Introductory note: EHPA would like to thank the study team for the work already carried out and welcome the opportunity given to comment on the options proposed in the final reports as well as the discussion paper for WG3 meeting “Calculation”. Please find below EHPA’s comments on several options and recommendations addressed during the experts meeting of 10th March 2020.

1. ACCOMODATING HYBRIDS

VHK claims that “Sophisticated packaged solutions (‘hybrids’) - i.e. central hydronic space heaters with multiple heat generators - are hardly accommodated in the legislation. The Ecodesign regulation only addresses efficiency limits for individual heat generators, using some simplified rules for back-up (‘supplementary’) heaters where it is unavoidable. In the Energy Label regulation, hybrids are handled in a crude manner, e.g. using arbitrary tables for weighting, and in an inconsistent manner, i.e. introducing an artificial dichotomy between hybrids with preferential and supplementary heat pumps. This raises disputes over what is still permitted and what not.”

After thorough consideration of VHK concerns and proposals, EHPA believes that:

 dez The current definition, calculation, declaration and requirements level of heat pump space heater as established under regulations EU 811/2013 and 813/2013 and clarified by the commission guidelines must be kept. They are well understood and accepted by consumers, industry, testing labs and market authorities and aligned with similar heating products in other eco-design lots to allow fair comparison. The proposed changes for already established products are not justified and will lead to confusion at all levels, threaten the built momentum by the previous regulation and potentially to bring back to the market previously banned products.

 dez For products that are not fully covered by the existing definition, we recommend the introduction of a new product category “hybrid heat pumps” with a new specific energy efficiency threshold value, and with the current specific requirements about sound power level and NOx emissions.

EHPA position is built on the following reasoning which is for space heaters but applies similarly to combination heaters.
Before entering into the details of proposed test methods and calculations for hybrids, general issues shall be raised considering the discussion during the first WG3 meeting:

a. Definitions

There is a clear need to remind and to clarify some definitions in order not to restart from scratch:

- The definition of a heat pump space heater and heat pump combination heater according regulation 813/2013

(17) ‘heat pump space heater’ means a space heater using ambient heat from an air source, water source or ground source, and/or waste heat for heat generation; a heat pump space heater may be equipped with one or more supplementary heaters using the Joule effect in electric resistance heating elements or the combustion of fossil and/or biomass fuels;

(19) ‘supplementary heater’ means a non-preferential heater that generates heat in cases where the heat demand is greater than the rated heat output of the preferential heater;

These products are designed so that the supplementary heater will only cover the coldest days of heat demand, allowing reducing the capacity of the heat pump and its operation in part load conditions and thus providing better energy efficiency.

As confirmed under question 8 of the Commission guidelines for regulation 811/2013 and 813/2013, heat pump space heaters equipped with a back-up heater, whatever the energy of the back-up heater are considered as products, fully covered by Regulation 813/2013, tested according to EN14825, shall meet specific requirements in order to be placed on the market (in particular, TOl and Tbw shall respect the limits as defined in Annex III table 4), and are provided with dedicated energy labels.

From the information requirements (Annex II Table 2 in Reg. 813/2013), it is also understood that the heat pump space heater may not be equipped with its supplementary heater but considered in the declared energy efficiency.

It is important that the heat pump space heater definition remains unchanged because:

- Energy efficiency wise, it is more beneficial to use an electrical backup heater the coldest hours and reduce recurrence of cycling on/off operation (only applicable to variable speed heat pump) as much as possible in the heating season.
- Keeping the backup as an optional equipment is important as the backup might not be needed in places where Tdesign is higher than -10°C, especially in warmer climate
- Keeping the backup as an optional equipment is important for renovation where the heat pump is ducted to an existing boiler. The energy efficiency thresholds apply to the heat pump + backup whatever is the Tbw, this allows for the comparison of all heat pump space heaters.
- To keep consistency with other eco-design lots addressing heat pumps with heating function (EU 206/2011 and EU 2281/2016) in order to allow consumer to fairly compare these products.
• Definition of a heat generator according to regulation 813/2013

(5) ‘heat generator’ means the part of a heater that generates the heat using one or more of the following processes:

(a) combustion of fossil fuels and/or biomass fuels;
(b) use of the Joule effect in electric resistance heating elements;
(c) capture of ambient heat from an air source, water source or ground source, and/or waste heat;

Since 1st of January 2018, all heat generators placed on the market shall be compliant with regulation 813/2013.

