EU Energy Label for heating appliances - Optimization of test standards for heat pumps

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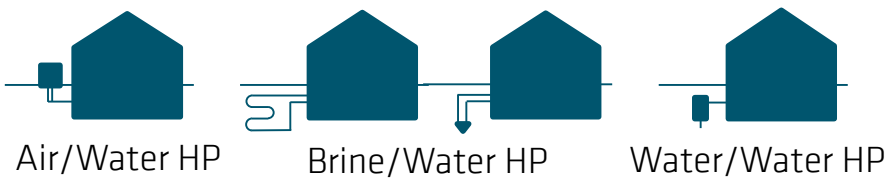
Introduction

To guarantee the full realization of the energy saving potential of the EU Ecodesign and Energy Labelling Directives an effective market surveillance is required. Due to the limited financial resources of the market surveillance authorities reliable, quick and cost-effective test methods are necessary for the elimination of non-compliant products. In this study heat pumps as a prospective and high efficient technology for heating are investigated regarding their standardized testing method EN 14825[1].

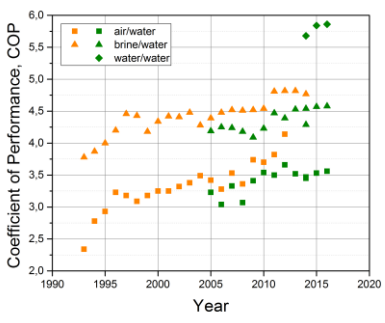
Heat pump development

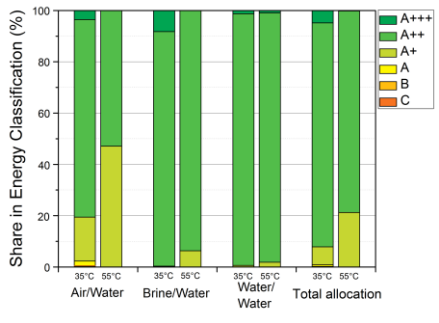
Three HP types of construction:



Increase of the energy efficiency and classification in the energy classes A+++ to C due to:

- Funding programs such as the Market Incentive Program[2]
- Introduction of the Energy Label for heating appliances in 2013
- Introduction of the Inverter technology (VSD)
- Improvement in defrosting procedures



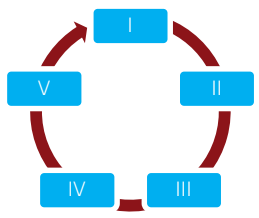


Methods

Round Robin Test with 5 accredited test laboratories:

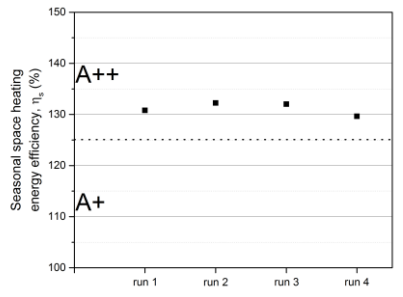
- Test method EN 14825 (Commission Delegated Regulation (EU) No 813/2013[3])

2 brine/water heat pumps:
42 kW
10 kW

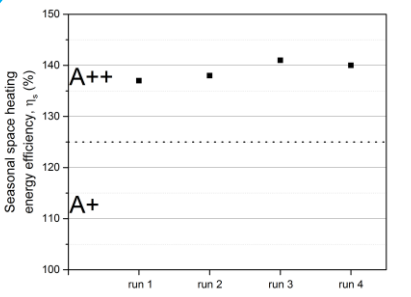


Each laboratory:
4 repetitions

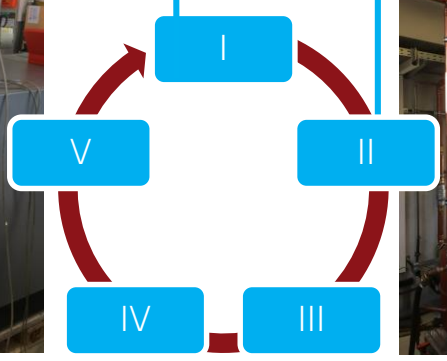
Results

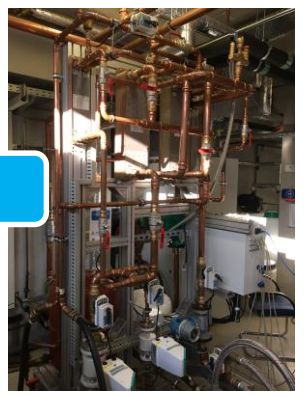


brine/water heat pump (10 kW)



brine/water heat pump (42 kW)





- The test method delivers repeatable results
- Manufacturer's declaration is confirmed for both HPs
- The measurement procedure is very time-intensive and implicates high financial effort
  → too expensive and time-consuming for the demand of market surveillance authorities
- First comparisons intend that the test method is also reproducible

Conclusion

Improved test method (Under development)

- New method for performance controlled heat pumps (inverter)
  → more realistic
- Reduction of measurement points (2 instead of 6)
  → 60 % saving of costs and time

Make it quicker

- Adjusted precision of temperature values (current method:± 0.2 K)
  → screening with ± 0.5 K

References

[1] Normenausschuss Kältetechnik (FNKä) im DIN, *Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling – Testing and rating at part load conditions and calculation of seasonal performance* - German version EN 14825:2016. Berlin, 2016.

[2] Federal Ministry of Economic Affairs and Energy, *Richtlinien zur Förderung von Maßnahmen zur Nutzung erneuerbarer Energien im Wärmemarkt*. Germany, March 2015.

[3] European Commission, *Commission Delegated Regulation (EU) No 813/2013* in Official Journal of the European Union L239/1-82, 02.08.2013.

Acknowledgment

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