Eurovent Position Paper PP – 2024-08-29

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Eurovent feedback on lot 21 call for evidence

In a nutshell

Eurovent with this paper provides some input to the public Call for Evidence on the revision of the lot 21, open until the end of August 2024. The paper in particular focuses on:

- **The importance of the new F-Gas regulation for the future development of the units**
- **Eurovent proposal for A/A process and IT cooling**
- **Eurovent proposal for VHT process chillers**
- **Current landscape of free cooling**
- **Heat recovery and simultaneous heating and cooling for polyvalent units and VRF**
- **A proposed new definition for rooftop unit**
- **A reminder of the situation of reversible hydronic heat pumps up to 1 MW**

Background

Eurovent welcomes the opportunity to provide feedback in the context of the public Call for Evidence on the revision of the so-called lot 21, i.e. the revision of the Regulation (EU) 2016/2281.

This Regulation involves different product groups of Eurovent, that are at full disposal of the Commission and its consultants for further exchanges and support in order to achieve the difficult goal of completing the revision process by the end of 2026. For reverence, these are the product groups involved:

- PG-AC = air conditioners of all the capacities
- PG-LCP-HP = liquid chilling packages and heat pumps
- PG-RT = rooftop units

This document reflects the structure of the Call for Evidence in order to provide punctual considerations to the relevant points raised by the Commission.

The review of other legislation, such as the revision of the F-gas Regulation, may be relevant

Eurovent strongly supports the approach of the Commission to carefully evaluate the impact of other Regulations or initiatives (like the F-Gas or the PFAS restriction proposal, as they have an impact on the availability of components and/or refrigerants that currently ensure that MEPS requirements are met) on the efficiencies of the units.

In particular, in the new Regulation on F-Gases[1] the product ranges are subject to a different array of refrigerant bans, the firsts applying between 2027 and 2030, setting restrictions to not exceed a GWP of 750 or 150 depending on the product range. In combination with that, a steep phase down is set, which will de-facto restrict the amount of refrigerant on the market, forcing manufacturers to balance the refrigerants based on a combination of GWP content and sales amounts.

[1] Regulation (EU) 2024/573 of the European Parliament and of the Council of 7 February 2024 on fluorinated greenhouse gases, amending Directive (EU) 2019/1937 and repealing Regulation (EU) No 517/2014

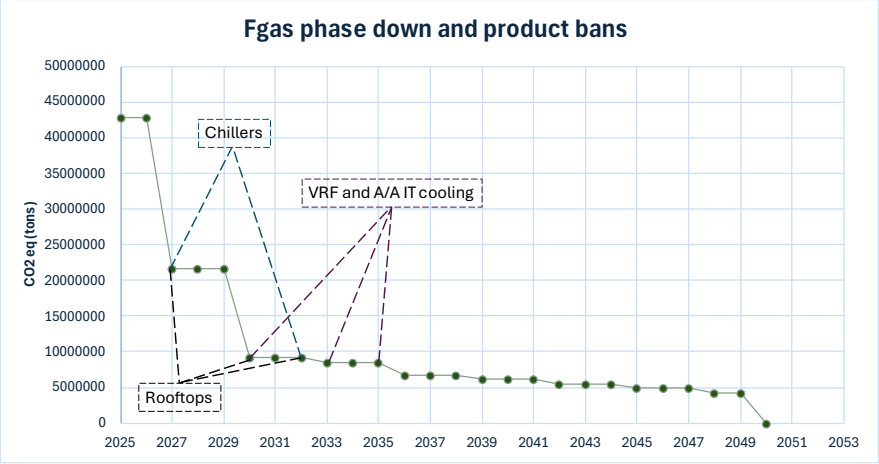

Figure 1: combination of quota reduction and product bans due to the new F-Gas Regulation

This will lead to a diversity of refrigerants not necessarily leading to improved efficiencies for these products. This in turn results in a grave uncertainty for the industry and the market and changing MEPS at the very same time or in between of the product bans could increase such uncertainty, as there is no clear view on what the best available technologies could be in the future.

