Annex 39

Technology Collaboration Programme on Heat Pumping Technologies (HPT TCP)

A Common Method for Testing and Rating Residential HP and AC Annual/ Seasonal Performance

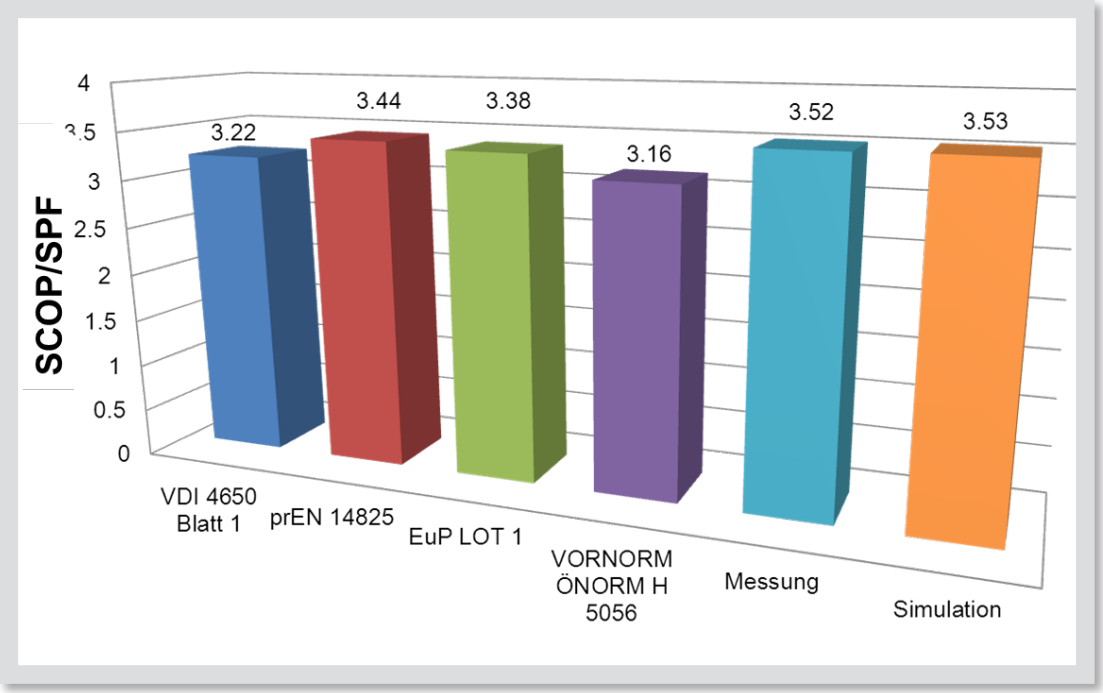

Figure 1. Comparison of different calculation methods with one field monitoring site.

Heat pump performance is an important topic, both for end users' economy and for policy makers to understand how they contribute to energy efficiency, environmental goals, etc. It is also an important factor when comparing different heating applications.

This Annex focuses on improvements of lab methods and related standards for performance evaluation, and creates a better understanding of differences between methods and standards, with the final goal to harmonize them.

Strengths and weaknesses with current methods have been analyzed and a SWOT analysis of existing standards has been done.

Success Stories

Comparisons on how different calculation methods predict the seasonal performance have been performed in the Annex, showing that the calculations almost always underestimates the real performance of the heat pumps, but that they are close to real performance.

A comparison was made for one field monitored site, where monitored Seasonal Performance Factor (SPF) was used as a benchmark. As can be seen from Figure 1 above, all calculation methods underestimated the SPF compared to the monitored value (Messung).

Results

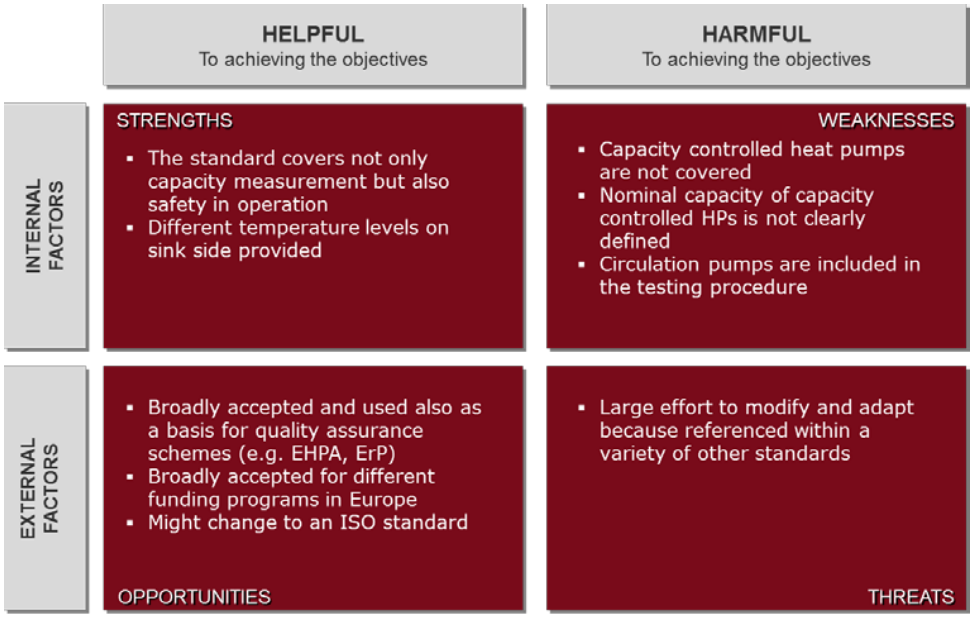

Figure 2. Results from the SWOT analysis of existing standards.

Background

There are numerous methods for calculating the SPF, taking into consideration different national geographic conditions and other special conditions. There was a quite clear view that calculation methods for different climates may need to be local. However, considering the test points for lab test standards, not many test points differ between different national standards. It would therefore be of interest to make a thorough evaluation of the consequences of harmonizing the test point parameters for lab testing.

Methodology

By looking into the development of products, the complexity of different building traditions and climatic conditions, we have developed a set of requirements that a completely new test/calculation method should be able to handle. Some of the most important are listed below, but all are presented in the Final Report.

To better compare heat pumps' benefits with other heating technologies, but also to better understand performance of heat pumps, a number of other measures could be used to understand:

a. The improvement potential of heat pumps and heat pump systems

b. The competitiveness of heat pumps regarding environmental performance, compared to other competing technologies

Conclusions

This annex provides proposals for harmonizing test standards, but also extends to give suggestions for building test chambers in an similar way in different countries. It also proposes alternative measures to describe the technical, environmental and financial performance of heat pumps.

Further information

Contact person: Operating Agent was Roger Nordman on behalf of SP Technical Research Institute of Sweden in Sweden, roger.nordman@sp.se

Participating countries: Austria, Finland, France, Germany, Japan, the Netherlands, South Korea, Sweden (OA), Switzerland, and the United States

Publications: Final Report of Annex 39 and Executive Summary of Annex 39, available at www.heatpumpingtechnologies.org