

Eurammon Symposium 2023

Updates on the Ecodesign regulation ENTR
Lot 1 on Professional Refrigeration -focus on
condensing units and process chillers

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26 June 2023

Ongoing review of Regulations (EU) 2015/1095 and (EU) 2015/1094

- **Commission Regulation (EU) 2015/1095** (ecodesign of professional refrigeration products) and **Commission Delegated Regulation (EU) 2015/1094** (energy labelling of professional refrigerated storage cabinets) set minimum energy efficiency and information requirements as well as energy labelling requirements for the placing on the market of the professional refrigeration products.
- The **review clause (art. 7)** of both regulations requires a review after five years in the light of technological progress and requiring answers to a number of specific questions.
- The review study addressed those **specific questions ('Phase 1.1')** and made an **update of the preparatory study** following MEErP (Methodology for Ecodesign of Energy-related Products) as appropriate (**'Phase 1.2'**).
- The process so far included **consultation of stakeholders** by the VHK team and **the Consultation Forum**.

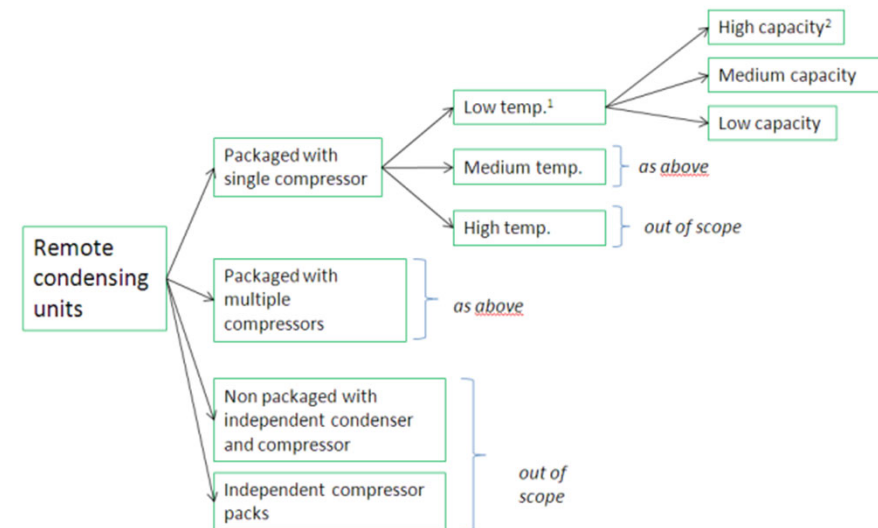
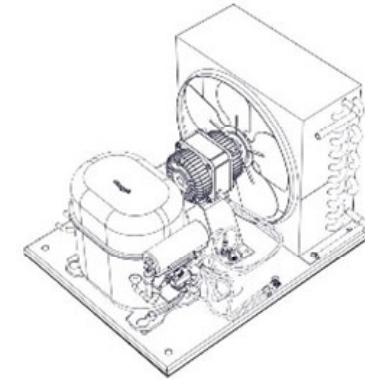
Scope

Commission Regulation (EU) 2015/1095 establishes **ecodesign requirements** for the placing on the market of condensing units.

A **condensing unit** means a product integrating at least one electrically driven compressor and one condenser, capable of cooling down and continuously maintaining low (-35 °C) or/and medium (-10 °C) temperature inside a refrigerated appliance or system, using a vapour compression cycle once connected to an evaporator and an expansion device.

Out of scope:

- (a) **condensing units including an evaporator**, which may be an integral evaporator, such as in monobloc units, or a remote evaporator, such as in split units;
- (b) compressor packs or racks, which **do not include a condenser**;
- (c) condensing units of which the condenser-side does **not use air** as heat transfer medium.



Ecodesign requirements

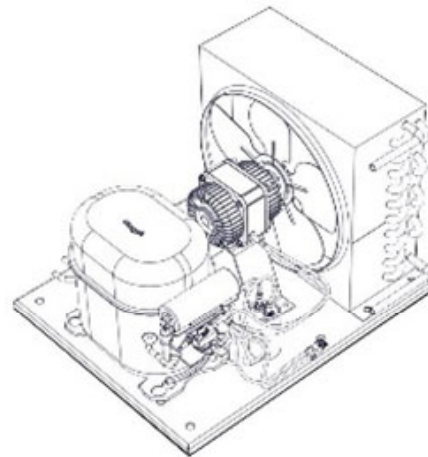
- From 1 July 2018, the **coefficient of performance (COP)** and the **seasonal energy performance ratio (SEPR)** of condensing units shall not fall below the following values:

Operating temperature	Rated capacity P_A	Applicable ratio	Value
Medium	$0,2 \text{ kW} \leq P_A \leq 1 \text{ kW}$	COP	1,40
	$1 \text{ kW} < P_A \leq 5 \text{ kW}$	COP	1,60
	$5 \text{ kW} < P_A \leq 20 \text{ kW}$	SEPR	2,55
	$20 \text{ kW} < P_A \leq 50 \text{ kW}$	SEPR	2,65
Low	$0,1 \text{ kW} \leq P_A \leq 0,4 \text{ kW}$	COP	0,80
	$0,4 \text{ kW} < P_A \leq 2 \text{ kW}$	COP	0,95
	$2 \text{ kW} < P_A \leq 8 \text{ kW}$	SEPR	1,60
	$8 \text{ kW} < P_A \leq 20 \text{ kW}$	SEPR	1,70