• Definition of a space heater according to regulation 813/2013

(2) ‘space heater’ means a device that

(a) provides heat to a water-based central heating system in order to reach and maintain at a desired level the indoor temperature of an enclosed space such as a building, a dwelling or a room; and

(b) is equipped with one or more heat generators;

In principle, a space heater can be equipped with several heat generators. However, only four categories of space heater are defined:

- boiler space heaters: (12) ‘boiler space heater’ means a space heater that generates heat using the combustion of fossil fuels and/or biomass fuels, and/or using the Joule effect in electric resistance heating elements;
- electrical boiler space heaters: (14) ‘electric boiler space heater’ means a boiler space heater that generates heat using the Joule effect in electric resistance heating elements only;
- Cogeneration space heaters: (16) ‘cogeneration space heater’ means a space heaters simultaneously generating heat and electricity in a single process;
- heat pump space heaters: (17) ‘heat pump space heaters’ means a space heater using ambient heat from an air source, water source or ground source, and/or waste heat for heat generation; a heat pump space heater may be equipped with one or more supplementary heaters using the Joule effect in electric resistance heating elements or the combustion of fossil and/or biomass fuels;

A space heater that generates heat using the combustion of fossil fuel and a thermodynamic cycle, none of them designed as a supplementary heater, sold under a unique model identifier is not defined.

As a consequence, where a heat pump is combined with a fossil fuel burner in a space heater the only available option is to consider a package of a heat pump space heater and a boiler space heater following the rules in annex IV of regulation 811/2013. Thus, the heat pump shall be compliant with regulation 813/2013.
In particular, TOL and $T_{biw}$ shall respect the limits as defined in Annex III table 4:

<table>
<thead>
<tr>
<th>Reference design temperature</th>
<th>Biw temperature</th>
<th>Operation limit temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_{design}$</td>
<td>$T_{biw}$</td>
<td>TOL</td>
</tr>
<tr>
<td>$-10 \pm 11 \degree C$</td>
<td>maximum $+2 \degree C$</td>
<td>maximum $-7 \degree C$</td>
</tr>
</tbody>
</table>

When the fossil fuel heater complements the heat pump heater, as it is generally, the figure 3 is used and then the preferential heater is the heat pump.

When the preferential heater is the boiler, or for example in case a low temperature heat pump is associated to a fossil fuel combination heater, the figure 1 is used, even if this situation does not always reflect reality.

On the other hand, where package with fossil fuel space heater, the boiler shall be compliant with regulation 813/2013 (in particular, Seasonal energy efficiency and NOx shall respect the limits as defined in Annex II).

Finally, packages with heat pump and fossil fuel space heater request to provide the dedicated energy label (one product label per heat generator + one package label) in order to be placed on the market.

b. Introducing the hybrid heat pump space heater

There is today no consideration in the regulation 813/2013 of a product including a heat pump generator and a fossil fuel generator not integrated in the same casing and put as such on the market, for which each generator cannot necessarily be tested separately and not fulfilling the requirement on $T_{biw}$/TOL but still providing a better efficiency than the boiler alone.

As of today, a heat pump space heater that shows a TOL above $-7\degree C$ and/or a $T_{biw}$ above $+2\degree C$ under average climate is not compliant with regulation 813/2013. Thus, even where associated with a fossil fuel space heater in a package, the package cannot be labelled according to regulation 811/2013.
In addition to the current definition of a heat pump that shall remain as such, i.e. considering a possible backup heater to the heat pump whatever the energy used is, and requirements on $T_{biv}/TOL$, it is necessary to introduce another category of space heater.

In view to solve this issue for the most common encased assembly or assemblies designed as a unit, EHPA suggests to firstly create a new category of product within regulation 813/2013 and by using current existing standards, rules and state of play. In this regard:

- This new category of product could be named “Hybrid unit”.
- A hybrid heat pump could be defined as it already exists in EN14825, without the need to define a preferential heater:
  - (XX) “hybrid unit” : encased assembly or assemblies designed as a unit consisting of an air/water(brine)/DX-to-water(brine) electrically driven heat pump with a second heat generator using fossil fuel, and managed by a common controller or providing an optimized operation of the heat generators for space heating or DHW.

