



Technical comments on the proposal on Eco-design and Energy label requirements
for boilers – ENER Lot 1
June 2011

Brussels, 16 June 2011

Dear Mr Kolb,

EHPA, EPEE and Eurovent would like to thank you for giving them an opportunity to comment on the Eco-design and energy label documents on boilers – ENER Lot 1. As agreed, we herewith present the additional technical comments on the working documents proposed and the transitional method.

We believe that updating and streamlining the documents according to these suggestions will result in a clearer Regulation that can be executed more efficiently.

In view of the technical proposals, we would like to submit the following proposals for modification:

1. Modifications on the transitional method;
2. Modifications on the installer label for heat pumps, for adding an auxiliary resistive heater or gas boiler;
3. Modifications on the installer label for fossil fuel boilers, for adding an auxiliary heat pumps;
4. Position on tolerances for annex III

We hope that this paper will help you in a positive and constructive way, in your technical work on the working documents.

Should you have any questions, we remain at your disposal.

Kind regards,

A handwritten signature in blue ink, appearing to read 'Thomas Nowak'.

Thomas Nowak
EHPA

A handwritten signature in blue ink, appearing to read 'Andrea Voigt'.

Andrea Voigt
EPEE

A handwritten signature in blue ink, appearing to read 'Joop Hoogkamer'.

Joop Hoogkamer
EUROVENT

1. Modifications on transitional method with track changes:

Heat Pump related topics in the current working document for Transitional Method take into account primarily *electrically driven* heat pumps (EHP) and their specific standards (EN14511 and EN14825). This document should also integrate the considerations about **gas heat pumps**, with the intention to properly compare all the heat pumps, while remaining the closest to the approach used in the standards for EHPs.

So, heat pump boilers category should cover:

- vapor compression electrically driven heat pumps;
- liquid or gaseous fuel sorption heat pumps. That is to say absorption and adsorption heat pumps.
- vapor compression liquid or gaseous fuel engine driven heat pumps;

The European Standard prEN 12309 (Part 1 and Part2), dealing with liquid or gaseous fuel sorption heat pumps is under revision within CEN/TC299 – WG2. Revision will include (as recommended by European Commission) calculations for:

- Partial load performance measurement. A working document dealing with testing methods at full load and part load has been prepared within the CEN/TC299 WG2 experts group.
- Auxiliary Electrical Consumption. A working document dealing with auxiliary electricity consumption measurement at full load and partial load has been prepared within the CEN/TC299 WG2 experts group.
- Seasonal energy efficiency. A working document dealing with testing methods at full load and part load, including a Seasonal Primary Energy Ratio (SPER) calculation method, has been prepared within the CEN/TC299 WG2 experts group.

According to the Chair of CEN/TC299, the revised draft for prEN12309 including above mentioned calculations is expected to be prepared by October 2011.

Currently there is no European standard dealing with vapor compression liquid or gaseous fuel engine driven heat pumps. A working group (CEN/TC 299 – WG3) is going to create a new EN standard to address this need.

In ANNEX I you can find our recommendation for managing the transitional period from the release of the European regulation to the release of the revised prEN12309 and newly created norm for engine driven heat pumps.

Also you can find a tracked changes document that includes all the necessary changes and adaptations to accommodate to the largest possible overlap with the soon to be finalised prEN 14825.

2. Installer label for heat pumps for calculation of the bonus related to auxiliary electric resistive heater or fossil fuel heater

The installer label has to be modified as follows to ensure a more "proper" calculation:
 The present proposal is not considering the effect of additional electric or fossil fuel boilers correctly. It should consider the capacity ratio in relation to the malus that can be achieved. In general we support the proposal by BWP for improvement of the label.

Seasonal space heating energy efficiency of heat pumps (%)

Storage tank buffering heating water
 Entry from storage tank fiche: Rating A = 'x' %; Rating B = 'x' %
 Rating C = 'x' %; Rating D, E, F, G = 'x' %

Temperature control
 Entry from temperature control fiche: Class IV = 11%; Class V = 12%;
 Class VI = 13%; Class VII = 13,2%;
 Class VIII = 13,5%; Class IX = 13%

Solar assisted space heating
 Entries from fiches of solar panel and storage tank:
 Collector size, m² Tank volume, m³ Collector efficiency Tank rating Tank position
 (III^a × + IV^a ×) × 0,45 × × × =

Auxiliary gas/oil boiler
 Entry from fiche of gas/oil boiler: Seasonal space heating energy efficiency
 (- 40) × 0,01 =

Seasonal space heating energy efficiency of this configuration (%) =

Seasonal space heating energy efficiency class of this configuration in average climate conditions

Heat pump installed with low temperature heat emitters at 35°C ? + 25 =

Indication of energy efficiency variation in colder and warmer climate conditions
 Warmer: + 'V' = Colder: - 'VI' =

Air-Water

CR	elektrisch	fossil
1	0	0
0,80	-0,44	0,04
0,70	-1,35	-0,11
0,60	-3,60	-0,41
0,50	-8,05	-1,12
0,40	-16,10	-2,80

X Etas/100%= (Zeile 5, Fiche heat pump)

Brine-Water

CR	elektrisch	fossil
1	0	0
0,87	-0,27	0,03
0,80	-1,14	-0,25
0,70	-4,05	-1,15
0,60	-10,24	-3,18
0,52	-19,32	-6,58

For CR following definition should apply:

$$CR = (P_{designh} / \text{max. Head load @ } T_{design})$$

The maximum heat load at T_{design} is to be determined by the installer, when evaluating what the real load of the building is where the heat pump is to be installed. The installer is in general required to determine the load of the building, and as such it is assumed to be known.

