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F gases regulation (EU) 517/2014

White Paper IE 9

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"Are cooling units and chillers from Rittal no longer deployable post 2020?" This or similar questions are repeatedly asked by panel, switchgear or machine builders. As background information, the inception of the regulation (EU) No. 517/2014 concerning fluorinated greenhouse gases (F gases regulation) since January 1, 2015, results in banned use for cooling and air-conditioning plants as well as new regulations for their maintenance and servicing.
This white paper explains which areas are affected by the new regulation, which use bans apply and how it affects the use of Rittal climate-control solutions.

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1 Introduction

“Are cooling units and chillers from Rittal no longer deployable post 2020?” This or similar questions are repeatedly asked by customers of worldwide panel, switchgear and machine building sector. As background information, the inception of the regulation (EU) No. 517/2014 concerning fluorinated greenhouse gases (F gases regulation) since January 1, 2015, includes banned uses for cooling and air-conditioning plants as well as new regulations for their maintenance and servicing.

The F gases regulation is fundamentally a contribution to reducing industrial emissions to 70 percent by 2030 compared with 1990. Specifically, the emissions of fluorinated greenhouse gases (F gases) in the EU should be reduced by 70 million tons of CO_2 equivalent to 35 million tons of CO_2 equivalent by year 2030. Whereby, three regulation principles should contribute to the emission reduction [UBA]:

– Introduction of a successive restriction (phase-down) of the quantities of partially-fluorinated hydrocarbons (HFC) available on the market by 2030 to a fifth of today’s sales quantities
– Issue use and marketing bans, provided technically feasible, climate-friendly alternatives are available
– Retention and augmentation of the regulations for leakage inspections, certification, disposal and marking

Important in this regard is the statement made by the EU Commission concerning alternatives to F gases [EUC]. Because of the different thermodynamic and safety properties of the alternatives, there is no “one size fits all” solution. Whether a specific alternative is suitable must be considered individually for each category of products and equipment. Consequent-

ly, in some cases, the ambient temperature at the deployment location of the product and of the equipment must be considered.

In the search for alternatives to HFCs (partially-fluorinated hydrocarbons) and HCFCs (hydrochlorofluorocarbons) for specific applications, the total greenhouse emissions associated with the use are of concern. Consequently, suitable climate-friendly alternatives must exhibit a high energy efficiency so that the reduction of the direct emissions from the alternatives HFCs and HCFCs is not offset by higher indirect emissions caused by the energy consumption.

This white paper explains which areas are affected by the new regulation, which use bans apply and how it affects the use of Rittal climate control solutions.

2 Content of the F gases regulation

The F gases regulation (EU) 517/2014 in force since January 1, 2015 replaced regulation (EC) 842/2006. Its objective is to reduce the emissions of F gases and so their effect on global warming.

The new F gases regulation includes additional action compared with the regulation from 2006. It strengthens the action of the earlier regulation, and introduces a number of new wider activities for reducing F gases and their emissions.

The new regulation affects the following areas:
- **Leakages:** new interval for the inspection, requirement for detection systems and recording
- **Recovery:** increased attention of the member states for ensuring disposal
- **Use bans:** restrictions for various applications that use F gases
- **Maintenance and servicing:** new rules post 2020 for products with GWP (Global Warming Potential) > 2500
- **Certification:** delivery of refrigerants to certified customers
- **Marking:** further additional details for marking plant and pressure vessels
- **Phase-down period:** reduction linked with production and import quotas
- **Reporting:** revised process for reporting to the EU

3 Limitation of the total quantity

The actual core concept behind the new F gases regulation is not the bans, but rather the on-going limitation and so reduction of the F gas quantities (phase-down) by issuing quotas to manufacturers and importers. Whereby, this is a drastic, previously never experienced, step meaning that industry and users must convert to refrigerants with a lower GWP value.

To implement the phase-down, the European Commission limits the HFC (= F gases) quantities that may be marketed in the EU. This means that the European Commission specifies for all enterprises that manufacture or import HFCs how much they may market in the EU.

These quantities, also called quotas, are expressed as a CO_2 equivalent and do not apply to specific refrigerant types; enterprises are not permitted to exceed their granted quotas.

The (relative) global warming potential (GWP) specifies the extent to which a specified quantity of a greenhouse gas contributes to the greenhouse effect. Carbon dioxide serves as comparison value. The value describes the average warming effect over a specific interval. 100 years are often considered. The CO_2 equivalent quantity is the product formed from the absolute quantity of the HFC and the associated GWP of the HFC.