Therefore, as already stated in the previous Position Paper[2], **Eurovent recommends evaluating the increase of the minimum efficiency thresholds with the next revision of the Regulation once the refrigerant market has stabilised**.

Products in scope of lot 21, such as for example rooftops and VRF systems, must consider limitations in installation applications, due to the potential toxicity and flammability of upcoming alternative refrigerants. At this point, it is necessary to consider specific design options that are suitable for all applications that can be considered in these product ranges.

Below please find some graphs that show the current distribution of refrigerants for the different technologies, the data are collected independently by Eurovent Market Intelligence.

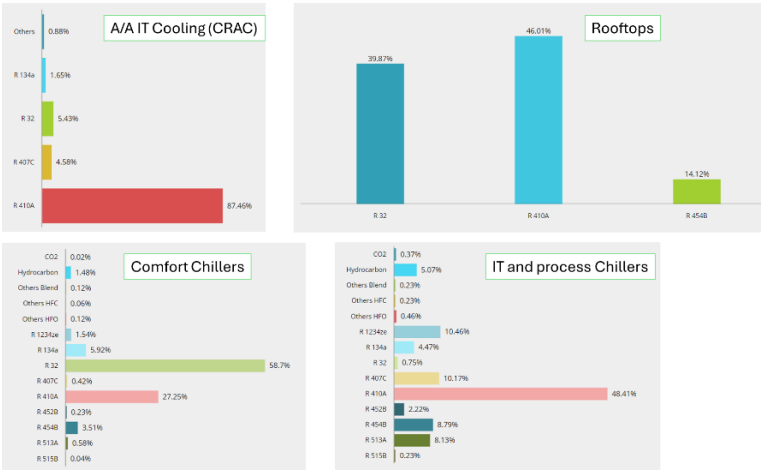

Figure 2: refrigerants currently used for different technologies - source EMI 2024

[2] Eurovent Position Paper - PP – 2024-01-26 - Eurovent comments on the review of Lot 21

Process and IT Cooling

Eurovent welcomes the consideration of the Commission that *there may be achievable energy and emissions savings from products currently outside the scope of the Ecodesign Regulation. Some examples might be product groups such as high temperature process chillers using evaporative condensing and absorption technology, information technology cooling equipment, combination warm air heaters* and the consequent policy option to *extend the scope of the Ecodesign Regulation by including process chillers with leaving chilled water temperature >12 °C, and information technology cooling equipment (close control air conditioners)*.

The Product Groups 'Air Conditioners' (PG-AC) and 'Liquid Chilling Packages and Heat Pumps' (PG-LCP-HP) have developed two recommendations to detail the **Eurovent proposals** for **process and IT technologies**. Recommendation 11/1 - Rating points for A-A process and IT Cooling[3] is attached as Annex A, while Recommendation 18/2 - SEPR for Very High Temperature Process Chillers[4] is attached as Annex B to this document.

Free Cooling

The Call for Evidence refers to Free Cooling as "a type of energy saving feature that is not included in the current Regulation" and as a possible inclusion of it within the new metrics that are going to be developed.

Considering that free cooling was also mentioned during the Consultation Forum in December 2023, it seems that this feature has a great relevance in the context of this revision and therefore Eurovent would like to provide some clarification to establish a common understanding of the topic.

General information about the free cooling

The Directive (EU) 2018/2001[5] defines free cooling as:

"'**free cooling**' means a cooling system using a natural cold source to extract heat from the space or process to be cooled via fluid(s) transportation with pump(s) and/or fan(s) and which does not require the use of a cooling generator;"

And cooling generator as

"'**cooling generator**' means the part of a cooling system that generates a temperature difference allowing heat extraction from the space or process to be cooled, using a vapour compression cycle, a sorption cycle or driven by another thermodynamic cycle, used when the cold source is unavailable or insufficient;"

Eurovent supports the above definitions.
For sake of transparency, it must be noted that *free cooling* is not a perfect wording since there is anyway an energy consumption, for pumps or fans, but the term is widely used on the market and therefore a new terminology can cause more confusion.

