POSITION PAPER

DRAFT REGULATIONS ON ECODESIGN AND ENERGY LABELLING REQUIREMENTS FOR SPACE AND WATER HEATERS

Brussels, 21st January 2026

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EXECUTIVE SUMMARY

We welcome the long-due publication of the European Commission's ecodesign and energy labelling proposals for space and water heaters. The decarbonisation of the energy sector goes hand in hand with reducing gas use in the European Union, especially at residential and heating level. Here, gas can be replaced in cost-effective ways, and the Ecodesign and Energy Labelling regulations can be a main driver for a transition towards more energy-efficient and cleaner appliances, as stated in the RePowerEU in 2022.

The Coolproducts campaign suggests the following recommendations to improve the proposals:

- Plan an early revision within two years to increase the energy efficiency requirements in Ecodesign for space heating to 115%, to phase out gas use in space heating and be in line with the objectives of the REPowerEU.

- Increase the energy efficiency requirements for hybrid units (gas boilers and heat pumps) and electric to not below 150% and heat pumps to not below 165%.
- Increase the label class limits for water heaters.
- Improve the compensation method as a standard measurement for heat pumps and introduce it as soon as possible and not later than 4 years after the entry into force of the regulations.
- Strengthen material efficiency requirements for space and water heaters.
- Include smartness requirements directly in the regulations, and not through the participation in a voluntary initiative controlled by industry, to justify the introduction of a smart energy pictogram and ensure a level playing field.

PART 1: ECODESIGN REGULATIONS

1. SUBJECT MATTER AND SCOPE (ARTICLE 1)

We agree with the proposal to **extend the scope to space heaters** with a rated output up to 1 MW.

The limit for **cogeneration heaters** is set at 50 kW. This means that there is a regulatory gap between 50 kW_e and 1000 kW_{th} – above which size they are included in Medium Combustion Plant Directive. We propose to increase the scope for this product, up to 1000 KW_{th}.

Water heaters for cooking are included in the scope according to the definition in Art. 2 (2). However, we propose to include water heaters for food preparation that are made to deliver water of 50°C or lower.

Reversible products that can both provide heating and cooling services are currently not covered under ecodesign and energy labelling requirements for their combined functions. We expect a growing market for this product group, hence we support the inclusion of cooling functions in reversible heat pump heaters.

For the scope, we support to cover products up to 1 MW heating capacity and propose to cover up to 2 MW cooling capacity, aligning with current limits of existing regulations for non-reversible heaters and coolers (chillers), easing the process of inclusion in the current revisions of the regulations.

Lastly, for energy labelling, we propose that a new label is developed for the cooling functions. However, this label should not delay the energy label revision proposed with the current draft regulations.

2. CONFORMITY ASSESSMENT (ARTICLE 4)

We support the proposal that heat pumps, fuel boilers and hybrids are subject to third-party conformity assessment. We propose in addition that **all heaters and water heaters** in the scope of the proposed regulations are independently tested and certified for their ecodesign requirement parameters, also for sound power, emissions, water heater efficiency, and water heating load profile.

We support that module B type conformity assessment is used for third party assessment, but we propose that it is introduced two years after the entry into force of the regulations, and not six years after, as proposed in the draft. We also support that the test report from the conformity assessment is included in the technical documentation of the product.

For testing of products above 400 kW, we propose that third-party testing is included and that in-situ testing can be allowed.

3. CIRCUMVENTION

We propose that the introduction of an article on protection against circumvention. This shall include already agreed articles that are now part of Ecodesign regulations, as well as of the EU Ecodesign for Sustainable Products Regulation (ESPR):

- Manufacturers, importers or authorised representatives shall not place on the market products designed to be able to detect they are being tested (for example by recognising the test conditions or test cycle) and to react specifically by automatically altering their performance during the test with the aim of reaching a more favourable level for any of the parameters in the technical documentation or included in any documentation provided.
- Manufacturers, importers or authorised representatives shall not prescribe specific test instructions that alter the behaviour or the properties of products to achieve a more favourable result for any of the declared values of the parameters regulated in this Regulation.
- Manufacturers, importers or authorised representatives shall not place on the market or put into service products designed to alter their behaviour or properties within a short period after being put into service resulting in a degrading of any of the declared values of the parameters set out in this Regulation.
- The energy consumption of the product and any of the other declared parameters shall not deteriorate after a software or firmware update when measured with the same test standard originally used for the declaration of conformity, except with explicit consent of the end-user prior to the update. No performance change shall occur as a result of rejecting the update.
- A software update shall never have the effect of changing the product's performance in a way that makes it noncompliant with the ecodesign requirements set out in this Regulation applicable at the time of the placing on the market or putting into service of the appliance.

4. DEFINITIONS (ANNEX I)

We propose some improvements of the currently unclear definitions in the draft ecodesign regulation

For water heaters:

- (12) '*peak temperature*' (T_p), it should be renamed as '*draw-off temperature*' as it is defined as the average water temperature during a draw-off. The current wording causes confusion, also in the development of the standards.

5. ECODESIGN REQUIREMENTS (ANNEX II)

5.1. DECARBONISE RESIDENTIAL BUILDINGS THROUGH ECODESIGN

Given the importance to decarbonise energy and reduce gas use in Europe, specifically in heating, where gas can be replaced in cost-effective ways, we propose to use ecodesign to **stop the installation of fossil fuel boilers. Thus, we support the increase of ecodesign energy efficiency requirements to 115%.** Given that there is no agreement among Member States for this presently, we propose that the Commission plans a specific revision in two years to increase the minimum efficiency thresholds[1].