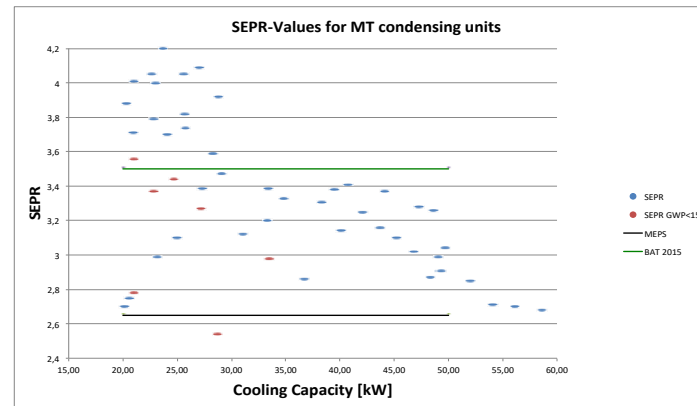
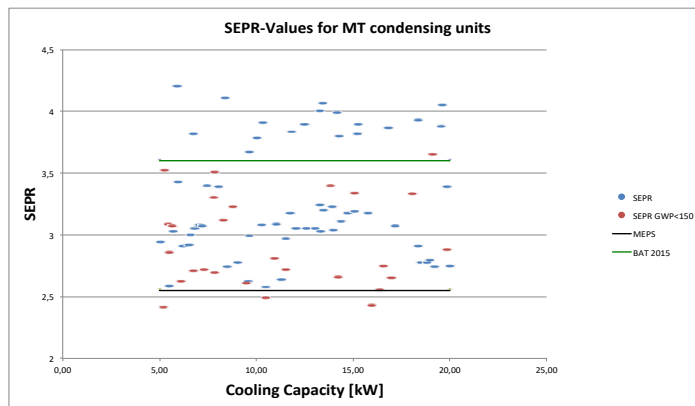
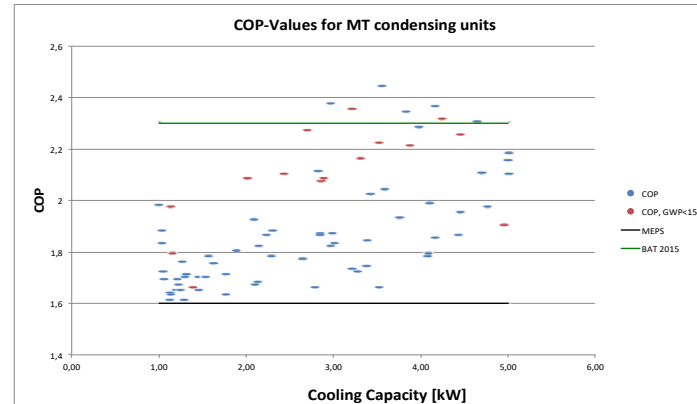
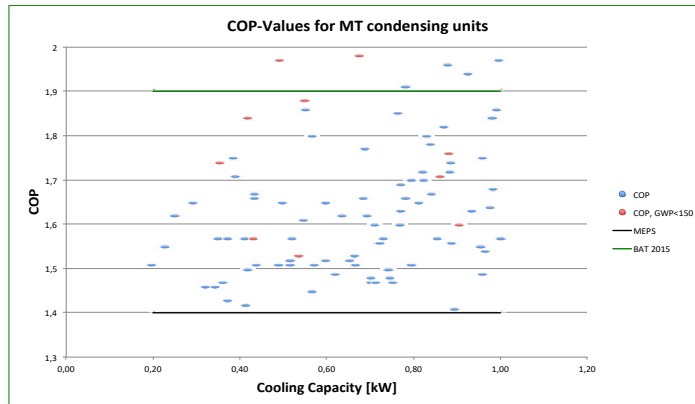
- For condensing units intended to be charged with a refrigerant fluid with a global warming potential lower than 150, COP and SEPR values can be lower than the values by a maximum of 10 %.



Remote condensing units – Proposals presented at the Consultation Forum of November 2022

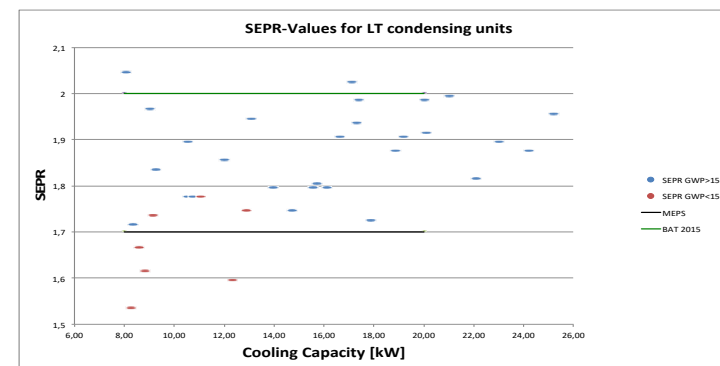
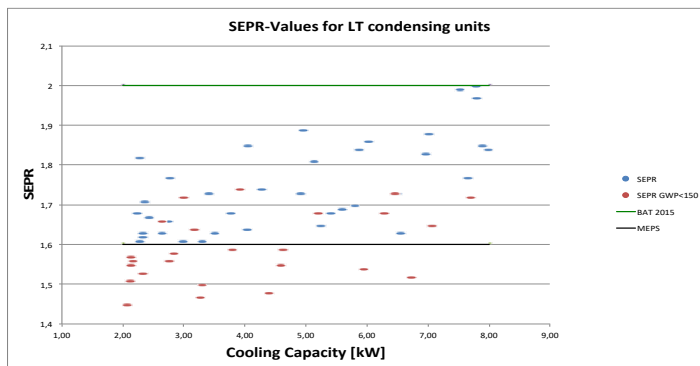
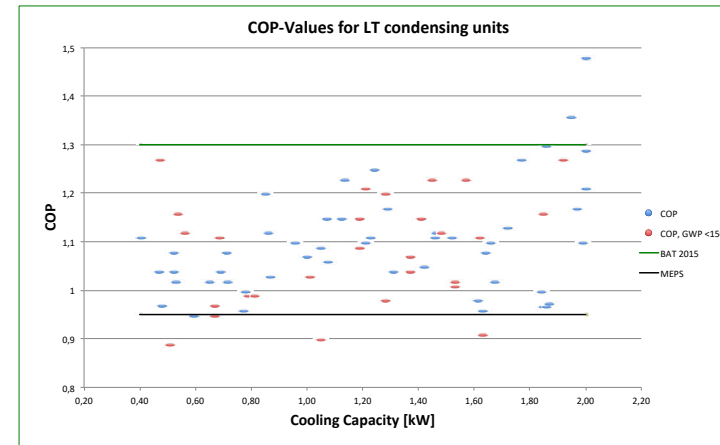
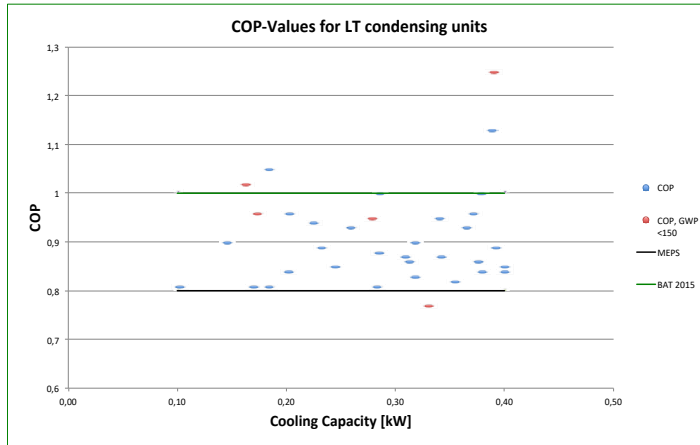


