



Eurovent 6/17 - 2020

Ecodesign Regulation (EU) 2016/2281: Minimum seasonal space cooling energy efficiency of water/brine-to-water/brine and water/brine to-air units

First Edition

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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
1 st edition	Present document

Preface

In a nutshell

This Eurovent Recommendation aims to provide a sound interpretation of Commission Regulation (EU) 2016/2281. Specifically, it aims to clarify how to calculate the minimum seasonal space cooling energy efficiency of water/brine-to-water/brine and water/brine to-air chillers.

Authors

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

Disclaimer

This Eurovent Recommendation does not replace Regulation (EU) 206/2281. A finally binding interpretation of EU legislation may only be provided by the European Court of Justice.

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Important remarks

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Background

The Commission Communication 2017/C 229/01 defines how to calculate the seasonal space cooling energy efficiency of chillers and air conditioners using electricity.

The Commission Regulation (EU) 2016/2281 establishes Ecodesign requirements for the placing on the market and/or putting into service of:

- Air heating products with a rated heating capacity not exceeding 1 MW
- Cooling products and high temperature process chillers with a rated cooling capacity not exceeding 2 MW
- Fan coil units

Starting from 1 January 2021, the cooling products shall comply with the requirements set out in point 2(b) of the Regulation Annex II:

	K_{sc} (*)
Air-to-water chillers with rated cooling capacity < 400 kW, when driven by an electric motor	161
Air-to-water chillers with rated cooling capacity \geq 400 kW when driven by an electric motor	179
Water/brine to-water chillers with rated cooling capacity < 400 kW when driven by an electric motor	200
Water/brine to-water chillers with \geq 400 kW rated cooling capacity < 1 500 kW when driven by an electric motor	252
Water/brine to-water chillers with rated cooling capacity \geq 1 500 kW when driven by an electric motor	272
Air-to-water chillers with rated cooling capacity \geq 400 kW, when driven by an internal combustion engine	154
Air-to-air air conditioners, driven by an electric motor, except rooftop air conditioners	189
Rooftop air conditioners	138
Air-to-air air conditioners, driven by an internal combustion engine	167

(*) To be declared in the relevant tables in this Annex and in the technical documentation rounded to one decimal place.

Seasonal space cooling energy efficiency ($\eta_{s,c}$)

Definition

According to the Regulation Annex I:

Seasonal space cooling energy efficiency' ($\eta_{s,c}$) means the ratio between the reference annual cooling demand pertaining to the cooling season covered by a cooling product, and the annual energy consumption for cooling, **corrected by contributions accounting for temperature control and the electricity consumption of ground water pump(s)**, where applicable, expressed in %.

Calculation formula

According to EN 14825:

$$\eta_{s,c} = \frac{1}{CC} \times SEER - \sum F(i) = \frac{1}{CC} \times SEER - F(1) - F(2)$$

Where:

- CC = conversion factor = 2,5
- F(1) = correction factor that accounts for a negative contribution to the seasonal energy efficiency ratio due to adjusted contributions of temperature controls, equal to 3 %
- F(2) = correction factor that accounts for the negative contribution to the seasonal energy efficiency ratio by energy consumption of ground water/brine pumps. This factor is only for water/brine-to-water/brine and water/brine to-air chillers and is equal to 5 %

Conclusions

Ground coupled applications (full load conditions inlet/outlet temperature: 10/15 °C)

According to the above-presented definition and formula it is possible to conclude that the seasonal space cooling energy efficiency of water/brine-to-water/brine and water/brine to-air chillers for ground coupled applications is:

$$\eta_{s,c} = \frac{1}{CC} \times SEER - 3\% - 5\%$$

Cooling tower or water loop applications (full load conditions inlet/outlet temperature: 30/35 °C)

According to the above-presented definition and formula it is possible to conclude that the seasonal space cooling energy efficiency of water/brine-to-water/brine and water/brine to-air chillers for cooling tower or water loop applications is:

$$\eta_{s,c} = \frac{1}{CC} \times SEER - 3\%$$

Annex A

Calculation of the seasonal space cooling energy efficiency of air-to-air chillers:

$$\eta_{s,c} = \frac{1}{CC} \times SEER - \sum F(i) = \frac{1}{CC} \times SEER - F(1) = \frac{1}{CC} \times SEER - 3\%$$

Where:

- CC = conversion factor = 2,5
- F(1) = correction factor that accounts for a negative contribution to the seasonal energy efficiency ratio due to adjusted contributions of temperature controls, equal to 3 %

About Eurovent

Eurovent is Europe's Industry Association for Indoor Climate (HVAC), Process Cooling, and Food Cold Chain Technologies. Its members from throughout Europe represent more than 1.000 organisations, the majority small and medium-sized manufacturers. Based on objective and verifiable data, these account for a combined annual turnover of more than 30bn EUR, employing around 150.000 people within the association's geographic area. This makes Eurovent one of the largest cross-regional industry committees of its kind. The organisation's activities are based on highly valued democratic decision-making principles, ensuring a level playing field for the entire industry independent from organisation sizes or membership fees.

Our Member Associations

Our Member Associations are major national sector associations from Europe that represent manufacturers in the area of Indoor Climate (HVAC), Process Cooling, Food Cold Chain, and Industrial Ventilation technologies.

The more than 1.000 manufacturers within our network (Eurovent 'Affiliated Manufacturers' and 'Corresponding Members') are represented in Eurovent activities in a democratic and transparent manner.

→ For in-depth information and a list of all our members, visit www.eurovent.eu