Multiple studies pointed out that electric heat pumps should be the main driver to decarbonise the entire building stocks, where important roles are played also by hybrid units, solar thermal energies and district heating. Research made by Fraunhofer Institute[2] and others showed that heat pumps exhibit good efficiency even in non-renovated buildings, including in detached and semi-detached houses. They also found numerous

[1] https://www.iea.org/reports/net-zero-by-2050. The report states "In buildings, bans on new fossil fuel boilers need to start being introduced globally in 2025, driving up sales of electric heat pumps"

[2] https://www.ise.fraunhofer.de/en/key-topics/heat-pumps.html

examples of successful heat pump installations in apartments as well. Furthermore, they found that barriers to adoption are often administrative rather than technical.

5.2. HYBRID HEATERS ENERGY EFFICIENCY REQUIREMENTS

The proposed energy efficiency requirements of 100%, with the new CC=1.9 is very low, allowing fossil fuels to provide a large majority of the heat as energy inputs. Besides, this requirement is substantially lower than the current limits for heat pumps of 110% with CC=2.5, which equals 145% with CC=1.9. This jeopardises the efforts to reduce fossil fuel consumption with a phase-out of 'stand-alone' fossil fuels boilers.

With the low efficiency limit of 100%, we believe that low-efficient fossil fuel boilers could still be sold on the market by adding contribution from renewables (i.e. a small HP). This would therefore circumvent the intention of the regulation by keeping gas as the main energy source for the upcoming decades. To avoid this, energy efficiency requirements for hybrids should be increased.

As shown in the below table, the current ecodesign limit (110% with CC=2.5 equal to 125% with CC=1.9) will allow in the market both the combination of low-efficiency appliances and several combinations with high shares of gas consumption, in contradiction with several EU targets. Even more of such low-efficiency appliances will remain on the market with an efficiency limit of 100%.

We analysed the possible combinations of hybrid heaters, highlighting the shares of energy inputs (the best BAT heat pump is for air-to-water appliance with crankcase standby demand 1 W and boiler as gas boiler):

Hybrids heaters (% of heat production)- as MT	Efficiency PEF=1,9	Boiler efficiency	Heat pump SCOP
Poor boiler (15%) + poor heat pump (85%)	125%	75%	2,7
BAT boiler (65%) + good heat pump (35%)	125%	94%	3,6
BAT boiler (35%) + good heat pump (65%)	151%	94%	3,6
BAT boiler (19%) + good heat pump (81%)	165%	94%	3,6
BAT boiler (5%) + BAT heat pump (95%)	190%	94%	3,85

Hence, we proposed to raise the **energy efficiency limits up to 150%** for the medium temperature (MT) regime This would allow hybrids, where the heat pump provides 2/3 or more of the heat.

Similarly for hybrids in **low temperature (LT) regime**, we propose 190% corresponding to below proposals for LT heat pumps, where the heat pump provides 78% of the heat.

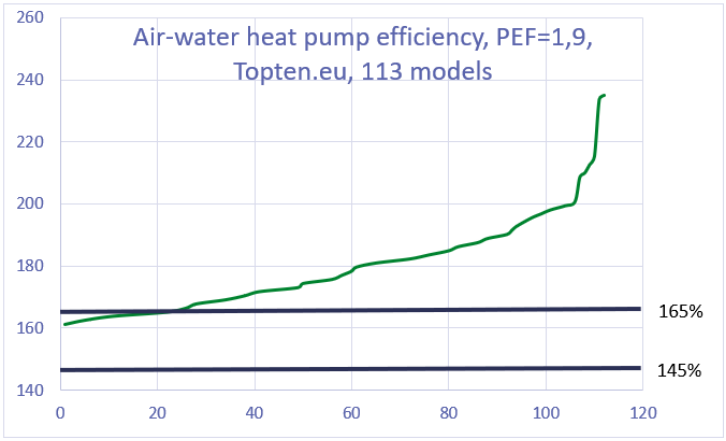
Hybrid heaters would be used in those buildings where the heat pumps alone cannot reach higher temperature with good efficiency. For hybrids able to work in high temperature (HT) regime, we propose that they fulfil the efficiency requirement for the MT regime and that the heating capacity in HT regime should be specified at minimum inlet temperatures to the cold side of the heat pump, $T_{designh}$ (which is -10'C for air-water heat pumps in average climate).

5.3. HEAT PUMPS ENERGY EFFICIENCY REQUIREMENTS

The proposed efficiency **for heat pumps** is currently 100% with the PEF CC=1.9. According to Topten.eu and the Danish Varmepumpelisten databases, the lowest efficiency of MT heat pump is already 161%.

Because Ecodesign should reflect the technological development of heating appliances in the market, we consider 100% by far not ambitious enough, and we propose to raise it **up to 165%** for MT regime.

Below, the graph shows the efficiencies of 113 heat pump models included in Topten.eu in MT regime and the proposed efficiency limits for the 1st tier, with recalculation from PEF=2,5 to PEF=1,9.



Similarly, for **LT heat pumps**, our suggestion is to raise the requirement to **up to 220%**.

By applying both, according to the Topten database, it will effectively be removing from the EU single market only the least 10% and 14% efficient air-water heat pumps, for MT and LT.

With the introduction of the compensation method, some heat pumps will show lower efficiency in the type test, but others will not be much affected. This is mainly a question of their control system. Given that a large majority of heat pumps will remain on the market with the proposed efficiency of 165% (MT regime), a large part will also remain on the market with the introduction of the compensation method.

