market (safety exceptions are possible)

- The F-gas Regulation guarantees sales from local stock, even after the ban date!
- Daikin ensures continued supply of spare parts, refrigerant for repair/refill and after sales support until end of life.




Find out more details about **servicing & maintenance** of products here

# Leak checks


Leak checks are an important part of the revised F-gas Regulation and are essential when handling refrigerants. Below you can find the latest information and guidance.

## General guidelines

**NEW** **In addition to the known limits for HFC refrigerants for carrying out leak checks, leak checks must now be carried out for filling quantities of 1 kg HFO refrigerant or more (2 kg for hermetically sealed systems).**

**NEW** **From now on**, leak tests must be carried out on chillers with the **refrigerant R-1234ze with a filling quantity of ≥ 1 kg**. The specialist company carrying out the inspection must also have a F-gas certification.

**Exception:** For hermetically sealed devices installed in residential buildings, no leak checks need to be carried out if the filling quantity is < 3 kg.

| Type of refrigerant | Refrigerant charge | Prescribed frequency of leak checks | |
|---|---|---|---|
| | | Without leak detection system | With leak detection system |
| HFC | < 5 $tCO_2eq$ | No check needed | No check needed |
| | ≥ 5 $tCO_2eq$ (hermetically sealed facilities: ≥ 10 $tCO_2eq$), < 50 $tCO_2eq$ | **Every 12 months** | **Every 24 months** |
| | ≥ 50 $tCO_2eq$, < 500 $tCO_2eq$ | **Every 6 months** | **Every 12 months** |
| | ≥ 500 $tCO_2eq$ | Not allowed* | **Every 6 months** |
| HFO | < 1 kg | No check needed | No check needed |
| | ≥ 1 kg (hermetically sealed facilities: ≥ 2 kg), < 10 kg | **Every 12 months** | **Every 24 months** |
| | ≥ 10 kg, < 100 kg | **Every 6 months** | **Every 12 months** |
| | ≥ 100 kg | Not allowed* | **Every 6 months** |

* Leak detection system required for refrigeration, air conditioning, heat pumps and fire protection equipment

The revised F-gas Regulation requires checking each component of an **HFC/HFO blend** individually. Whichever leak check requirement is reached first defines the requirement.

**Example for R-454C (GWP: 145.5)**

- Composition: R-32 (21.5%) + R-1234yf (78.5%)
- HFC: leak check needed from 5 tonnes $CO_2eq$ onwards – 7.4 kg of R-32 = **34.4 kg of R-454C**
- HFO: leak check needed from 1 kg onwards – 1 kg of R-1234yf = **1.3 kg of R-454C**

➔ HFO threshold is reached first
➔ Leak check needed from 1.3 kg onwards

## Specifications after repair

As before, the final leak test after a repaired leak must be carried out **within one month of the repair**.

**NEW** The **minimum time interval** between repair and the final leak test must now be **at least 24 hours** (previously the test could be carried out directly after the repair).

**The inspection does not necessarily have to be carried out on site, but can also be carried out using an indirect inspection method through our various offsite solutions**, such as Daikin on Site (chillers), Daikin Cloud Plus (VRV), Web Checker (VRV or Rooftop) or DCS Residential (selected split systems). These indirect inspection methods are permitted for any preventive and time-prescribed leak inspection.

**This regulation applies immediately to all systems, regardless of the type of refrigerant, after repairing a leak.**

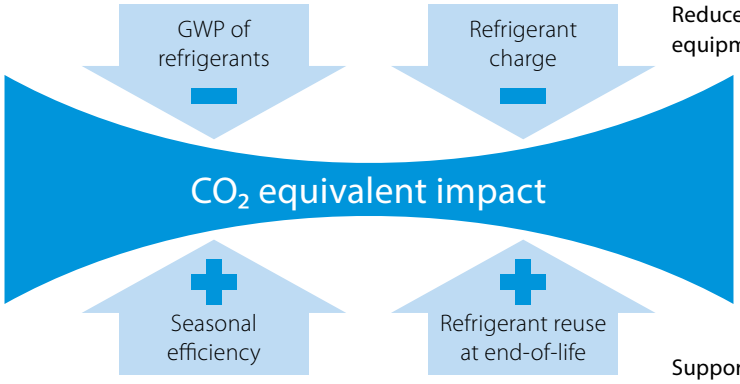
# Supporting decarbonisation

It is in our DNA to provide safe, healthy and comfortable spaces throughout the building life cycle using world-leading technology. Driven by a dedication to achieve net zero $CO_2$ emissions by 2050, we work together with our partners and customers in helping to create a world with healthier indoor air and minimal environmental impact.

## Daikin actions to reduce $CO_2$ equivalent impact of our systems

Use of lower GWP refrigerants

Reduced refrigerant charge in new equipment




Market leading efficiencies

Supporting a circular economy of refrigerants

## We support you with your next project:

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