[3] Eurovent AISBL / IVZW / INPA. (2024). Eurovent 11/1 - 2024 - Rating points for A/A process and IT Cooling. Brussels: Eurovent.
[4] Eurovent AISBL / IVZW / INPA. (2024). Eurovent 18/2 - 2024 – SEPR for Very High Temperature Process Chillers. Brussels: Eurovent.
[5] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast)

How is free cooling applied to chillers and rooftops today

Having said that, it is important to notice that the products addressed by this Position Paper, i.e. chillers, large air/air conditioners and rooftop units already make use of free cooling, when possible, to improve their efficiencies.

To correctly address free cooling it is fundamental to develop a proper methodology and acknowledge the intrinsic differences among the products.

Free cooling for chillers

For example, with the current Regulation, chillers used for comfort purposes can't take advantage of free cooling due to their operating range of Temperatures (12-7°C) and the profile load (no cooling demand for air Temperature below 17°C), while for process cooling there is still cooling demand for air Temperature until -19°C. For chillers, the higher is the leaving water temperature and the greater are the benefits of free cooling that can be obtained. In any case, the Eurovent proposal for Very High Temperature process chillers (Annex B) already takes into account the benefits of free cooling, therefore units that adopt or have a better designed free cooling operation will simply have better efficiencies compared to the others. The same concept applies to High Temperature process chillers or to water/water chillers.

Free cooling for rooftop units

The situation **is very different for rooftop units**, where the free cooling has different physical characteristics because it involves an exchange of mass (external air directly conveyed in the cooled space) while for chillers this never happens due to the presence of a heat exchanger in between.

For rooftop units the free cooling is a must-have and is not currently addressed by the testing standards EN 14511 and EN 14825. The public enquiry of the draft standard prEN 17625 will begin in August 2024 and the Eurovent Product Group 'Rooftop Units' (PG-RT) has already given its support to the text and the definitions proposed:

- Free cooling: operation mode of the rooftop in which the cooling capacity is partially or totally provided by direct supply of outdoor air or of a mixture of outdoor air/recycled air to air-conditioned space, with or without using the thermodynamic cycle
- Active cooling: operation of the rooftop in which the cooling capacity is only provided by the use of thermodynamic cycle
- Free cooling temperature Tfree: highest outdoor temperature at which the thermodynamic cycle is switched off and the cooling capacity is provided by outdoor air or a mixture of outdoor and recycled air only
  Note 1 to entry: For temperatures below or equal than Tfree, the thermodynamic cycle is switched off.

Heat recovery and simultaneous heating and cooling

Polyvalent Units

As already stated in the previous position paper[6], Eurovent supports the introduction of hydronic Polyvalent Units in the new Regulation with dedicated requirements. It has to be noted, as well

[6] Eurovent Position Paper - PP – 2024-01-26 - Eurovent comments on the review of Lot 21

summarised during the Consultation Forum in December 2023, that these units are capable of both heating recovery and simultaneous heating and cooling at the same time.

VRF units

In the same position paper[6], Eurovent also reminded that VRF units are capable of heat recovery and this is an important feature for energy savings. VRF are also capable of simultaneous heating and cooling as well.

New definition of Rooftop Unit

With the previous Position Paper[6] Eurovent proposed a first definition of Rooftop unit, which was further elaborated by the Product Group (PG-RT) and is proposed hereafter for the Commission consideration:

(rooftop) Air conditioning unit which function is space cooling or heating, or both, using a vapour compression cycle driven by electric compressor(s) and in which the evaporator, compressor, condenser and supplementary heaters are integrated into a single package. Rooftop units use recycled air or a mixture of recycled air and outdoor air on the indoor heat exchanger, and outdoor air or a mixture of outdoor air and extracted air on the outdoor heat exchanger, with capability of free cooling and may be equipped with a heat recovery system to benefit from the extracted air.

Reversible hydronic heat pumps

During recent exchanges with the Commission, Eurovent learnt that reversible hydronic heat pumps up to 1 MW capacity should be addressed under lot 1 (space heaters) with heating requirements and only information requirements for the cooling performances, in order to collect useful data for future requirements: **Eurovent fully supports this proposal**.