The present drafts include no requirements for cooling efficiency for **reversible heat pumps**, which we find is wasting a good opportunity to use ecodesign to increase efficiency in a new, energy consuming sector. We propose that cooling efficiency for reversible heat pumps are set at the same level as for chillers. We have proposed the following seasonal energy efficiency ratio (SEER) limits for chillers that we also propose for the cooling function of reversible heat pumps for central heating systems:

- Comfort chillers, air cooled: 4.58
- Comfort chillers, water cooled < 400 kW: 6.0

5.4. FOSSIL FUEL BOILERS ENERGY EFFICIENCY REQUIREMENTS

We proposed an **increase to 115% of the energy efficiency thresholds** for fuel boilers and electric (combi) boilers as a 2nd tier in 2030.

Having the energy efficiency threshold as of 115% is potentially not allowing hydrogen heating as of 2nd tier, unless it has proven reliable, cheap and has scaled up installations. Indeed, with current technologies hydrogen should not be used to heat households. The suggestion that it could be is unrealistic and complicates a question for which a simpler answer already exists.

Electric heat pumps are the primary way forward, whereas there is also a place for district heating (powered by large-scale heat pumps, solar energies, geothermal heat and clean waste heat sources), solar thermal energy, or solar PV (and/or combinations to be coupled with electric heat pumps).

5.5. WATER HEATING ENERGY EFFICIENCY REQUIREMENTS

We support different Ecodesign energy efficiency thresholds being there for the different technologies.

Nevertheless, there are a few requirements, listed below, that should be more ambitious in the current proposals:

- For **heat pump combis**: for size M, the current ambition of the proposals about the threshold is 70%, whereas for size L and XL, the thresholds are 75% and 80% respectively leading to hardly any removal of least efficient appliances, according to the EPREL database. We propose to increase the **requirements up to 105% and 130% for size M and L/XL,** respectively and, with this requirement, only the least 20% and 5% of the size L and M of water heaters will be removed.
- For **fuel combi boilers**: for size M and L, we support **to raise the current limits up to 70% and 75% for size M and L** respectively, two years after the entry into force of the regulations. We also propose a 2nd tier, in line with the phase out of fuel boilers for space heating, raising efficiency further up to 105% and 115% for size M and L respectively.
- For **dedicated water heaters,** we propose:
    - For size L and XL, to raise efficiency **level up to 130%,** which will phase out fuel and simple electric water heaters and will remove around 5% - only 15 models in EPREL - of size L heat pump water heaters, also keeping the majority of solar assisted water heaters in the market.
    - For sizes XXL and above**:** to increase the efficiency limit for all water heaters to the proposal for heat pump water heaters, meaning up **to 133% for XXL and to 144% for 3XL/4XL.**
    - For size M and S**:** the market of heat pump water heaters is not mature enough to phase out traditional water heaters (only 316 M-size models and 5 S-size model in EPREL), but we recommend that it anyway is considered **to phase out fossil fuel-based water heaters** in these smaller classes, while keeping electric water heaters available to consumers.

For hot water tanks, we do not see a need for two tiers, and we propose to introduce the requirements in Annex II, Table 12 two years after the regulation is entering into force instead of after four years.

5.6. REQUIREMENTS RELATED TO EMISSIONS

For emission limits, the NO_x emission limits are not changed in the draft from current requirements for natural gas, **G20 (methane)**. For LPG gases, it is proposed in the draft to make that limits less tight for **G30 (butane) and G31 (propane)** family gases, by 30% and 20% respectively compared with current limits.
Contrarily, we propose to have 30% lower NO_x emission limits for gas equipment for normal gas and to keep current limits for equipment using G30 and G31 gases, instead of making requirements less tight for this type of equipment.

We do not support the proposed NOx emission limits of 240 mg/kWh and higher for cogeneration heaters and propose to reduce NO_x emission limits of all **cogeneration heaters to 200 mg/kWh**. Likewise, for **cogeneration heaters above 400 kW, we propose 160 mg/kWh**, in line with the Medium Combustion Plant Directive[3]. For engines that cannot meet this limit, the manufacturers shall equip them with flue-gas NOx reduction technologies.

5.7. REQUIREMENTS FOR MATERIAL RESOURCE EFFICIENCY

5.7.1. Accessibility of spare parts – Annexes II of both regulations - Articles 5.2.8 and 1.6.2.1:

[3] The Medium Plant Directive, (EU) 2015/2193 sets the limit for NOx emissions for engines above 1 MW fuelled with gaseous and liquid fuels to 190 mg(m3, which is equal to 163 mg/kWh. This is except gas engines fired with natural gas, where the limit is only 95 mg/m3.

The lists of spare parts accessible to end-users for space and combination heaters and water heaters are very limited. We appreciate that these products are complex and that a faulty repair could potentially cause problems, even though this risk would still need to be evidenced. However, the list of spare parts accessible to professional repairers does contain items that could be replaced by end users if manufacturers designed these products accordingly: electric fuses, printed circuit boards, gaskets and seals, buttons, switches and knobs, cables and plugs, displays and status indicators, and software and firmware, including reset software.

5.7.2. Time of accessibility of spare parts - Annexes II of both regulations - Articles 5.2.9 and 1.6.2.3:

We support the required availability of spare-parts, but given the lifetime of the heaters, we find that spare-parts and software updates should be available for the lifetime of the product, **17 years for heaters** according to the review study, instead of 10 years.