Performance results for MT units



Representative COP and SEPR values of medium temperature (MT) condensing units in the range from 0,2 – 60 kW Cooling Capacity (source: Wuppertal Institute 2021 based on the ASERCOM Database of certified products and manufacturers data).

Performance results for LT units



Representative COP and SEPR values of of temperature (LT) condensing units in the range from 0,1 – 25 kW Cooling Capacity (source: Wuppertal Institute 2021 based on the ASERCOM Database of certified products).

Conclusions

What can be **concluded** from these figures:

- **Most COP and SEPR are much better than the MEPS-values** over the whole range of cooling capacities.
- **Improvements** could be observed **in the BAT-values of MT-units** by one manufacturer since the preparatory study of 2015, which refers to data from 2012.
- **No improvements** could be observed **in the BAT-values of LT-units**.
- The totality of the values shows a typical broad distribution for products above the regulated MEPS level, which indicates **a clear potential for improvement**.
 - **Adaptation of MEPS** towards more ambitious levels should be discussed.
 - Consideration should be given to **introducing an A-G efficiency labelling scheme** to create an **incentive for more energy efficiency** (cf. the Star Rating of CU of the Australian Institute of Refrigeration, Air Conditioning and Heating, AIRAH).

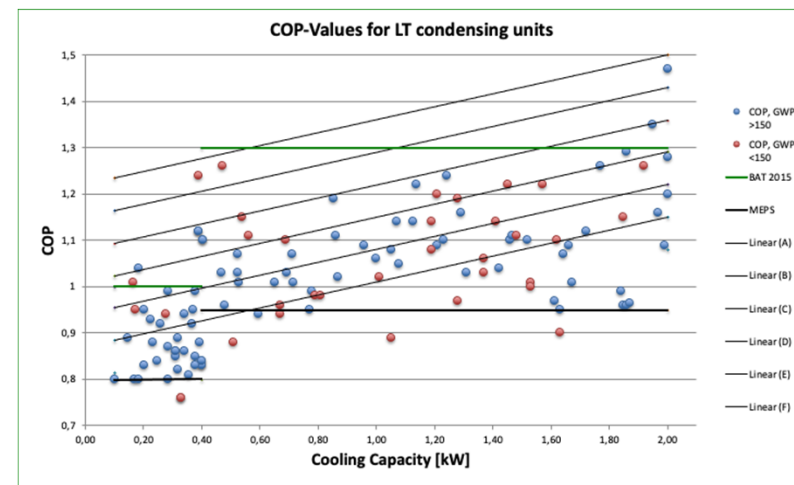
Main changes proposed at the November 2022 meeting (consultation forum)

- More ambitious MEPS.
- Introduction of an energy label.
- Removal of GWP bonus for units with refrigerant < 150 GWP.
- Less complicated classification: from four different rated capacity groups for MT and LT to two (i.e. MT: 0,2-5 and 5-50 kW, LT: 0,1-2 and 2-20 kW).
- No expansion of scope.
- The preliminary estimated electricity savings of these measures are 2,4 TWh/a in 2030 and 4,5 TWh/a in 2040.