Eurovent and transparency

When assessing position papers, are you aware whom you are dealing with?

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1. Who receives which number of votes? At Eurovent, the number of votes is never determined by organisation sizes, country sizes, or membership fee levels. SMEs and large multinationals receive the same number of votes within our technical working groups: 2 votes if belonging to a national Member Association, 1 vote if not. In our General Assembly and Eurovent Commission ('steering committee'), our national Member Associations receive two votes per country.	**2. Who has the final decision-making power?** The Eurovent Commission acts as the association's 'steering committee'. It defines the overall association roadmap, makes decisions on horizontal topics, and mediates in case manufacturers cannot agree within technical working groups. The Commission consists of national Member Associations, receiving two votes per country independent from its size or economic weight.
3. How European is the association? More than 90 per cent of manufacturers within Eurovent manufacture in and come from Europe. They employ around 150.000 people in Europe largely within the secondary sector. Our structure as an umbrella enables us to consolidate manufacturers' positions across the industry, ensuring a broad and credible representation.	**4. How representative is the organisation?** Eurovent represents more than 1.000 companies of all sizes spread widely across 20+ European countries, which are treated equally. As each country receives the same number of votes, there is no 'leading' country. Our national Member Associations ensure a wide-ranging national outreach also to remote locations.

Check on us in the European Union Transparency Register under identification no. 89424237848-89.

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Eurovent is the voice of the European HVACR industry, representing over 100 companies directly and more than 1.000 indirectly through our 16 national associations. The majority are small and medium-sized companies that manufacture indoor climate, process cooling, and cold chain technologies across more than 350 manufacturing sites in Europe. They generate a combined annual turnover of more than 30 billion EUR and employ over 150.000 Europeans in good quality tech jobs.

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Annex A

EUROVENT
EUROPEAN INDUSTRY ASSOCIATION

Eurovent 11/1 - 2024

Rating points for A/A process and IT Cooling

First Edition

Published on Monday, 15 July 2024 by
Eurovent, 80 Bd A. Reyers Ln, 1030 Brussels, Belgium
secretariat@eurovent.eu

Document history

This Eurovent Industry Recommendation / Code of Good Practice supersedes all of its previous editions, which automatically become obsolete with the publication of this document.

Modifications

This Eurovent publication was modified as against previous editions in the following manner:

Modifications as against	Key changes
1st edition	Present edition
2nd edition	
3rd edition	

Preface

In a nutshell

With this Recommendation, Eurovent proposes a new definition and two methodologies to address air to air process and IT cooling in the context of the revision of the Ecodesign Regulation (EU) 2016/2281. The definition and the methodologies derive from the existing Regulation or the existing standard EN 14825.

Authors

This document was published by Eurovent and was prepared in a joint effort by participants of the Product Group 'Air Conditioners' (PG-AC), which represents a vast majority of all manufacturers of these products active on the EMEA market.

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Suggested citation

Eurovent AISBL / IVZW / INPA. (2024). Eurovent 11/1 - 2024 - Rating points for A/A process and IT Cooling. Brussels: Eurovent.

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Contents

A/A process and IT Cooling

Eurovent considers that all IT cooling/close control air-air air conditioners should be addressed under the Regulation that will replace the existing (EU) 2016/2281 regardless of the capacity.

A comprehensive assessment about both the technical and socio-economic feasibility should be conducted as this particular application strongly differs from comfort cooling. It will be essential to accurately define these units and provide clarity on the efficiency and temperature profile they'll need to follow. This technology is on a progressive rise. The impact of data centres' energy consumption has been recognised within the revised Energy Efficiency Directive and the recently adopted delegated regulation[1], and it is important to set a framework for these units considering that their design will also need to comply with the change of refrigerants required by the new F-Gas Regulation (EU) 2024/573[2].

Considering the possibility of extending the proposed methods also to process cooling, what follows is applicable to both process and IT Cooling.