5.7.3. Price of spare parts – Annexes II of both regulations - Articles 5.2.10 and 1.6.2.4:

Simply providing information on the indicative pre-tax prices of spare parts on a free-access website is not enough. At the very least, the announced pre-tax price should not simply be indicative information but a binding commitment. With merely indicative pricing at the time of sale, and no incentive for manufacturers to ensure spare parts price stability, there is a significant risk that consumers base their choice on spare price information that will turn out to be outdated at the time when they will actually need the repair. In order for consumers to be able to make an informed choice at the time of purchase, taking into account future repair options, it is vital that manufacturers commit to the announced prices of spare parts.

We, therefore, suggest that the manufacturer declares, in the product documentation as well as on their publicly accessible website, the maximum pre-tax price (without shipping costs) for each spare part they make available, in a list that is searchable by product model. The word “indicative” should be replaced by the word “maximum”.

More details on the need to make that amendment to all the current and forthcoming Ecodesign requirements can be found in this position paper.

5.7.4. Type of tools - Annexes II of both regulations - Article 5.2.11 and 1.6.2.5:

Following our proposal to extend the list of spare parts accessible to end-users, the types of tools needed to replace these spare parts should comply with Class A of EN45554:2020 (No tools, tools supplied with the product or the spare part or basic tools listed in Table A.3 of this standard). Also, the working environment in which the repair operation should take place should be specified, with spare parts only available to professional repairs corresponding to class B (workshop environment) and spare parts also available to end-users corresponding to class A.

5.7.5. Software and firmware updates - Annexes II of both regulations - Article 5.2.12 and 1.6.2.6:

We support the required availability of spare-parts and software updates, but given the lifetime of the heaters, we find that spare-parts and software updates should be available for the lifetime of the product, **17 years for heaters** according to the review study, instead of 10 years.

We propose that all software necessary for heating products to properly function is to be open source and accessible by grid operators and maintainers. This is required to allow interoperability and smart demand control management of the grids as well as to prevent planned obsolescence. This is particularly of relevance to those companies selling hardware and software upgrades aimed at improving and fine-tuning the performance of the heat pump.

5.7.6. Delivery of spare parts - Annexes II of both regulations - Article 5.3 and 1.6.3:

For maximum delivery time of spare parts, we consider that 15 working days to deliver spare parts is too long for heating appliances as consumers cannot be expected to live without a functioning appliance for over 3

weeks during the coldest season. Following what has been proposed for mobile phones, smartphones, cordless phones and tablets, we suggest having it as short as **5 working days** for delivery to the repairer in charge or to the end user.

5.7.7. Access to repair and maintenance information - Annexes II of both regulations - Article 5.4 and 1.6.4.1:

We strongly oppose the process allowing manufacturers, importers and authorised representatives to prevent access to repair and maintenance manuals. These repair and maintenance manuals should be accessible on a free access website, to everyone. Also, allowing the manufacturers, importers and authorised representatives to wait 5 days before accepting to send this information is way too long.

In a context where professional repairers must provide evidence of their professional status to manufacturers before accessing repair and maintenance information, requiring manufacturers to motivate their rejection is necessary.

5.7.8. Dismantling for material recovery and recycling - Annexes II of both regulations - Article 5.5 and 1.6.5:

The proposal requires that the products can be dismantled with class C tools (as defined by EN45554:2020), meaning tools that are at least commercially available. Class B would be more appropriate in order to make sure that material recovery and recycling can take place without a too important investment in specialised tools by recyclers.

5.7.9. Recycled content

Given its relevance for metal consumption and the carbon-intense production chain linked with heating technologies, and building on the EU's Green Deal Industrial Plan and the EU's Circular Economy Action Plan **we strongly support the insertion of recyclability criteria** in this products group. For this reason, we suggest that from 48 months after entry into force all heating technologies that contain copper, aluminium, lead and steel will have to contain a share of at least 50% recycled content for those material streams, coming from manufacturing waste or post-consumer waste.

Equally important, from 48 months after entry into force all products regulated by the present act will need to have at least a 90% recyclability score for metal and plastics.

5.7.10. Part serialisation (article missing)

We also want to stress that the software updates / OS system (where applicable) should not impede repair for independent operators. An article about part serialisation, inspired by the similar section in the Regulation on smartphones[4], and complying with the requirements set in the directive on the repair of goods[5].

5.8. REQUIREMENTS RELATED TO SELF-MONITORING

We support the proposed requirement of self-monitoring of heaters, which will allow users and service personnel to keep monitoring the performance of the heater throughout its lifetime. We propose that the self-monitoring requirements are introduced two years after entry force of the regulation, not only after four years as proposed in the draft.

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[4] Commission Regulation (EU) 2023/1670 of 16 June 2023 laying down ecodesign requirements for smartphones, mobile phones other than smartphones, cordless phones and slate tablets pursuant to Directive 2009/125/EC of the European Parliament and of the Council and amending Commission Regulation (EU) 2023/826 – Annex II – Article B.1.1(7).

[5] Directive (EU) 2024/1799 of the European Parliament and of the Council of 13 June 2024 on common rules promoting the repair of goods and amending Regulation (EU) 2017/2394 and Directives (EU) 2019/771 and (EU) 2020/1828 – Article 5.6

We also propose that relevant information is collected on failures, durability, and lifetime of appliances. The collection of such data will enable a better evaluation of the durability and the lifespan of appliances. Manufacturers should also keep a registry of the most common failures, and failures causing the end of the life of the appliance.

We propose that self-monitoring is also included for water heaters size XL and XXL, not only size 3XL and 4XL.

