

April 2026



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Rittal position regarding the F-gas Regulation (EU) 2024/573 and its significance for enclosure cooling units and chillers

1. Regulatory framework – F-gas Regulation (EU) 2024/573

The F-gas Regulation (EU) 2024/573, which has been in force since **11 March 2024**, is accelerating the phase-down of fluorinated greenhouse gases. The established plan to reduce these gases is being rigorously pursued, with the aim of a **complete phase-out by 2050**. In addition, new prohibitions on placing many types of equipment on the market now apply.

The permissible quantities of hydrofluorocarbons (HFCs) are being reduced further – from **2025** and particularly steeply from **2027** onwards.

Fixed GWP thresholds will apply to a lot of refrigeration and air conditioning equipment in the future:

- **Equipment up to 12 kW:** from 2027, only refrigerants with a **GWP < 150**
- **Equipment above 12 kW:** initially **GWP ≤ 750**, with stricter rules set to apply in the future (e.g. **GWP < 150 from 2032**)

Consequently, it will be essential to use refrigerants with a very low global warming potential (GWP) in the future.

2. F-gas-compliant Rittal strategy – Blue e+ & Blue e+ S with R-1234yf

Rittal is acting quickly to switch its **Blue e+** and **Blue e+ S** cooling unit and chiller platforms over to refrigerant **R-1234yf** – in good time ahead of the marketing prohibition, which comes into force on 1 January 2027.

Technological benefits of R-1234yf

- **Extremely low GWP:** R-1234yf (GWP 0.5) is virtually climate-neutral and is replacing both R134a (GWP 1430) and R-513A (GWP 631)
- **Tried and tested:** R-1234yf has been used in serial applications millions of times, including in vehicle air-conditioning systems
- **Efficient & compact:** R-1234yf is thermodynamically ideal for compact, energy-efficient systems – the perfect match for the Blue e+ platform

ENCLOSURES

POWER DISTRIBUTION

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3. Safety of R-1234yf and compliance with standards

A2L classification

Standards ASHRAE 34 and ISO 817 classify R-1234yf as **A2L**, which means it has low toxicity and is mildly flammable. The **lower flammability limit (LFL)**, at approximately **6.2% by volume**, is very high, so flammable mixtures will only form under conditions that are extremely unlikely to arise.

Certified safety

Rittal units containing R-1234yf comply with various standards, including:

- **EN/IEC 60335-2-40 for CE marking and international approvals**
Household and similar electrical appliances – Safety – Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers
- **UL 60335-2-40 specifically for UL approval in North America**
Household and similar electrical appliances – Safety – Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers

Blue e+ and Blue e+ S units therefore meet the safety level for household appliances.

No additional safety equipment required

All Rittal cooling units and chillers are below the permissible thresholds that, when breached, require safety measures at the installation site.

Standard-compliant thresholds for refrigerant R-1234yf:

- EN/IEC 60335-2-40: 1.734 kg
- UL 60335-2-40: 1.734 kg
- EN 378-2: defined by the cubic capacity at the installation site

Consequently, **no additional measures** are needed, such as:

- Leak sensors
- Forced ventilation
- Special cut-off mechanisms

The installation site, and thus the position of the cooling unit and chiller, must be carefully selected to ensure good ventilation. Irrespective of the refrigerant used, all enclosure cooling units need adequate circulation so that they can emit their heat load to the ambient air.



Minimum room volume (installation site)

To ensure adequate ventilation, compliance with the following minimum volumes is essential:

| Unit | Minimum room volume |
|--|---------------------|
| SK 3478.xxx, SK 3479.xxx, SK 3480.xxx, SK 3484.xxx | No specification |
| SK 3484.837, SK 3485.xxx | ≥ 3 m ³ |
| SK 3486.xxx, SK 3487.xxx | ≥ 6 m ³ |
| SK 3488.xxx, SK 3489.xxx | ≥ 12 m ³ |

4. Additional safety tests

Additional tests conducted by the **Federal Institute for Materials Research and Testing (BAM)** have validated the technical safety design measures of the units in their application.

The results:

Under real-life operating conditions, there is **no risk of fire**. At a room temperature of 20 °C and with a maximum ignition energy of 1000 J and 1600 A (this corresponds to a heavy electrical short circuit spark), no ignition or flame formation occurs. Even at a higher room temperature of 50 °C, the same ignition energy only results in a slight deflagration, but **without subsequent flame formation**. Under these conditions, the VX 8286000 enclosure used in the tests showed **no signs of damage whatsoever**; the emerging deflagration is suppressed without any problem.

Only when there was a continuously high surface temperature of > 405 °C was it possible to get the refrigerant/air mixture burning with the aid of a candle – a scenario that **cannot occur in enclosures due to technical reasons**.

5. Rittal risk analysis

Rittal conducted a deliberately conservative risk analysis for its Blue e+ units with refrigerant R-1234yf, and the results were as follows:

- **Classification: low risk**
- **Probability of occurrence** of a critical incident: < **1:1,000,000**
- Values **well below the permissible filling volumes** in all output classes
- **Mechanical engineers can take the analysis and use it fully in their own risk assessments**



6. F-gas Regulation derogation

A2L/A3 refrigerants are not permitted at the site of operation

If, in justifiable cases, A2L/A3 refrigerants cannot be used (e.g. due to building regulations, fire safety or explosive hazardous areas), the Regulation permits a derogation regarding the permissible maximum GWP thresholds up until 2032:

- ≤ 12 kW: from 2027 **GWP < 150**
- > 12 kW: **GWP ≤ 750**

Please note:

- **No official approval is required**
- There **must be a risk analysis** available that documents an unacceptable risk

For cases where this derogation applies, Rittal continues to offer units **with refrigerant R-513A** (GWP 631).

7. Further information

Further information is provided in the **Rittal white paper on the F-gas Regulation**. It explains which product areas are affected, which prohibitions on use and placing on the market apply, and what specific impact the new provisions are having on the utilisation, maintenance and servicing of Rittal climate control solutions.

Link to the Rittal landing page:

[Refrigerant switchover](#)

For more information about the current F-gas Regulation and the associated rights and obligations, we also recommend taking a look at the **European Commission's official web pages**, where you will find detailed explanations about fluorinated greenhouse gases and their impact on the climate.

Link to the European Commission's web page:

[Fluorinated greenhouse gases – Climate Action](#)

You will find details of the EU's National Contact Points, which can help with **questions relating to the implementation of the F-gas Regulation**, via the following link:

[National Contact Points - Climate Action - European Commission](#)



8. Summary

With its Blue e+ range, Rittal already ensures total compliance with the provisions of the F-gas Regulation, while also reducing cost-related risks to a minimum. This is because refrigerants with a higher GWP, such as R-513A, are becoming increasingly scarce and expensive due to stricter quotas. Making an early switch to R-1234yf thus also ensures a reliable long-term supply – especially after the substantial reductions from 2027 onwards.

Thanks to UL and IEC certifications, the very low volumes of A2L used, and an optimum unit design in terms of safety, these Rittal units can be used anywhere in the world without any need for additional safety measures. You can download the relevant certificates from the Rittal website.

Rittal offers its customers a complete, futureproof portfolio that covers all applications. The Blue e+ technology delivers a sustainable, energy-efficient and viable solution for the long term – one that extends well beyond mere transitional technology.

For special cases in which the operator documents an unacceptable risk in their application, units with refrigerant R-513A (GWP 631) continue to be available.

Business Unit Cooling Solutions
Rittal Ltd