- As the hybrid heat pump space heater would be considered as product, it would necessarily have to be placed on the market by one single manufacturer as a complete product integrating the heat pump, the fossil fuel boiler and the combined control.
- The hybrid heat pump space heater will not require fulfilling the $T_{biv}/TOL$ requirements on limit values. The common controller allows taking the best benefit of the operation of each generator for achieving the highest efficiency, the lowest CO$_2$ emissions or the lowest energy bill or any other indicator. In that sense the limits on $T_{biv}$ and TOL are not anymore relevant for those products.
- The hybrid heat pump space heater could be tested according to a unique test method or several test methods – see pending issue still in discussion by joint CEN TC113/TC109 WG [combined method and/or separate method (EN 14825) and/or simplified method proposed by TC109].
- The hybrid heat pump space heater should comply with a new specific energy efficiency threshold value with a fixed value still to be defined, and with the current specific requirements about sound power level and NOx emissions (56 mg/kWhPCS for gas boiler and 120 mg/kWhPCS for oil boiler), in order to be placed on the market.
- Some hybrid products, already existing on the market, cannot be tested using any other method than the combined method as the two heat generators cannot operate independently:
  - the incoming air used in the heat pump is pre-heated with the fumes. At outdoor temperature where both the heat pump and the burner are in operation, it is not possible to test both generators independently;
  - the heat pump is used to pre-heat the water, both heat generators are always in operation;
  - the heat pump has no active defrost operation system and thus cannot be tested as a stand-alone product;
  - etc.

It is important to offer the possibility of testing hybrid using combined and separate method.
c. **Setting of specific requirements for hybrid heat pump space heaters**

The following elements should be taken into consideration:

- Seasonal space heating energy efficiency: more than 86% (fossil fuel boiler) but not more than 130% with CC=2,1 (heat pump MT). A possible value shall be further investigated.

- Safeguards will also need to be defined to avoid place back on the market of non-efficient fossil fuel boilers, as of today banned from the market.

- Water heating energy efficiency:

<table>
<thead>
<tr>
<th>Water heating energy efficiency per tapping profile, once adapted with the new PEF of 2.1</th>
<th>second heat generator using fossil fuel = Storage COMBI</th>
<th>second heat generator using fossil fuel = Instant COMBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>3XS-XXS-XS-S tapping profiles</td>
<td>% (45%)</td>
<td>% (72%)</td>
</tr>
<tr>
<td>M tapping profile</td>
<td>% (56%)</td>
<td>% (75%)</td>
</tr>
<tr>
<td>L tapping profile</td>
<td>% (68%)</td>
<td>% (82%)</td>
</tr>
<tr>
<td>XL tapping profile</td>
<td>% (78%)</td>
<td>% (90%)</td>
</tr>
<tr>
<td>XXL tapping profile</td>
<td>% (100%)</td>
<td>% (110%)</td>
</tr>
<tr>
<td>3XL-4XL tapping profiles</td>
<td>% (105%)</td>
<td>% (115%)</td>
</tr>
</tbody>
</table>

- Should be provided with a dedicated energy label (as for all current heaters), which could be the same energy label as the one used for heat pump.

Having said that, **EHPA recommends keeping the current logic ranking in terms of energy efficiency thresholds for heating as it is now, and positioning “hybrid heat pumps” between “heat pumps” and “boilers”: Energy efficiency threshold for heat pump > Energy efficiency threshold for hybrid heat pump > Energy efficiency threshold for fossil fuel boilers.**

d. **Packages of space heaters**

It should still be possible for installers to assemble several heaters in a package on the field. The consultant proposes to change figure 1, 3 and 4. In that event, all generators are compliant with eco-design regulation, and no specific threshold for the packages are needed. EHPA does not support the consultant’s proposal and recommends maintaining the current method for packages, which is appropriate and is already being used.
2. PEF CORRECTED ECODESIGN LIMITS FOR SINGLE HEAT GENERATORS

EHPA strongly disagrees with the proposal of harmonising the testing for boilers and heat pumps and consequently test heat pumps with a 65°C water regime. This proposal goes beyond a simple PEF correction as the consultant presumes that heat pumps (except LT heat pumps) should be rated under HT regime while maintaining the limit of MT regime.