5.9. REQUIREMENTS RELATED TO REFRIGERANTS AND INFORMATION REQUIREMENTS

We propose that heat pumps with GWP refrigerants higher than 5 should have a sign on them that it contains a refrigerant that is harmful to the climate, if not collected during dismantling.

The efficiency of a HT heat pump should be shown on the product information fiche and on the label, in addition to its efficiency in MT regime. This is currently not in case in the proposal.

6. MEASUREMENTS AND CALCULATIONS (ANNEX III)

6.1. CALCULATION METHOD REQUIREMENTS

We strongly support the introduction of the compensation method for all heat pumps to replace the various test conditions in the current standard EN 14825[6]. We propose that the compensation method becomes mandatory as heat pump test method four years after the entry into force of the regulation, not only after six years.

With the current standard, a specific test software is provided by the manufacturer. Although this can be also the operational software, this it is not mandatory nor verifiable by third parties. The test software can create favourable test settings that may never occur in real life operation. If market authorities take a unit from the shelf to verify the regulated parameters, they have to ask the manufacturer to provide the (same) test software as during original testing. Requirements like: “it is not allowed to include software detecting that the unit is test condition” is meaningless for heat pump testing. “Software updates should not negatively impact regulated parameter” is also a meaningless requirement: the relation of the software update with the test software is not verifiable and may be even non-existing.

The compensation method applies the native software and immediately resolves the major drawbacks of the current test method. We therefore strongly welcome the introduction of this method.

Annex I, 1.3 point 4 requires steady state for heat pumps tested to the compensation method. We recommend keeping all potential compensation test method options open and let the best option emerge. The European Commission, as well as the European Court of Auditors, expressed the importance of product testing standards being as close to real life as reasonably possible. Requiring steady state conditions prevents the heat pump to behave during the test as in real life and therefore could hamper the full potential of real-life conditions.

6 A comprehensive list of obstacles in the standards development of heat pumps, and its solutions to overcome those, are compiled in this document: https://ecostandard.org/wp-content/uploads/2022/11/ECOS-position-on-standard-issues_MGR-For-general-audience.pdf.

Annex I, 1.3 point 4 states “the units shall not cycle during the test”. In real life, this is exactly what vapour compression heat pumps do at the higher ambient temperatures. This impact is worsened by the formulas addressing cycling operation as stated in 3.5(e).

The **degradation factor** is counterproductive. It stimulates a low compressor off-input and a high part load ratio input, resulting in a counterproductive factor. High part load outputs do result in an unfavourable capacity ratio. The impact on the total cycling correction factor is however very limited as demonstrated in below table:

Cd	0,98		0,99
CR	cycling factor	CR	cycling factor
0,1	0,847	0,1	0,917
0,2	0,926	0,2	0,962
0,3	0,955	0,3	0,977
0,4	0,971	0,4	0,985
0,5	0,980	0,5	0,990
0,6	0,987	0,6	0,993
0,7	0,992	0,7	0,996
0,8	0,995	0,8	0,998
0,9	0,998	0,9	0,999
1	1,000	1	1,000

Fig. 1: cycling factor as function of capacity ratio for Cd is 0.98 and 0.99

The table demonstrates that the impact of cycling on the COPd is very limited, moreover it is not related at all to cycling losses resulting from re-starting the compressor. This method gives no incentive to really improve cycling impact. New technologies that perform well at low loads will never be able to beat above cycling penalties. This is probably also the reason why same heat pumps are sometimes declared with a lower and higher Pdesign: the penalty for overdesign is negligible.

The compensation method, allowing cycling operation during the test, as in real life, solves this issue in a technology-neutral way. Therefore, we recommend deleting this requirement. In case further studies demonstrate that steady state is a must to guarantee a reproducible standard, the requirement can be reintroduced within a European Commission’s Standardisation Request to European Standardisation Organisations. We also suggest replacing the definition for the degradation factor (whereas (85)) with the following:

- *a factor compensating the energy input during off-state when the unit is in cycling operation.*

The main benefit of the degradation formula is reduction of the compressor off input, Manufacturers already achieved very good results. This allows simplification of the test method by introducing a cycling factor only depended on the capacity ratio:

CR	cycling factor
0,1	0,73
0,2	0,78
0,3	0,83
0,4	0,87
0,5	0,9
0,6	0,93
0,7	0,95
0,8	0,97
0,9	0,98
1	1

Fig. 2 : proposal for cycling factor to be multiplied with COPd to achieve COPbin

This table is an incentive for improving the capacity ratio and gives room for new technologies, such as acoustic heat pumps to be rewarded for low output capabilities. To maintain low values for compressor-off-input the regulation could introduce max values.

We believe that there is room for improvement related to **temperatures below the bivalent point**. In general, standards have conservative default values for not measured parameters. This does not apply to the **back-up heater (BUH)** in heat pump standards. The standard defines an assumed BUH with a 100% electrical efficient, perfectly modulating heater, hard to beat in reality.

We suggest deleting Annex I, 1.3 point 4 and applying the load and let the heat pump including the back-up heater deal with this load, as it happens in real life. This option gives the best incentive for improving the BUH strategy. Also, below bivalent point the BUH may switch on/off, hence no steady state operation is needed.

As a second-best option, in case the assumed heater is maintained, we suggest following a conservative approach. For all test points where there is a gap between heat pump output and the load, the assumed heater is considered producing its **staged output**. The heat pump contribution is the largest value of the load minus the staged BUH output and 0. This is an incentive to improve back-up heater outputs. It prevents excessive BUH capacities, hence also reduces the load on the electricity grid during winter days. Moreover, this conservative value could stimulate including the BUH in the test. It can be applied in the standard just by calculation. Related to this point, we suggest checking in the draft definition (78) where Padd(Tj) is defined as the “gap” and the formula where Padd(Tj) seems to equal the BUH output.