Eurovent proposal for rating points for A/A process and IT Cooling air conditioners

A new definition

Starting from the existing definitions provided by the Ecodesign Regulation (EU) 2016/2281, here below Eurovent proposes the following:

'**air-based process and IT cooling system**' means the components or equipment necessary for the supply of cooled air, by means of an air-moving device, either through ducting or directly into the cooled space, in order to attain and maintain the desired indoor temperature of a data centre room or other applications excluding comfort of human beings;
- that may or may not integrate the condenser or other ancillary equipment;

'**air conditioner for process and IT cooling**' means a cooling product that provides space cooling and:
(a) of which the indoor side heat exchanger (evaporator) extracts heat from an air-based cooling system (heat source);
(b) which has a cold generator that uses a vapour compression cycle or a sorption cycle;
(c) of which the rejection heat exchanger (condenser) releases this heat to ambient air, water or ground heat sink(s) and which may or may not include heat transfer that is based on evaporation of externally added water;

'**air-to-air air conditioner**' means an air conditioner which has a cold generator that uses a vapour compression cycle driven by an electric motor or internal combustion engine and whereby the outdoor side heat exchanger (condenser) allows heat transfer to air.

[1] COMMISSION DELEGATED REGULATION (EU) 2024/1364 of 14 March 2024 on the first phase of the establishment of a common Union rating scheme for data centres
[2] Regulation (EU) 2024/573 of the European Parliament and of the Council of 7 February 2024 on fluorinated greenhouse gases, amending Directive (EU) 2019/1937 and repealing Regulation (EU) No 517/2014

Systems without integrated condensers

This methodology applies to systems where the indoor unit can be matched with several outdoor units from the same manufacturer or from third parties.

Table 1: rating points for systems without integrated condenser

Rating Point (1)	Load [%] (2)	Outdoor T [°C] (3)	Condensing T [°C] (4)	Subcooling ΔT [°C] (5)	External Static Pressure [Pa] (6)	Indoor return air conditions [°C, RH%] (7)
Nominal	100	35	45,0	3	Ducted Upflow and Downflow Units: 30 Pa Non-ducted Units: 0 Pa	30°C, 35% RH
A	75	35	42,5	3		30°C, 35% RH
B	75	25	≥ 32,5	3		30°C, 35% RH
C	75	15	≥ 30,0	3		30°C, 35% RH
D	75	5	≥ 27,5	3		30°C, 35% RH

If a unit can be ducted it shall be tested in accordance with ducted conditions.

Systems using an integrated condenser

This methodology applies to systems where the indoor unit can be coupled with a limited number of outdoor units from the same manufacturer or to systems where the indoor unit incorporates the condenser. If the system has been tested according to Table 1 conditions, then the test must not be repeated.

Table 2: rating points for systems with integrated condenser

Rating Point (1)	Load [%] (2)	Outdoor T [°C] (3)	External Static Pressure [Pa] (6)	Indoor return air conditions [°C, RH%] (7)
Nominal	100	35	Ducted Upflow and Downflow Units: 30 Pa Non-ducted Units: 0 Pa	30°C, 35% RH
A	75	35		30°C, 35% RH
B	75	25		30°C, 35% RH
C	75	15		30°C, 35% RH
D	75	5		30°C, 35% RH

Technical background

General

The decisions taken that led to the proposals are explained below. The numbers in brackets refer to the corresponding columns in the tables.

(1)-(3) The same four outdoor duty points, in accordance with the current Ecodesign Regulation (EU) 2016/2281, for the SEPR metric for High-Temperature Process Chillers were considered.

(2) At 75% of the nominal load, in accordance with the new Very High-Temperature Process Chiller proposal[3]. The underlying reasons are the following:

- a. IT cooling units are usually used in redundancy, therefore on the field the units are generally used at partial load to gain efficiency.
- b. IT cooling units are often used with IT devices that are not fully installed from the beginning, thus requiring a lower capacity than the full one for a long time.