Also, the limits are indicated for single heat generators, which according to the consultant does not include heat pump as defined today.

Furthermore, on the proposed limit-calculation for packages, the definition also seems to be inconsistent with current regulation as the consultant assumes if heat pumps have an eta of 130%, then with back up heater efficiency will be 100% assuming worst scenario for T_{bx} +2degC and TOL -7degC. Whereas the current MEPS for heat pumps taking into account the back-up heater is defined at 130%.

Therefore, EHPA urges the consultant and the Commission to maintain the MT application as the mandatory rating conditions for heat pump.

3. TEMPERATURE CONTROL FACTOR F(1)

EHPA disagrees with the proposal of increasing the value of the temperature control factor F(1) to a default of 8% instead of 3%.

Adjusting the temperature control factor F(1) to 8% instead of 3% is not only too high but will also result in the penalisation of -5%, which is not justifiable to customers. Moreover, manufacturers will have to review control factors to achieve the same efficiency. Consequently, such a proposal is penalising the heat generator for issues related solely to buildings. It is something that heat pumps could anyway not compensate for, as it is not linked to the product itself.

Furthermore, control correction, especially for an external system, is not in the scope of ecodesign and does not serve ecodesign’s purpose which is to help compare products and help customers choose the most efficient product. Consequently, the only correction of controls that are provided with the system (can be compensated) should remain.

Therefore, EHPA recommends maintaining the temperature control factor F(1) at 3%.
Initial response VHK to EHPA comments (on 1st WG3 meeting)

date: 2020 April 15

The proposal in the first section is interesting and we are looking forward to reactions from other stakeholders, notably those representing the interests of other central hydronic space heat generators (fossil fuel fired boilers, chp, solar thermal, ventilation exhaust air). Also the reaction of standardisation experts on the feasibility of using the combined method for hybrids will be of special interest.

Section 2 opposes the proposal for a harmonised (LT + ) HT regime for the main heat generators (gas/oil boilers and heat pumps) at a HT-regime as defined in EN 14825, i.e. at a 65 °C feed temperature at 100% load, compared to the current 55 °C for heat pumps and the current 80 °C for gas/oil boilers. While not denying that the MT regime might be adequate in many cases, the rationale for the proposal is that in other cases it will not be sufficient and suitability for a HT regime will open those markets for the heat pump and will avoid possible disappointments, functionally and/or economically, with the end-users. At the same time, a heat pump with proper HT functionality also will meet MT functionality in space heating and will contribute more to water heating in a combi-configuration. Furthermore, if testing costs are a concern, a regulation could allow inter-/extrapolation practice for variable speed driven (90% of the market) heat pumps.

In its paper, EHPA does not address the issue underlying the consultants' proposal but contests the drop on the nominal heat pump seasonal efficiency number at HT versus MT regime. At the same time, EHPA shows that one of the consultant's preliminary proposals for limits is less ambitious (with HT-regime) than the current efficiency limit with MT-regime. So, in fact there is not necessarily a problem with the ecodesign limits.

In the third section, EHPA contests the proposal to increase the temperature control factor (F1) from 3% to 8%. EHPA's reasons are directed towards keeping the status-quo as regards current efficiency numbers. As mentioned earlier, it is the intention of the consultants’ proposal to adjust the limit accordingly, so that is not the issue. The reasons for the consultants’ proposal, i.e. making the Ecodesign/Energy Label efficiency numbers more comprehensive (realistic) and thus easier to integrate in the national EPBs, are not addressed. An alternative proposal to solve that problem, from EHPA or others, would be highly appreciated.

Overall, rest assured that we fully support heat pumps as a vital part of reaching EU policy goals in space heating. Our main concern is that the heat pump (and its combi’s) market will not grow enough in the short time given for those goals; certainly not the opposite.

VHK/RK/20200415