Not all heat pumps are delivered with BUH to the market. In those cases where the **heat pump with a BUH becomes a package**, the responsibility of this package to respect legal requirements now lies with the installer. A default BUH can be included in the test. The manufacturer has the obligation to include in the installation manual the minimum requirement for the back-up heater to guarantee that regulated parameters will be met. The installer must check and declare that the installed back-up heater meets these requirements. The current standard and the draft regulation do not include a check on the declared values of the back-up heater. If a fake or underrated back-up heater is installed, it will not be detected. If the standard is harmonised, installing a non-performing back-up heater will give presumption of conformity with EU requirements to the manufacturer. At all times a test must be performed, just to proof the output of the appliance. We recommend enabling the back-up heater just at TOL testing, only to check the combined output of heat pump and back-up heater.

ECOS supports the introduction of the **mean temperature approach** (Annex III, Table 3). This allows testing of CO_2 heat pumps and it is the only method to compare heat pumps at a level playing field. Therefore, we recommend introducing it for all heat pumps. Only then it is guaranteed that heat pumps have the same

capacity to heat up the dwelling. Applying mean temperature is also ideal when testing variable flow units to the compensation method. Further remarks related to Annex III, Table 3:

- Heat pumps supply water to an emitter system therefore apply a maximum supply temperature based on the emitter system limits.
- In case the return temperature is 20°C or lower, the logarithmic calculation cannot be made anymore, preventing already unrealistic return temperatures. The remark "*the return temperature is lower than 20°C, the mean temperature is the sum of 20 °C and the part-load ratio of the specific test point multiplied by the logarithmic temperature difference at Tdesignh of the specific climate*" can be deleted.
- Remark at **: The standard rating condition is a questionable value and it is not clear whether the output is the maximum output at 7°C. This would be factors higher as Pdesign at Tdesign. The reality is that manufacturer chooses an output, meaning they choose the flowrate for the part load testing. We suggest deleting this remark and let the manufacturer choose the optimum flowrate. The mean temperature approach safeguards applying unrealistically low flowrates. The current standard allows low flow rates for fixed speed pumps and variable compressor speed, potentially resulting in very low return temperatures. This loophole should be closed. At Tdesign the delta T of the temperature condition should respected as a minimum to avoid extreme high flows.
- Include in the table mean temperature values at Tdesign and the lowest bin temperature of the climate to allow interpolation over the complete bin range. Leave the part load column blanc.
- Especially in low load heat pumps, it is possible to have very small delta T's (Tsupply-Treturn). This jeopardizes measurement uncertainty and reproducibility. In real life, small delta T's are realistic. Reproducibility is however a standard quality that cannot be compromised. Therefore, we propose to reduce the flow by the test bench whenever necessary to maintain a minimum delta T of 3 C. The mean temperature should still be applied. The impact on the COP is estimated as small, the requirement applies to all heat pumps.

The current standard allows a 10% **tolerance** on the declared capacities. The draft regulation refers to measured values. If the same heat pump is tested twice, even in the same lab, measured values may be different. It is not clear which measurement is the basis for such test results, and this should be clarified in the Regulations. The verification tolerance is 2,5 to 5% depending on the heat pump delta T. Product variation may require declaring more conservative values than measured. While we support improvements on the 10% tolerance, a better solution could be allowing manufacturers to declare more conservative values than measured (not less) and applying a 5% tolerance in the standard for capacities at bivalent points and TOL.

Applying the compensation method makes the **Control Verification Procedure** (CVP) superfluous. We recommend anticipating the introduction of the compensation method to 4 years. If this recommendation will not be followed, we ask for reconsidering the CVP with the following modifications which we believe are an improvement:

- The test standard should establish a frequency instead of being a fail / pass standard,
- The test standard determines the starting point and heat up/cool down pace,
- The verification period should be longer than 20 seconds,
- The frequency measurement accuracy to be state of the art. We recommend ± 1Hz,
- The regulations should establish a verification tolerance. We recommend - 3 Hz.

Standard principles are to measure parameters and compare them with regulated limits. In our proposal the standard establishes the lowest frequency with controls in operation. It is a bit unusual that the regulations now need to specify the limit not as a number, bur refer to the frequency applied in EN 14825 part D testing.

As an editorial recommendation, “Minimum frequency measurement procedure” would be a better name since the controls are not verified, but the minimum frequency is established with the controls enabled.

Annex II 1.3 point 3 indicates that **single speed heat pumps** need to be tested according to the current standard. This means that domestic heat pumps, provided with a label, are compared, applying different test methods. This is far from desired, and not needed. Also test single speed heat pumps to the same method as other types. Single speed heat pumps can also be tested with the compensation method.

