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04/05/04

IEA HPP Annex 28

«Test procedure and seasonal performance calculation of residential heat pumps with combined space and domestic hot water production»

Participants

There are nominal ten countries participating in Annex 28. However, official declaration of participation to the IEA is given only from eight countries (AT, CA, CH, DE, FR, JP, NO, UK) up to now.

SE has not formally declared its participation to the IEA, so far, but is actively working in the IEA HPP Annex 28.

The DOE of the USA has not declared formally its participation up to now and has mandated the work to Oak Ridge National Lab (ORNL).

Norway has returned to work in the IEA HPP Annex 28 in 2004, after a break in 2003 due to problems with funding and manpower.

IEA HPP Annex 28 Website

Austria has realised a new website for the IEA HPP Annex 28, which is online at the URL <http://www.annex28.net> since March 2004. The corresponding work was carried out instead of a participant fee, as agreed by the annex members.

Focus of the website are actual information on the activities in IEA HPP Annex 28. Furthermore, the website provides documents and information to related subjects of the Annex like calculation and comparison of heating systems and state-of-the art developments in standardisation and energy labelling.

Interim Report IEA HPP Annex 28

The actual state in the Annex 28 by February 2004 has been summarised in an interim report delivered to the ExCo in March 2004. The report contains basically the results of Task 1, i.e. an analysis for systems on the market and the actual state in standardisation as well as data sources for the boundary conditions of the calculation method. Additionally, the resolutions of the second Annex meeting and an overview of the national contributions are contained.

As an update on the national projects an overview is given in the following chapter.

Overview of the state in the national projects (according to status reports of the countries)Austria

Austria has tested four heat pumps with direct expansion and combined domestic hot water production according to EN 255-3. Since October 2003, three systems with direct expansion and domestic hot water production are monitored. Results will be used to elaborate a test procedure for direct expansion systems with combined DHW production and the calculation method. CEN/TC 113 is treating this working item in a new established working group.

Canada

Focus of Canada is a system with B/W heat pump for simultaneous heating/DHW production and cooling/DHW production by desuperheating. Actually a test rig for measurements is under construction.

France

CETIAT has performed testing of a B/W heat pump with DHW production by desuperheating based on the EN 255-2 and EN 255-3 using tapping profiles from EU mandate M 324. EDF has performed testing of an A/W heat pump in part load operation. Both results will be used to develop a test procedure and calculation method.

Germany

Germany focuses on compact units for the application in ultra low energy houses consisting of a ventilation system with heat recovery, a heat pump, an integrated hot water storage and, as an option, a solar system. Test rig measurements of the compact unit have been carried out at Fraunhofer Institute for Solar Energy Systems in Freiburg (DE). Field measurements of three systems are in progress. Data are used to further develop mathematical models for the evaluation of the SPF.

Japan

Due to schedule changes of the testing facility Japan had to postpone the planned test rig measurements on a CO₂-system for combined floor heating/DHW production including inverter drives from April 2004 to August 2004. Actually field measurements and simulation results on DHW-systems are evaluated with regard to annual performance.

Norway

Norway has extensively tested a B/W heat pump using CO₂ as refrigerant with combined space and DHW heating. Preliminary estimations of the SPF have shown, that under certain conditions (e.g. 25%-30% annual DHW energy demand, return temperature of space heating 30°C and lower) the CO₂ – system reaches at least the performance of the presently most efficient B/W systems on the market. Detailed documentation of the results will be available in a Ph. D. thesis by May 2004. Moreover a test rig for propane heat pump systems with combined space heating and DHW production for propane (R-290) is under construction. First results will be available in June 2004.

Sweden

Sweden has performed testing of a B/W heat pump for heating mode according to EN 255-2 and EN 14511, for domestic hot water mode according to EN 255-3, simultaneous operation according to a test scheme based on EN 255-2 and EN 255-3 and domestic hot water testing according to the EU mandate M 324

Switzerland

As further development of a testing and calculation approach for a combined cascade heat pump using condensate subcooling, the focus of the Swiss national project are compact units with heating, DHW and ventilation. Field monitoring of such a system has started in spring 2004 and the concept for the calculation is extended to include the ventilation system and possible other generators (e.g. solar energy). Preliminary test rig measurements of a system have been carried out, as well.

UK

In the UK the study for the calculation of the seasonal performance factor with a new type of A/W heat pump has been performed in the simulation software ESP-r. The heat pump contains a recently developed compressor especially designed for heat pumps. In 2004 field monitoring of that heat pump type will be started, and results should be used for validation purpose.

USA

The USA promised a project description for the beginning of this year. Actually no contribution from USA to IEA HPP Annex 28 has been received.

Annex related developments in standardisation

EN 14511

On the European level, the standard EN 14511 on the testing of heat pumps for single heating and single cooling application has been accepted in formal vote in April 2004 and will presumably be introduced within a year. The new standard has already been anticipated partly in the testing performed in the national projects.

EU Mandate M 324

Mandate M 324 on the elaboration of common test procedures for DHW systems for household appliances has not been accepted by CEN management centre. However, some of the CEN working groups use the tapping profile given in the mandate for their testing activities.

Next working meeting IEA HPP Annex 28

The next working meeting of the IEA HPP Annex 28 is scheduled for the 2-4 June 2004 and will take place in Tokyo.

Subject of the meeting are the discussion of the interim results of Task 2 and Task 3 with regard to the integration of the results in a common approach for standards on testing and calculation. For that, the structure of a standard each for testing and calculation shall be worked out on the meeting.

Furthermore the HPTCJ organizes for Annex members a technical tour to Sanyo Electric Air Conditioning Co. and a special workshop open to public, where members of the Japanese National Team and Annex participants will present latest research results. The OA thanks on behalf of all Annex participants the HPTCJ for hosting the meeting.