Remote condensing units – Energy label

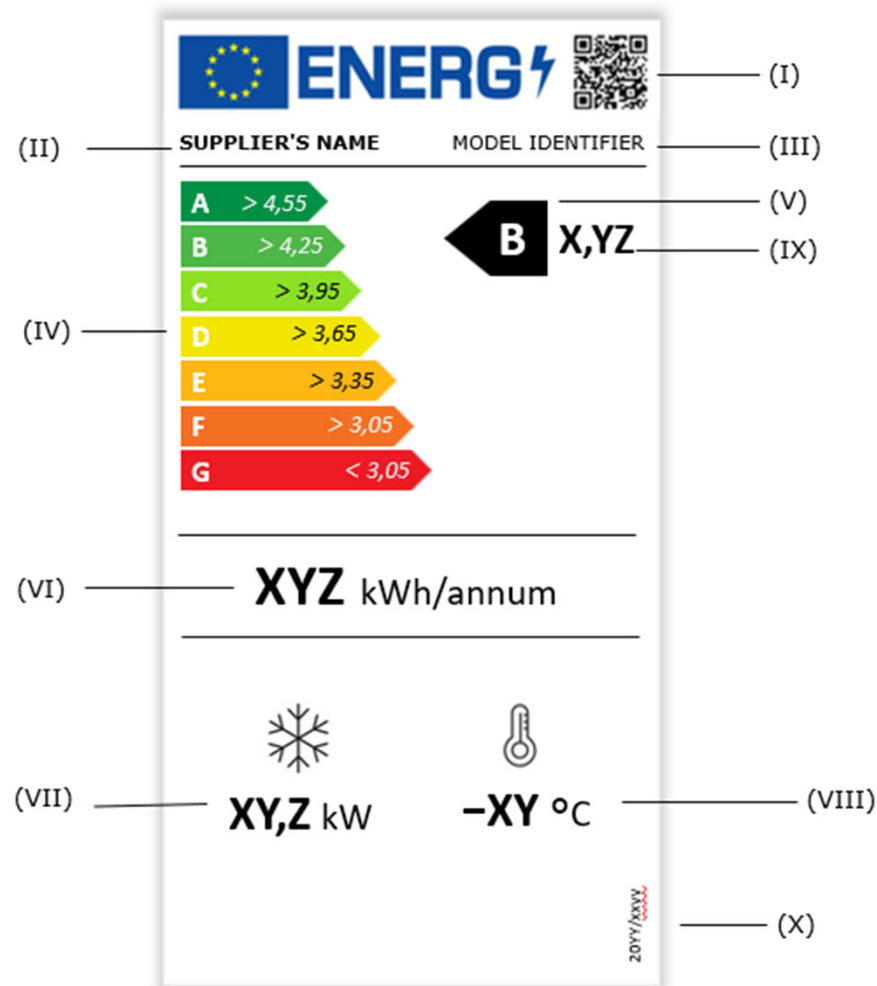
Condensing unit, labelling classes lower limit EEI

Temperature	MT		LT		
	Capacity	0,2-5 kW	5-50 kW	0,1-2 kW	2-20 kW
Class		$EEI = COP - 0,09 \cdot C$	$EEI = SEPR + 0,012 \cdot C$	$EEI = COP - 0,14 \cdot C$	$EEI = SEPR - 0,005 \cdot C$
A		2,15	4,55	1,22	2,02
B		2,025	4,25	1,15	1,95
C		1,90	3,95	1,08	1,88
D		1,775	3,65	1,01	1,81
E		1,65	3,35	0,94	1,74
F		1,525	3,05	0,87	1,67
G		<1,525	<3,05	<0,87	<1,67



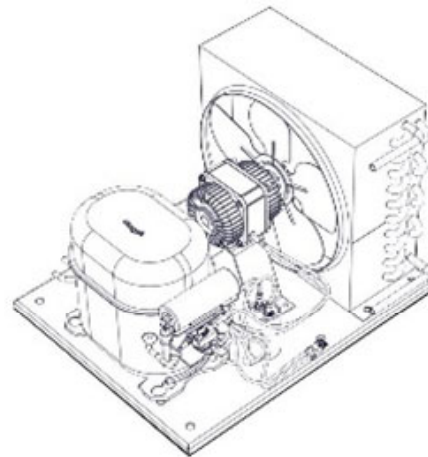
Label design

- I. QR code;
- II. supplier's name or trade mark;
- III. supplier's model identifier;
- IV. scale of energy efficiency classes from A to G;
- V. the energy efficiency class;
- VI. the annual electricity consumption in kWh;
- VII. the rated cooling capacity in kW;
- VIII. the operating temperature of the condensing unit. – 10° C for medium temperature, – 35° C for low temperature;
- IX. efficiency expressed in EEI (two decimal places);
- X. the number of this Regulation