3. Installer label for fossil fuel boilers for calculation of the bonus related to auxiliary heat pumps

Main issue of concern:

In view of hybrid systems, the scope should be clarified and the calculation method should be improved.

Hybrid systems (fossil fuel boilers and heat pumps in one casing) are now excluded from the scope for energy label and Eco-design requirements.

This implies that these products do not need to meet the minimum requirements for Eco-design, secondly they are not able to apply a manufacturing label.

Although not in scope, the legal text explains it is possible to add a product fiche, using the calculations as prescribed. However, in our understanding it is not possible to add a manufacturing label on the product.

Next to it, the calculation in the product fiche underestimates the bonus that can be achieved by adding a heat pump compared to a detailed bin calculation according to prEN 14825 and should be modified accordingly.

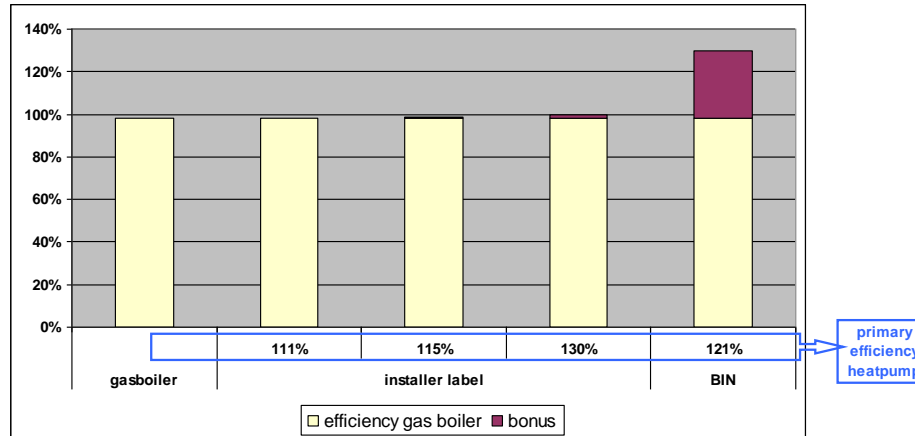


Figure 2: comparison of installer label and bin method according to prEN 14825 of a 32kW boiler (etas 94%) with a 8kW heatpump

Furthermore it should be understood that heat pumps used in the hybrid system are only used from a certain temperature (2° or higher) and are not able to meet the minimum requirements since these heat pumps are not designed to operate below 2°C. However, based on the Eco-design scope, we believe that these heat pumps are out of scope (or should be out of scope)

Proposal to improve the installer label

1. The assumption is made that the hybrid system will rely on the fossil fuel boiler below 2°C ambient temperature, and the heat pump will operate above 2°C ambient onwards. Usually a big fossil fuel boiler will be supported by a small heat pump. The load will be lower than the maximum capacity of the fossil fuel boiler. In this setup 60% of the load is covered by the heat pump and 40% of the load is covered by the fossil fuel boiler.

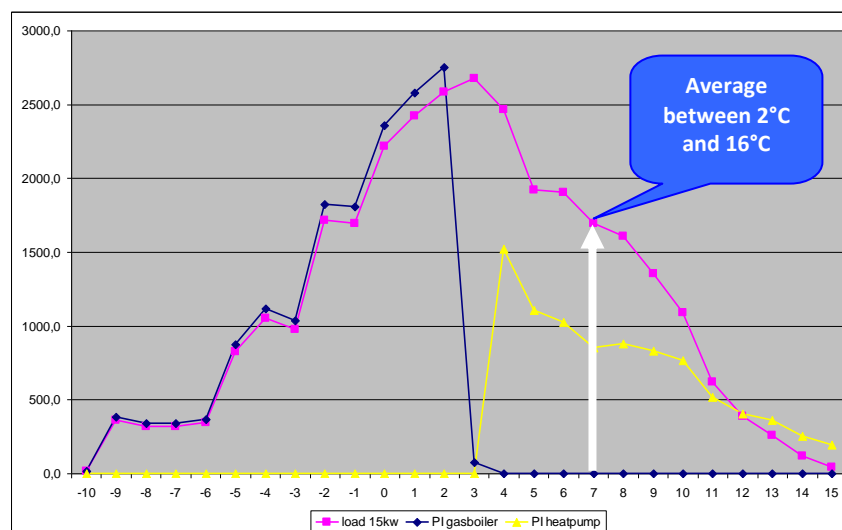


Figure 3: BIN of a combination of a 32kW gasboiler with a 8kW heatpump at design load of 15kW with bivalent temperature at 2°C.

