Review of Ecodesign Lot 1

Carrier position on energy efficiency limits for low temperature heat pumps

The review clause of regulation (EU) N° 813/2013 concerning Ecodesign requirements for space heaters and combination heaters (Lot 1) includes the appropriateness of setting stricter efficiency requirements. Carrier, a worldwide leader of HVAC equipment, welcomes all initiatives towards more sustainable products.

At this point in the preparatory work, Carrier would like to express concerns about the alternative suggestion raised in the report to the European Commission by consultancy VHK to eventually increase seasonal space heating efficiency of low temperature heat pumps to 170-175% (paragraph below Table 1 of preparatory study Task 6 report on page 15)

Carrier has analyzed the consequences of this suggestion and would like to draw the attention of VHK and the European Commission to the following:

1. The increase of seasonal space heating efficiency from 125% (PEF 2.5) to 175% (PEF 2.1) could correspond to an enormous increase of 20% of the SCOP

2. Setting exaggerated energy efficiency requirements for heat pumps could lead to higher greenhouse gas emissions

3. The setting of seasonal space heating energy efficiency to 175% will lead to the elimination of 90% of air-to-water heat pump units today offered on the market

Further explanations for each concern are given in the following pages;

1. The increase of seasonal space heating energy efficiency to 175% (PEF 2.1) combined with the other proposal to change F(1) correction factor from 3% to 8% (Task 6 report, 6.4 temperature control, page 99) will mean an increase of the SCOP by 20% compared to the current requirement. It is important to notice that for heat pump manufacturers, what matters is the SCOP in final energy, indeed only the SCOP is measured by performance tests.

<table>
<thead>
<tr>
<th>Low temperature air to water heat pumps</th>
<th>Current PEF adjusted</th>
<th>Task 6 (worst case)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal space efficiency %</td>
<td>125</td>
<td>149</td>
</tr>
<tr>
<td>SCOP (final energy)</td>
<td>3.20</td>
<td>3.20</td>
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<tr>
<td>Delta</td>
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The suggestion to increase seasonal space heating energy efficiency by 20% is disproportionate, it is more than twice the efficiency increase accomplished with the implementation of Tier 2 requirements in September 2017 (+8.5% between Tier 1 and Tier 2).

An increase of 20% in the product efficiency will require a complete reconsideration of heat pump design and will significantly increase the dimensions and the cost of heat pumps. This would lower the advantages of heat pumps compared to heating systems using fossil fuels.

2. Low temperature heat pumps are reversible systems providing both space heating and cooling in commercial buildings. In these buildings, due to the heat rejected by technical systems, very often, the building’s cooling demand is greater than the heating demand. Furthermore, low temperature heat pumps are mainly used in Southern Europe where the cooling season lasts longer than the heating season (see market breakdown below).

There is a risk that the increase of seasonal space heating energy efficiency by 20% will be achieved at the expense of the energy efficiency in cooling mode. Indeed, when designing reversible heat pumps, engineers must make compromises to balance heating and cooling energy performances. In conclusion, an exaggerated increase of seasonal heating energy efficiency might lead to a reduction of the efficiency in cooling mode and translate into higher greenhouse gas emissions.
3. According to our analysis based on seasonal energy efficiency data for air-to-water heat pumps available on Eurovent Certita Certification web site, setting seasonal space heating energy efficiency to 175% will lead to the withdrawal of 90% of heat pumps currently available on the market. Even if this new limit would not be applicable before a couple of years, the elimination of so many products is not realistic.

Conclusions

The alternative suggestion to increase the seasonal space heating energy efficiency of low temperature heat pumps to 175% would be exaggerated in our view and could lead to negative consequences for the HVAC industry and the environment through the disadvantage it would create for LT heat pumps. Carrier strongly advises the consultant and the European Commission to be very careful when assessing potential increases of seasonal space heating energy efficiency limits for low temperature heat pumps.