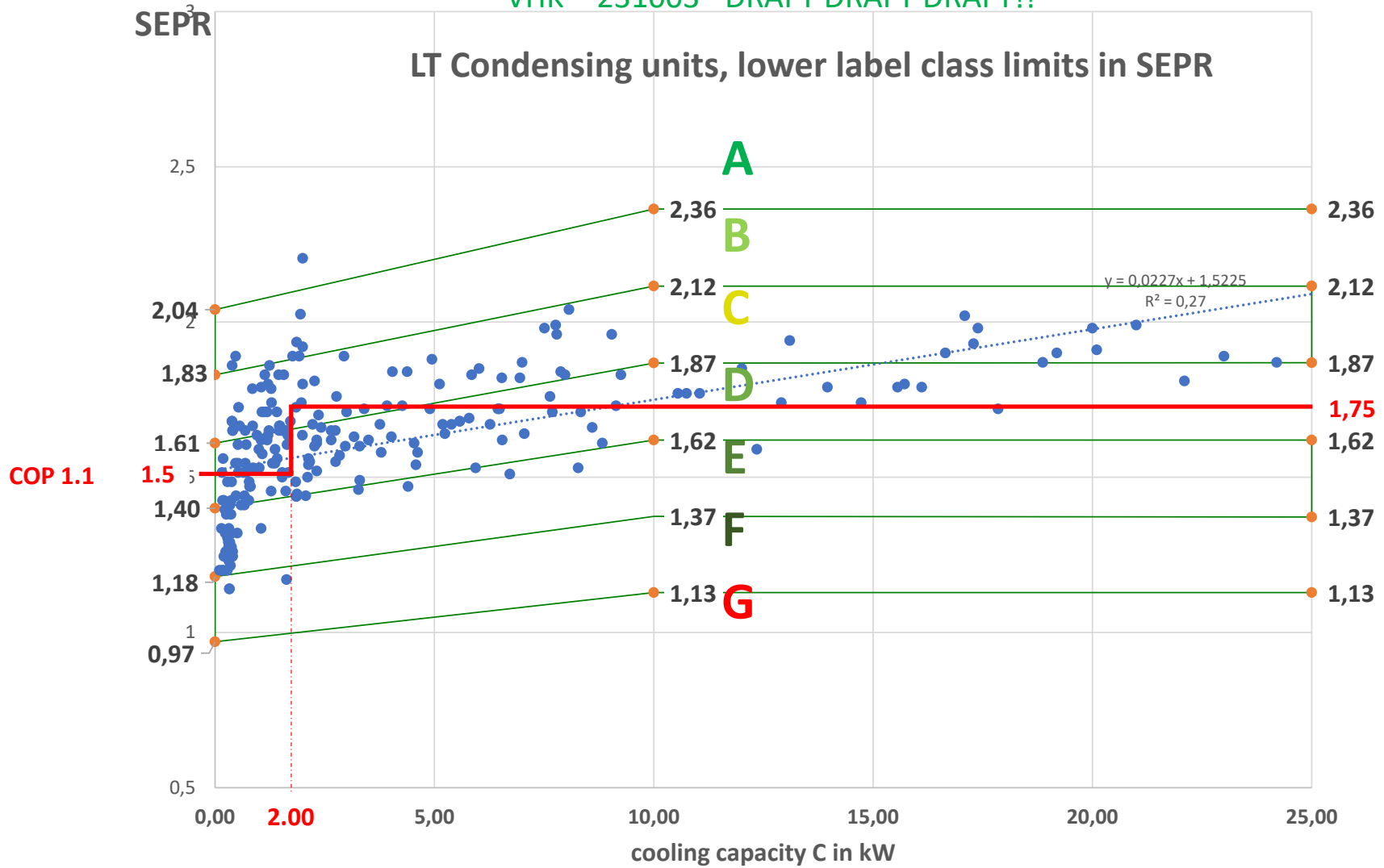




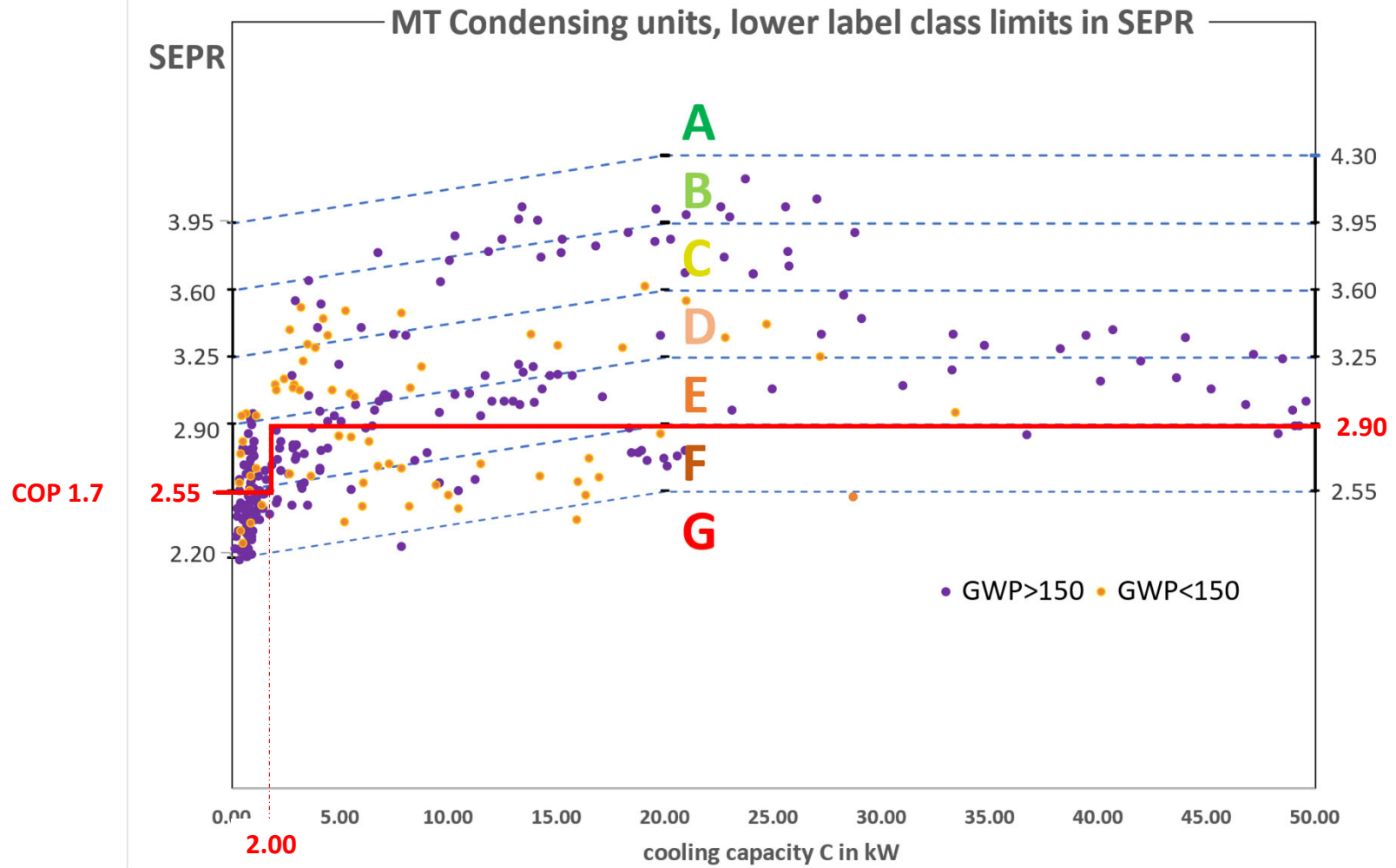
Remote condensing units – ongoing follow up activities/assumptions following the Consultation Forum of November 2022



