

# Standardization and Eco-design for Refrigerating Systems & Heat Pumps

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# Standardization & Eco-design for refrigerating systems & heat pumps

## General

- **Eco-design requirements are stated in EU-Regulations**
- **Energy Labelling Requirements are stated in different EU-Regulations, but not for all products, for which Eco-design requirements are valid.**
- Often, harmonized standards are used to clarify measurement procedures and rating methods / calculation methods.  
However, for a number of products harmonized standards are under development or do not exist.  
→ In this situation, the European Commission publishes separate documents  
“Commission Communication on transitional methods of measurement and calculation”  
→ These documents have to be used by manufacturers, until harmonized standards are published in the Official Journal of the EU.
- **Intention of the Regulations: strengthen the efforts taken to minimize energy consumption.**

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## To be considered

- **Regulations often set definitions for new terms, which were not used in the past**
- **Different ways of implementing exclusions from the regulation's scopes, especially for products made on a "one-off basis"**
- Requirements are typically described in several tiers, with rise in minimum efficiency data  
→ products not fulfilling the minimum efficiency data shall not be placed on the European Market after the specified date.
- Often, acoustic requirements are posed additionally.
- Usually, regulations describe the obligation to draw-up a Declaration of Conformity and affix the CE marking to the product.
- **Regulations are reviewed regularly → Manufacturers need to be "up to date"**

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## Overview

under Review

Products in Scope	Eco-design	Energy Label	Remarks
Household refrigerators/freezers	643/2009	1060/2010	Change on 2021-03-01
Air-conditioners <12 kW (Air-Air)	206/2012	626/2011	
<b>Space heaters / Combination heaters</b>	<b>813/2013</b>	811/2013	includes Heat pumps
(Sanitary) Water heaters	814/2013	812/2013	includes Heat pumps
Professional storage refrigerators/freezers	2015/1095	2015/1094	
Condensing units (MT <50kW, LT <20kW)	2015/1095	--	
MT & LT process chillers	2015/1095	--	
Blast cabinets	2015/1095	--	
Heating & Cooling products	2016/2281	--	incl. HT process chillers
Appliances with a direct sales function	2019/2024	2019/2018	Valid as of 2021-03-01

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## Regulation 813/2013 on Space heaters / Combination heaters

- includes several types of heat generators with rated heat output up to 400 kW:
  - boilers using gaseous fuel (i.e. natural gas)
  - boilers using liquid fuel (i.e. oil)
  - electric boilers
  - cogeneration space heaters with max. electrical capacity below 50 kW
  - heat pumps with electrically driven compressors
  - heat pump with fuel driven compressors / gas-fired sorption heat pumps
- includes also packages of space/combination heaters, temperature control and solar device
- levels the environmental impact of power generation by means of a “conversion coefficient” (in existing regulation CC=2,5)
  - It is therefore complicated to demonstrate the advantages of heat pumps.
- No exclusion for units manufactured on a “one-off basis”

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## Regulation 813/2013 – Context with Regulations 811/2013, 812/2013 and 814/2013

- Labelling Regulation 811/2013 (Space heaters / combination heaters) applies to products with rated output up to 70 kW
- Regulations 812/2013 & 814/2013 apply to products which are only used for (sanitary) water heating. Rating limits are equivalent (Eco-design up to 400 kW, Labelling up to 70 kW).
- Technical requirements for (sanitary) water heating are the same for “combination heaters” according to 813/2013 and “water heaters” according to 814/2013
- A guidance document is available since 2018  
Guidelines accompanying Regulations 811 & 812/2013 ... 813 & 814/2013 ...  
(... 2015/1187 & 1189 →also comparison to solid fuel boilers!)
- Review Process is going in parallel for Regulations 811 to 814/2013

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**Review Process – Targets as described in the “Guidelines” document (2018) for Space heaters / Combination heaters and Water heaters – as relevant for heat pumps –**

- **Appropriateness of setting eco-design requirements for greenhouse gas emissions related to refrigerants**
- **Level of eco-design requirements for emissions of carbon monoxide, hydrocarbons and particulate matter that may be introduced**
- **Appropriateness of setting stricter eco-design requirements for emissions of nitrogen oxides and for space heaters also for energy efficiency and sound power level**
- **Validity of the conversion coefficient value**
- **Appropriateness of introducing third party certification**
- **Concerning Energy Labelling: usefulness of indications given on the label and the appropriateness of package fiches**

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And what about harmonized standards? Status as of June 2020 for heat pumps