	IPCC 4th AR	**Refrigerant quantity [kg] corresponds to tons of CO_2**	
		5	10
F gas	**GWP_{100}**	**kg**	**kg**
R 134a	1,430	3.5	7
R 404A	3,922	1.3	2.6
R 407C	1,774	2.8	5.6
R 410A	2,088	2.4	4.8
R 422D	2,730	1.8	3.6
R 507A	3,985	1.3	2.6

Table 1: GWP / refrigerant quantity overview

Calculation:

The refrigerant R134a used by Rittal has a GWP of 1,430. The refrigerant filling quantity of an enclosure cooling unit with 500 g then corresponds to a CO_2 equivalent of 0.72 t (500 g filling quantity x 1430 GWP = 0.72 t CO_2e).

The objective is to reduce the consumption of F gases. As of 2015, the production quantities, expressed as CO_2 equivalent, should be reduced by 79% by 2030.

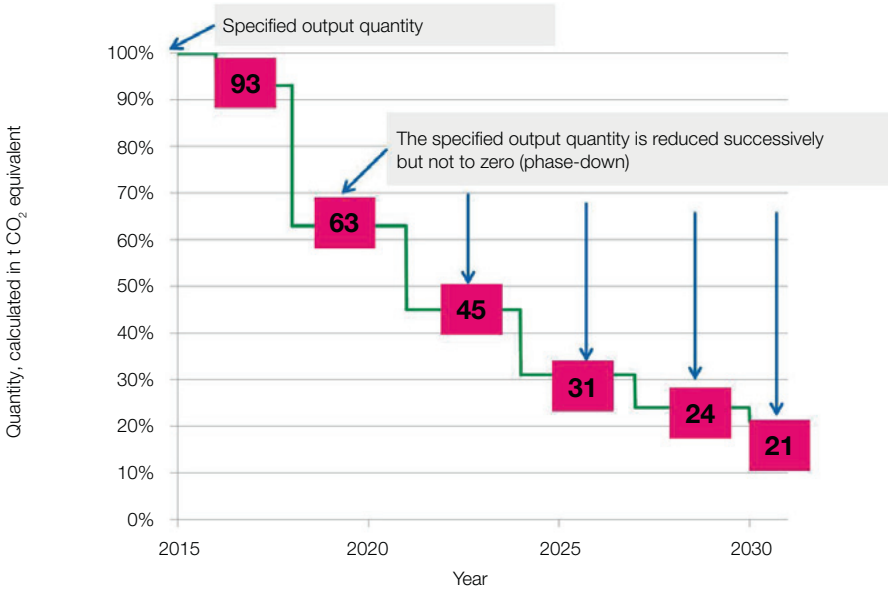

Figure 1: Phase-down graphic (source: German Environment Agency [UBA])

4 Use bans for F gases

Use bans have been issued for many refrigeration and air-conditioning applications for which more environment-friendly alternatives exist, such as refrigerators in households or in commercial properties (supermarkets), air-conditioners as well as foams and aerosols:

Use bans in new plants [in addition to the existing restrictions from the F gases regulation 842/2006]	**Valid as of**
Household refrigerators and deep-freezers that contain HFCs with a GWP of at least 150	01/01/2015
Fire extinguishers that contain R 23 (exception: critical applications)	01/01/2016
Refrigerated counters and freezer cabinets in the commercial area (hermetically sealed) that contain HFCs with a GWP of at least 2500	01/01/2020
Stationary cooling plants with F gases with a GWP > 2500, except for plants with temperatures below –50°C.	01/01/2020
Portable room air-conditioners (hermetically sealed) that contain HFCs with a GWP of at least 150	01/01/2020
XPS foams that contain HFCs with a GWP of at least 150	01/01/2020
Technical aerosols that contain HFCs with a GWP of at least 150, except for medical applications or requirements that affect national safety	01/01/2020
Refrigerated counters and freezer cabinets in the commercial area (hermetically sealed) that contain HFCs with a GWP of 150	01/01/2022
New refrigeration centres for commercial purposes with a capacity above 40 kW, except for the main cycle of cascade systems whose refrigerant must have a GWP value below 1500	01/01/2022
Other foams that contain HFCs with a GWP of at least 150	01/01/2023
Split systems with less than 3 kg refrigerant filling and HFCs with a GWP of at least 750	01/01/2025

Table 2: Use bans

Rittal enclosure cooling units and chillers are not affected by these use bans because they have a hermetically sealed refrigerant cycle (no split climate-control systems).