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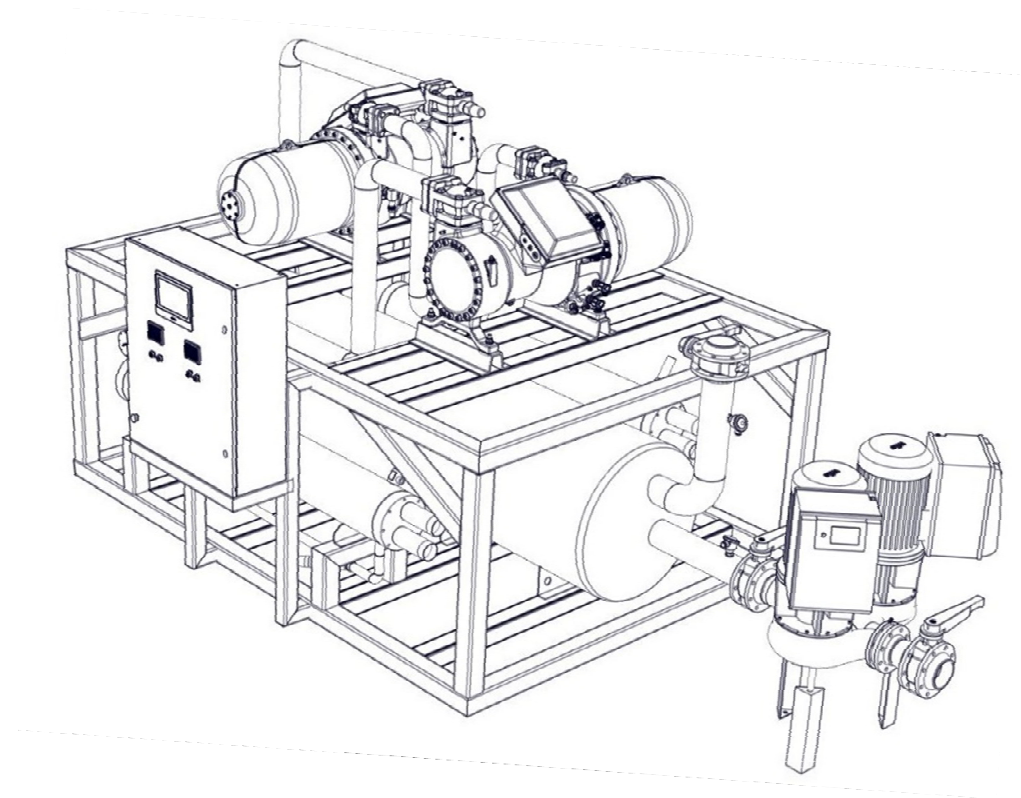
Open points

- **Tightness of the requirements**
- **Relevance and feasibility of the label**
- **COP/SEPR** (granularity, testing burden, etc..)