Any option of the compensation improves addressing **defrost losses** more realistically as the native controls are in operation. The testing time is another important parameter; we would recommend indicating either in the regulations or in the upcoming compensation method Standardisation Request to increase the test time compared to the current standard. It should be an optimum in test cost and properly addressing defrost. The test time could be limited to a maximum of 3 defrost cycles,

Hybrid heat pumps play an important (transition) role in decarbonising the heating industry. **Whereas 22** states that they must be tested by either the combined or the separate method, provided they maintain high accuracy. This "high accuracy” is difficult to establish. One can measure with high accuracy instruments, but that does not automatically mean that the result is “highly accurate". CEN internal part 3 par. 18.5.5 requires only one method, if not avoidable appoint a referee method. In line with CEN rules, we propose to apply only the combined method. **Whereas 27** requires the compensation method as test method for hybrids. The dynamic version of the compensation method is perfectly suitable for testing hybrids, apply the load and let the appliance deal with it. Moreover, any type of heat pump (CO2, acoustic, vapour pressure) can be tested applying the same load. This will give manufacturers and consumers valuable information of the **most efficient** technology for higher temperature applications. Again, this would require deletion of Annex I, 1.3 point 4 (or postpone this decision to the future mandate).

Concluding remarks on the introduction of a compensation method:

- **Timeline.** Any option of the compensation method should replace the current method in maximum 4 years after the adoption of these regulations. In case of a delayed introduction of the compensation method, re-introduce an improved version of the verifying EN 14825 applied frequency.
- **Dynamic method.** We suggest deleting steady state operations during testing. Deleting this requirement gives the opportunity to develop a state-of-the-art and technologically neutral compensation test standard. As an alternative, we suggest reconsidering steady state operations at a later stage or re-introducing it in the Standardisation Request on the compensation method. This would give standardisers more clarity on the dynamic method, making use of the full potential of the compensation method or better (closer to real life) load-based testing. Being the most technological neutral test method, it also allows for a direct comparison of high-temperature applications (hybrids with various types of heat pumps). In both options, the capacity of the back-up heater should be checked. An upcoming Horizon project meant to test the different methods addressed within this draft regulation will also contribute to the development of the best test method. It is therefore important to keep these options open.
- **Scope.** The scope should apply to domestic appliances (up to 70 kW), allowing fair comparison between all domestic heat pumps inclusive single speed compressors. Labels of one-to-one comparable product should not be measured with different standards.

6.2. OTHER REMARKS ON CALCULATIONS

The air volume allowed for ventilation air for heat pumps is 100 m^3/kW. However, we propose to reduce to 50 m^3/kW with the rest of the ambient heat should be taken from outdoor air at climate related outdoor air

condition. Ventilation heat recovery should be incentivised at national and EU level, building on current provisions in national building codes and the implementation of the Energy Performance of Buildings Directive.

We support that heat pumps can be declared as HT for design forward temperature of 65°C, in addition to MT for design forward temperature of 55°C. If they are declared as HT, their performance needs to be tested in design ($P_{designh}$) condition, with 100% capacity.

For the combination heaters made of a space heater and a hot water tank, it is important to specify in the text the heater and tank losses (P_{stby}, S) and how they are calculated as well as their units.

For **water heaters**, we propose the following provisions:

- The value for **V40 measurement** is based on the condition that the heater is turned off, giving the consumers a wrong indication/comparison, as high-capacity products will deliver more than low-capacity ones when heater is turned on. In case the V40 requirement is not met with the max load profile, the unit fails to comply (instead of reducing the max load profile). With other words, it should not be a criterion for determining the maximum load profile. During V40 testing it is essential for water heaters that the appliance remains connected. If not, it will present problems for heat pump water heaters to meet the V40 requirement. Besides, it will limit the design options to improve e.g. increasing the power output will not help. This cannot be the purpose of a regulation. We propose that this is changed: during V40 measurements, the unit should be run as in real life. The test can be stopped if the declared load profile energy has been tapped 3 times or if the temperature drops under 40 °C. This principle is already incorporated in the working draft of EN 16147.
- Measurements should be allowed to deviate from **24-hour measurement** to allow more reliable results and to avoid circumvention. Heat pump water heater testing sometimes take up to 72 hours. This is how long it takes after the tapping program to recover the energy content of the storage to the starting condition. Within CEN/TC 113/WG 10, work is ongoing to improve the method and avoid circumvention. As an additional requirement, all water heaters need to fulfil the temperature range, as required by the load profile, even during the next day of operation. This method could be simplified by introducing a requirement that in case of a storage vessel, recovery should be realised before the first tapping of the following day. This would make sure that the load profile will be met every day.
- We support that the theoretical (fictious) perfect electric heater is no longer an option as a supplement for heat pumps water heaters. In principle, we also support the proposed compromise to reduce the **hot water temperature set points** to 50°C. However, we acknowledge that 50°C is too low temperature to avoid legionella in storage water heaters. This risk can be mitigated in instantaneous water heaters and in water heaters where the heat is not stored in the hot water supply, but in a heat buffer storing energy. Some national standards require a minimum 55°C. For these countries, additional testing would be required. To avoid these additional testing, we propose that the load profile requires 55°C and that those units that do not reach 55°C but do reach 50°C receive a 5% penalty in efficiency and are disinfected by increasing temperature once per week to minimum 55°C in the coldest part of the storage. Indicating "the coldest part" makes sure that also the bottom of the tank is disinfected to protect users against legionella for those countries requiring 55°C at the tapping point. Those units that do not even reach 50°C should not be allowed on the market. This would result in a fairer label comparison of all units and will not require any additional testing at national level.
- Indoor air used for the rating conditions should be introduced with a penalty on the energy supplied by the source. A heat pump should be considered as renewable as the source energy (input in the efficiency formula) only if it is free of any fossil fuel heating, and this may not be the case for indoor air. There should be a new factor representing the **fossil load on the source** for indoor air and non-heated space to introduce this deviation as energy source input in the efficiency calculation, dependent on the climate zone with the related heating season (higher for colder climates). We would like to suggest the following factors

depending on climate zones: average climate: 0.3, warmer climate: 0.15 and colder climate: 0.6. Instead of 0 as it is in the current proposals. This principle should be applied for both heat pump space and water heaters taking air from a non-heated space. The "non-heated space" is a misleading term. The temperature condition is higher as the ambient, which requires some kind of heating. This could be changed into an "indirect heated space".