In addition, the R134a, R410a and R407c refrigerants used in Rittal products have a GWP less than 2500.

5 Prevention of F gas emissions

The routine inspection and maintenance of existing plants with F gases as well as the recovery of the gases at the end of the plant service life should prevent emissions.

As also in the regulation from 2006, the number of leakage inspections depends on the refrigerant filling of the equipment (per refrigerant cycle). However, the new regulation in effect since 01/01/2017 uses the CO_2 equivalent as basis rather than the weight in kilogram as previously.

CO_2 equivalent per refrigerant cycle	**Number of leakage inspections**	
	Without leakage detection system	**With leakage detection system**
From 5 to 50 tons	Every **12** months	Every **24** months
From 50 to 500 tons	Every **6** months	Every **12** months
Above 500 tons	Every **3** months	Every **6** months

Table 3: Leakage inspections

Equipment classified as hermetically sealed with a quantity less than 10 tons CO_2 equivalent is not subject to a leakage inspection. This is the case for all Rittal enclosure cooling units. Filling quantities, GWP values and CO_2 equivalent details are shown on the associated rating plates and can also be obtained from the product descriptions on the Rittal website.

Rittal provides appropriate services for plants with a CO_2 equivalent filling quantity > 10 tons. Leakage inspections may be performed only by certified, qualified personnel. The Rittal service personnel is certified in accordance with the F gas regulation no. 267/2014 and so authorised to perform the required inspections.

Further information can be found at:
http://www.rittal.com/service-maintenance

6 FAQs

1.) Are cooling units with compressors no longer permitted post 2020?
No. Rittal enclosure cooling units and chillers are not affected by these use bans because they have a hermetically sealed refrigerant cycle and the deployed refrigerants have a GWP value less than 2500.

2.) Are cooling units with a GWP = / > 150 no longer permitted post 2022?
No. The regulation affects only commercial refrigerated counters and freezer cabinets (hermetically sealed). Enclosure cooling units are not affected.

3.) What is banned?
Refer to the table in Chapter 4, “Use bans for F gases”.

4.) From when (date) what applies and how?
Refer to the table in Chapter 4, “Use bans for F gases”.

5.) Which cooling units are affected? Filling quantity in kg?
See Question 1. Equipment classified as hermetically sealed with a quantity more than 10 tons CO_2 equivalent is subject to a leakage inspection. Only Rittal chillers with power rating above 30 kW must inspected. Rittal offers appropriate services for this purpose (see item 4).

6.) Does Rittal have a detailed “roadmap” for what needs to be adapted to conform to the EU regulation post 2022?
Rittal products are not affected by the use ban. Notwithstanding this, Rittal remains in contact with the component and refrigerant manufacturers. The mid-term objective is to provide feasible alternatives for energy-efficient and environment-friendly cooling solutions.

7.) Are the refrigerants R134 and R410a still permitted post 2020 or 2022?
Yes. Refer to the table in Chapter 4, “Use bans for F gases”.

8.) How does the quota system function?
Quotas are expressed as CO_2 equivalent. This means, the larger the global warming potential (GWP) of a refrigerant, the greater the quantity of CO_2 equivalent and so the larger the required quota. The quotas are calculated once a year. The European Commission has also created a special reserve for enterprises that in the past did not market any HFC quantities in the EU. This should ensure that such enterprises can also apply for quotas. The European Commission then deploys an assignment mechanism as basis for calculating the quota for each enterprise.

9.) Do the refrigerants used in Rittal products originate from a quota?
Yes. All refrigerants used in Rittal enclosure cooling units and chillers are obtained from manufacturers with an appropriate quota. This is the case for all Rittal factories worldwide.

10.) Has Rittal issued a declaration of conformity required for the introduction of cooling units with HFCs in the EU?
Yes. The declaration of conformity can be downloaded from the Rittal homepage for the associated products.
Download: http://www.rittal.de/eu-conformity

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[UBA] German Environment Agency: www.umweltbundesamt.de 3, 6
[EUC] EU Commission objective:
http://ec.europa.eu/clima/policies/f-gas/alternatives/index_en.htm 3
Rittal: www.rittal.com 8
EPEE: https://www.epeeglobal.org/refrigerants/

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