Further points

- **F-gases regulation**
- **PFAS**
- **ESPR**

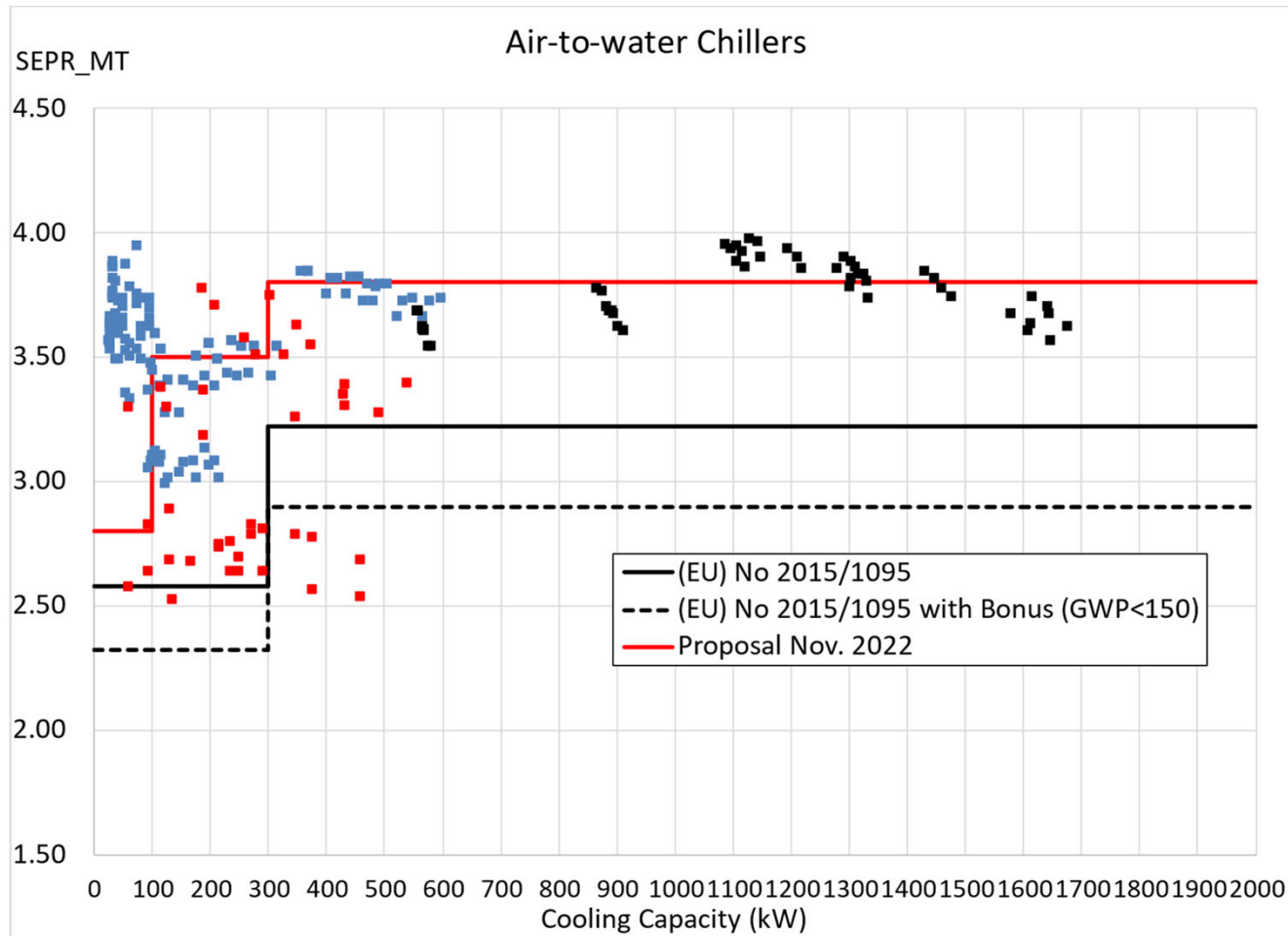
Process chillers



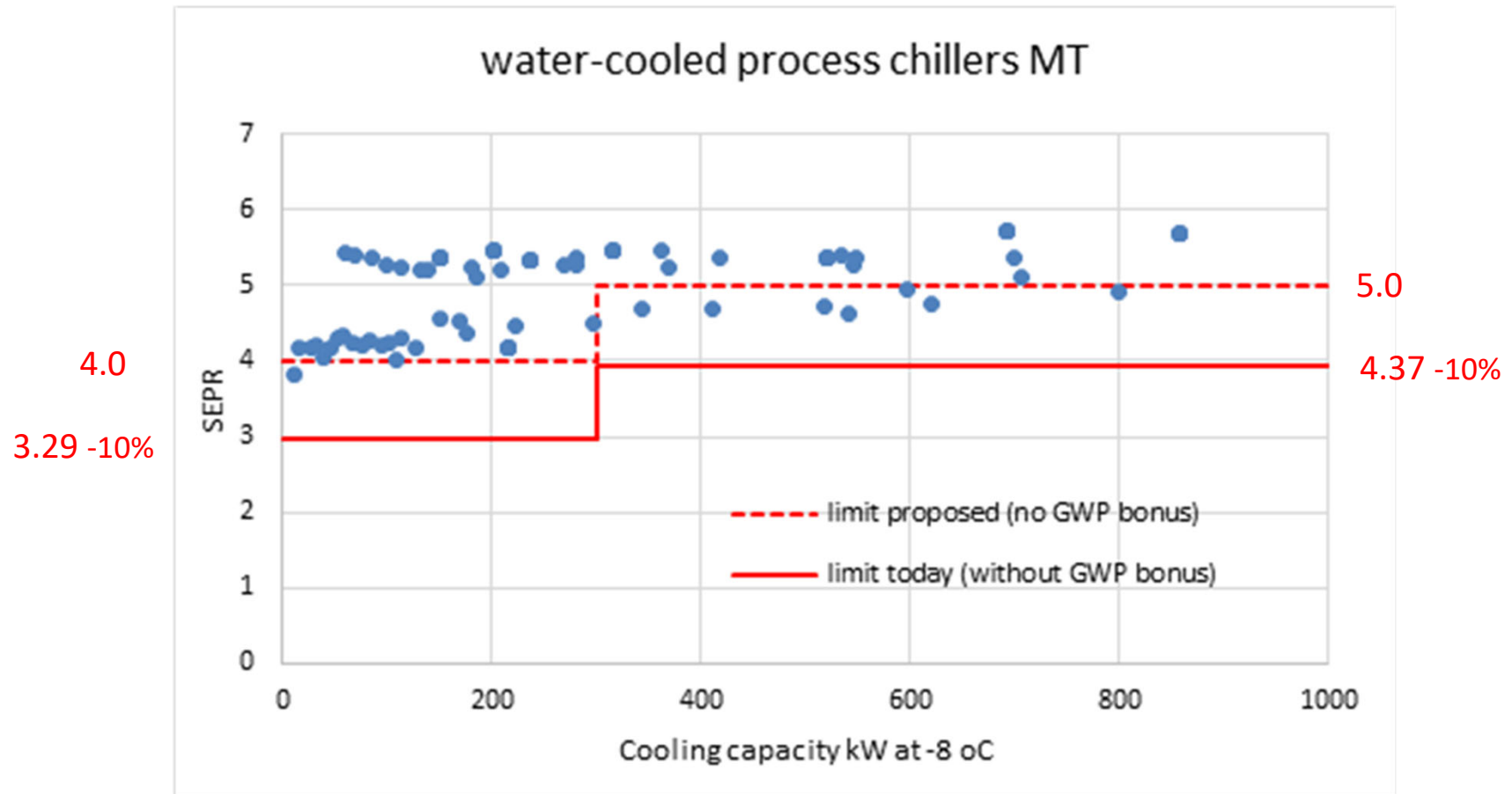
Process chillers – Main changes

- More ambitious MEPS.
- Removal of GWP bonus for units with refrigerant < 150 GWP.
- No expansion of scope.
- Clarification/improvement of test standard needed as regards system definition (*what components are in or out of the scope of the SEPR, 10% tolerance level for cycling*).
- The preliminary estimated electricity savings of these measures are 2,4 TWh/a in 2030 and 5,4 TWh/a in 2040.