- The heat pump provides energy from 2°C to 16°C, in that area the average condition is 7°C. As such, we propose to use as hybrid coefficient of performance at 7°C. The hybrid capacity should be defined as the capacity at 2°C.

This results in following formula:

$$60\% \times (0,4 \times \boxed{\text{“hybrid” coefficient of performance}} - 1) = \boxed{\text{6}}$$

With **“hybrid heat pump coefficient of performance”** to be defined at 7°C. This implies a modification of following definition:

- (66) “hybrid coefficient of performance/hybrid heat pump power” means the coefficient of performance/capacity used as input for evaluating the seasonal space heating energy efficiency of combinations of heat pumps and fossil fuel boilers, referred to in point 1(2) of Annex III. For air-to-water heat pumps it is the declared Coefficient of performance/Declared capacity for part load pertaining to outdoor temperature $T_i=2^\circ\text{C}$ under average climate conditions. For water/brine-to-water heat pumps, it is the declared Coefficient of performance/Declared capacity at part load condition 0,54 under average climate conditions;

$T_j=7^\circ\text{C}$

In order to validate this method, herewith you can find a comparison of the values achieved in relation to the BIN and in relation to the former method:

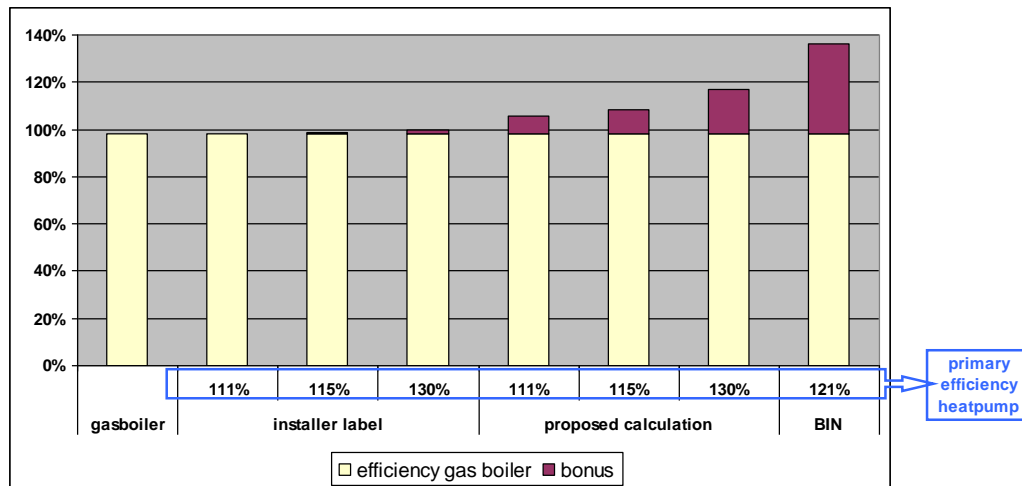


Figure 3: comparison of the results for present installer label, new proposal and bin method according to prEN 14825 of a 32kW boiler (etas 94%) with a 8kW heat pump

Implications on the scope for Ecodesign requirements

For us, it is not clear if a hybrid system and the fossil fuel part of hybrid systems is considered in scope. From the current wording of the legal text, we understand hybrid systems to be out of scope, and as a consequence, also the combination of heat pump and fossil fuel boiler.

We suggest rewriting the current text for more clarity using any of these 2 options:

- modify article 1 (2) by adding item (i)

(i) heat pumps integrated in hybrid systems

2. declare these heat pumps in scope but make them subjected to minimum requirements at other conditions:

Heat pumps integrated in hybrid systems shall comply with the minimum requirements as defined in annex I, for warmer climate conditions.

Implications on the Energy label requirements

It should be clarified that there is no requirement to add the manufacturing label on the fossil fuel boiler and the heat pump for hybrid systems. Only the installer label should be presented.

4. Tolerances for annex III (Ecodesign) annex VIII (energy label) on market surveillance

Measurement of heat pump system efficiency is more complicated than measurement of boiler efficiency. This result in greater difficulty of achieving lower values of measurement uncertainty mainly due to the fact that the temperature difference between feed-in and return temperature is very low (often not exceeding 5°C).

According to EN14511, the maximal allowed measurement uncertainty is 5 %, but lower values can often be obtained in accredited test laboratories, especially on liquid-to-water heat pumps for which an energy balance can be performed. The value depends on several circumstances and the lowest values are probably around 2-3%.

When testing is performed according to prEN14825 the maximal allowed measurement uncertainty is higher than 5% for part load. If the testing is performed with the maximal allowed uncertainty according to this standard, the uncertainty for SCOP on can well be up to 9-10%. However, we think much lower values of the uncertainty can be reach in most cases, especially for liquid-to-water heat pumps in on-off operation.

Due to all these differences in technology we believe that the measure should maintain 8%.