(6) IT cooling units often require running with an external static pressure ESP. This is in accordance with the 2024 Eurovent ITCU Certification, i.e. Technical certification rules of the Eurovent certified performance mark for IT cooling units.

(7) Indoor return air conditions in accordance with 2024 Eurovent ITCU Certification, i.e. Technical certification rules of the Eurovent certified performance mark for IT cooling units.

Proposed methods

The proposed methods are an adaptation of or directly come from existing and well-accepted standards, mainly EN 14825. The same annual frequency profile of external temperatures as in the current Regulation (EU) 2016/2281 was maintained.

Systems without integrated condensers

Why indoor unit only for systems without integrated condensers

It has been chosen to focalise the attention on the indoor unit only because the outdoor unit is composed of a fan and the condenser, while all the remaining components are incorporated into the indoor unit. This leads to a negligible energy consumption of the outdoor unit compared to the indoor unit, therefore to a minor impact on the overall efficiency.

Moreover, an indoor unit can be coupled with multiple outdoor units, making the tests and the method to define the efficiency over-complicated compared to the accuracy and significancy of the results.

Fixed condensing Temperature and subcooling Temperature

(4)-(5) The condensing temperature and the relevant liquid temperature entering the unit under test are fixed, simulating a matched remote condenser (i.e. a finned coil or microchannel heat exchanger with the fan) with an approaching temperature of 10°C at full load and considering 7.5°C at 75% partial load. For low condensing temperatures there are often constraints in the compressor capability, so it is not possible to impose the same approach: that's why it is imposed only a minimum temperature limit and the manufacturer will define the condensing temperature within these limits.

Systems using an integrated condenser

The approach as considered in EN 14825 standard is deemed adequate.

[3] Eurovent AISBL / IVZW / INPA. (2024). Eurovent 18/2 - 2024 – SEPR for Very High Temperature Process Chillers. Brussels: Eurovent.: https://www.eurovent.eu/publications/eurovent18-2-sepr-for-very-high-temperature-process-chillers/

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Annex B

EUROVENT
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Eurovent 18/2 - 2024

SEPR for Very High Temperature Process Chillers

First Edition

Published on Wednesday, 29 May 2024 by
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secretariat@eurovent.eu

Document history

This Eurovent Industry Recommendation / Code of Good Practice supersedes all of its previous editions, which automatically become obsolete with the publication of this document.

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Preface

In a nutshell

In this recommendation, the Eurovent Product Group 'Liquid Chilling Packages and Heat Pumps' presents the proposal for a dedicated index for Very High Temperature Process Chillers in the context of the revision of the Regulation (EU) 2016/2281.

Authors

This document was published by Eurovent and was prepared in a joint effort by participants of the Product Group 'Liquid Chilling Packages and Heat Pumps' (PG-LCP-HP), which represents a vast majority of all manufacturers of these products active on the EMEA market.

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Current situation

Currently, the Regulation (EU) 2016/2281 addresses High Temperature process chillers with inlet/outlet water Temperature at the evaporator 12/7°C with a dedicated efficiency index, called SEPR.

Considering the evolution of the market, today more and more applications request higher temperatures and a wider ΔT and the most common application is 30-20°C (inlet/outlet water Temperature at the evaporator).

The most common application of this category of process chillers is IT Cooling where the normal approach is to apply redundancy of units to prevent failures. This is why the proposal considers a constant part load.

SEPR for VHT chillers

Considering the current market situation and a dedicated survey among the PG-LCP-HP participants, the Eurovent proposal results in the table below:

Table 1: SEPR for VHT process chillers testing points

VHT SEPR Rating Point	Part Load %	Outdoor Temp °C	Evaporator* Inlet/Outlet °C
Nominal	100	35	30/20
A	75	35	*/20
B	75	25	*/20
C	75	15	*/20
D	75	5	*/20

* Variable flow and free cooling are included in this proposal

The other conditions of High Temperature Process chillers apply:

- Same annual frequency profile of external temperatures,
- Efficiency measured at 5, 15, 25 and 35°C external temperature,
- Efficiency linearly interpolated along the external temperature and weighted with the frequency profile.

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