Process chiller data: Air-cooled MT



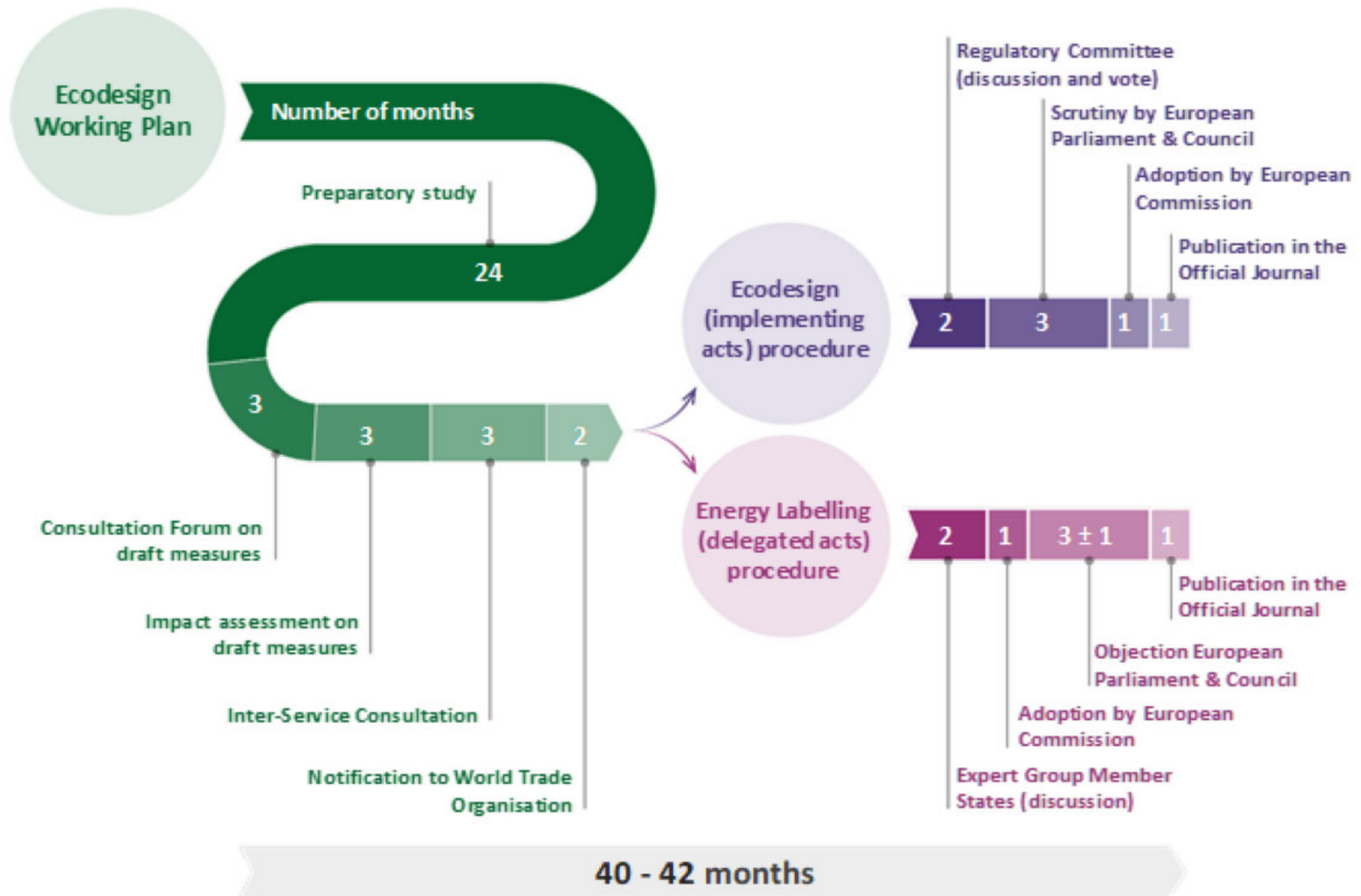
Process chiller data: Water-cooled MT



Process chillers – Ecodesign (Annex X & benchmarks Annex XIV)

Condenser	Operating temperature	Rated cooling capacity P_A	Min. SEPR now (per 2018)	Min. SEPR proposed (2027)	Benchmarks BAT SEPR values (2022)
Air-cooled	Medium	$PA \leq 100 \text{ kW}$	2.58	2.8 (+9 %)	3.7 (+32 %)
		$100 \text{ kW} < PA \leq 300 \text{ kW}$		3.5 (+35 %)	4.1 (+17 %)
		$PA > 300 \text{ kW}$	3.22	3.8 (+18 %)	4.2 (+11 %)
	Low	$PA \leq 200 \text{ kW}$	1.7	<i>na</i> (2,0?)	<i>na</i>
		$PA > 200 \text{ kW}$	1.84	<i>na</i> (2,1?)	<i>na</i>
Water-cooled	Medium	$PA \leq 300 \text{ kW}$	3.29	4.0 (+21 %)	5.5 (+28 %)
		$PA > 300 \text{ kW}$	4.37	5.0 (+14 %)	5.9 (+31 %)
	Low	$PA \leq 200 \text{ kW}$	2.09	2.5 (20 %)	<i>na</i>
		$PA > 200 \text{ kW}$	2.42	2.9 (7 %)	<i>na</i>

(SEPR defined in EN 14825:2022)



THANK YOU FOR YOUR ATTENTION!

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