- No harmonized standards in place.
- Manufacturers still need to refer to the Transitional Method (TM) as published in 2014!
- Main standards published: EN 14511 series & EN 14825 (electrically driven compressors)

Criteria	EN 14511 series	EN 14825
Main focus	Measurement standard	Rating standard
Latest version published	2018	2018
Version referred in TM	(2013)	2013

→The situation is even worse for (gaseous) fuel driven heat pumps

- Most references in the TM are to EN 14825:2013.
- In the meanwhile, CEN TC 299 developed new standards: EN 16905 series / EN 12309 series.  
(gas motor units) (sorption units)

→For sound power level: EN 12102:2013 mentioned in TM (all heat pumps)



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## Standardization Progress for EN 14825 and EN 14511 series (Committee: CEN TC 113)

- Since the publication of the Transitional Method, several efforts have been taken in order to “make the standards compliant with the requirements of the EU-Regulations”.
- Main topic: the scope of the EN standards is differing remarkably from the scope of the EU-Regulations → different approach:  
Standards: focus on technology (e.g. vapour compr. cycle with elec. driven compressors)  
EU-Regulations: focus on application (e.g. space heating), comparing technologies
- Result: Standards are “growing”. Example EN 14825:2018: 139 pages & several Annexes Z...

Annex ZA	Regulation 206/2012	Split type air conditioners <12kW
Annex ZB	Regulation 813/2013	Heat pumps – only space heating
Annex ZC	Regulation 811/2013	Heat pumps – only space heating
Annex ZD	Regulation 2015/1095	MT & LT process chillers

→ Further discussions needed and already in progress for EN 14825 and EN 14511

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## Standardization Progress for other standards on heat pumps

- **EN 16905 series: gas-fired engine driven heat pumps, developed until 2017 by CEN TC 299 and part 2 revised in 2020**
  - not harmonized
- **EN 12309 series: gas-fired sorption appliances for heating and/or cooling, updated until 2014/2015 by CEN TC 299**
  - not harmonized
- **EN 12102 (sound): approach changed, now part 1 (all others) and part 2 (water heaters), process chillers now included in scope, work done until 2019 by CEN TC 113 (WG 9)**
  - not harmonized
- **Further standards (not harmonized):**
  - EN 16147 Water heaters (domestic hot water units)
  - EN 15879 DX-ground coupled heat pumps (series still under development)

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## Review Process for Regulations 811/2013, 812/2013, 813/2013 and 814/2013 (as relevant for heat pumps)

Year	Step / Action
2013	Regulations published
2015	TIER I requirements apply on 26-Sep-2015
2017	TIER II requirements apply on 26-Sep-2017
2018	TIER III requirements apply on 26-Sep-2018 (Water heating Efficiency only)
2019	Review Study published (7 docs = 7 tasks)
2020	Consultation meetings in 4 working groups
2021	Commission's working draft documents to be presented to Consultation Forum (expected)

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**Review Process for Regulations 811/2013, 812/2013, 813/2013 and 814/2013 as relevant for heat pumps – Proposals resulting from the Review Study**

- **Change of the Primary Energy Factor to 2,1 or not?**
  - **Tendency of lowering the verification tolerances**
  - **3<sup>rd</sup> party conformity assessment**
  - **Extension of the scope (for eco-design) up to 1 MW**
  - **High temperatures (65°C) instead of medium temperatures (55°C) for heat pump testing**
  - **“dynamic testing” for heat pumps (instead of declared condition given by the manufacturer)**
  - **Harmonize boiler and heat pump test conditions**
- However, the focus is not on heat pumps, but on the further use of the gas grid (several options discussed, especially “green hydrogen”, “decarbonisation”)**

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**Review Process for Regulations 811/2013, 812/2013, 813/2013 and 814/2013 as relevant for heat pumps – ongoing work of the 4 Working Groups introduced**

- **WG 1 – “Special Topics” (~ “horizontal questions”)**
  - Primary Energy Factor
- **WG 2 – “Testing”**
  - Testing of heat pumps, incl. “dynamic testing” and “65°C HT application”
- **WG 3 – “Calculation”**
  - Revised “integral” calculation for eco-design and labelling
- **WG 4 – “Water heaters”**
  - discussion with focus on domestic hot water production
- **First meetings of WGs held in this year, further input in writing (done by many stakeholders)**
- **Next steps to be announced by the project leaders →the complexity of topics will remain!**

**Thank you for your attention!**

→ **Questions?**

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