- There are different interpretations regarding the criteria for the maximum load profile within standardisation working groups. We therefore recommend a clarification of the criteria: The 24-hour tapping should be performed with the flow required for this tapping as a minimum value. The average temperature of the tapping should not be below the required temperature of this tapping (no under tolerance). The tapping stops if the indicated energy has been reached. There should be an indication on the tolerance on flow rate and tapping energy per tapping. In addition, the load profile above the max could be checked by theoretical approach or a measurement. Now the criterion is that it should fail. In case of doubt, measurement is the referee method.
- 2(h): This paragraph requires for a ventilation air heat pump water to be connected to a second climate chamber with the conditions of the climate zone, next to the 20 C condition, Please clarify how to test the LP above the declared one. This one should fail despite the additional ambient air. The test has to be performed per climate condition. We support supplementing the air flow with ambient air conditions. Some guidance for testing related to the max load profile would be helpful though.

6.3. PRODUCT COMPLIANCE (ANNEX V)

A solution needs to be found to lower the uncertainty in the measurement for the efficiency of air-to-water heat pumps (currently and proposed in draft to be 8%)

6.4. BENCHMARKS (ANNEX VI)

Given that there are already heaters on the market with efficiencies above 200% for CC=1.9, the benchmarks should be increased to at least the efficiency of the heat pump with the highest efficiency that is well documented.

Given than there are already water heaters on the market with efficiencies well above the proposed benchmarks, we propose to increase the benchmarks at least to the level of the A-label that we propose below. See comparison in below table.

Efficiency	3XS	2XS	XS	S	M	L
Draft benchmark	46%	46%	46%	90%	120%	120%
Proposed A-label	112%	112%	84%	160%	210%	260%

PART 2: ENERGY LABELLING REGULATIONS

1. SMART ENERGY ICON

We do not support the smart energy-related icon proposed for both space and water heaters. While an icon could be a good way to differentiate smart heaters from devices that are not capable of demand-side flexibility, such an icon needs to be supported by a robust methodology. The proposal defines an 'energy-smart appliance' as a product complying with the EU Code of Conduct (CoC) for the interoperability of energy-smart appliances. To date, the CoC has a limited scope that is aligned with one specific technical standard. Therefore, the smartness communicated by the icon only relies on the use cases of that standard, leaving out a whole range of important demand-side flexibility use cases. The CoC could evolve to include more use cases.

However, it is governed by a Steering Committee where only manufacturers have decision-making power. Any decision to add use cases is therefore not based on what the energy system needs, but rather on the interpretation of smartness that suits a specific group of appliance manufacturers. This is problematic because a legislative instrument - the energy label - would rely on a voluntary initiative controlled by private actors rather than on an impartial methodology.

Moreover, the current Governance rules of the CoC are not conducive to a level playing field between manufacturers. A specific group of manufacturers has been involved in drawing up the first version of the CoC, which may give them a competitive advantage. They are already implementing the use cases that are in the CoC and will therefore easily obtain the smart icon. To add use cases that fit the needs of other manufacturers, a three-thirds majority has to be found in the Steering Committee. Therefore, to obtain the smart icon, other manufacturers will likely have to adopt the approach decided by a small group of manufacturers who already invested in this approach.

A more effective way forward would be to include the requirements directly into the Energy Labelling Regulation for space and water heaters, or to establish these by means of a horizontal regulation covering several product groups with similar characteristics (in this case flexible use of energy). It is then up to market surveillance authorities to check compliance, while the specific requirements would be proposed by the European Commission and established by the usual decision-making process, instead of being decided by industry stakeholders alone. The CoC can remain in place for products that are not regulated under ecodesign yet (e.g: EV chargers) or for products of which the energy label is still to be revised.

2. SPACE HEATING

Regarding space heating labels, we firmly support the proposal, where A class is empty and fuel boilers are in the class F and G. We think that the F class threshold should be slightly higher, moving it from 90% to 92%, allowing only efficient fuel boilers to belong to the F class.

Currently the E class spans from 115% to 145% and we believe a minor modification to the upper limit, up to 150%, will spur energy efficiency for heat pumps.

3. WATER HEATING

Generally, we support the current energy class thresholds for combi-heaters (size class S and above), but we find that the A-label should be more demanding for dedicated water heaters class 3XS-XS, where the limit for the A-label should be increased to have an empty or almost empty A class. This is based on a simple comparison with the best in EPREL without apparent outliers and shown in the table below.

Efficiency	3XS	2XS	XS	S	M	L
EPREL high, CC=2.5	70%	85%	85%	85%	186%	200%
EPREL high, CC=1.9	92%	112%	112%	112%	245%	263%
Proposed A	112%	112%	112%	160%	210%	260%

Table comparing efficiencies from the most efficient water heaters in EPREL with current CC=2.5 and without apparent outliers, the same efficiencies with CC=1.9 and the proposed limit of the A class in the drafts

We propose that the lower label classes below A likewise are regulated upwards for size class 3XS – XS. Regarding noise levels, we propose that A-label for outdoor noise is reduced to 35 dB for heat pumps below 12 kW and indoor noise is reduced to 40 dB for heat pumps 6-12 kW.

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