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Heat pump water heater — Testing and rating at part load conditions and calculation of seasonal coefficient of performance for space heating

Chauffe-eau à pompe à chaleur — Essais et classification à charge partielle et calcul du coefficient de performance saisonnier

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 86, *Refrigeration and air-conditioning*, Subcommittee SC 6, *Testing and rating of air-conditioners and heat pumps*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Heat pumps water heaters are, at present, selected and compared at a rated condition. This condition does not represent the usual operating conditions of the equipment over a season. This operating condition can be better assessed by comparing equipment at representative reduced capacities and determining the Seasonal Coefficient of Performance.

This standard provides part load conditions and calculation methods for calculating the Seasonal Coefficient of Performance ($SCOP_{on}$ and $SCOP_{net}$) of such units when they are used to fulfil the heating demands.

Other energy consumptions can occur when the unit is not used to fulfil the heating demands such as those from a crankcase heater or when the unit is on standby. These consumptions are considered in the calculation methods for reference *SCOP*.

Reference $SCOP/SCOP_{on}/SCOP_{net}$ calculations may be based on calculated or tested values. For the purpose of $SCOP/SCOP_{on}/SCOP_{net}$, three design conditions average (A), Colder (C) and warmer (W) are considered as well as three temperature applications. In case of tested values, this standard gives the methods for testing heat pumps water heater at part load conditions.

Heat pump water heater — Testing and rating at part load conditions and calculation of seasonal coefficient of performance for space heating

1 Scope

The document specifies test conditions for determining the seasonal performance characteristics of air source heat pump water heaters for space heating with electrically driven compressors with or without supplementary heater. The purpose of this document is to rate performance of the heat pump water heaters for space heating with no operation of any supplementary heater. In the case of heat pump water heaters for space heating consisting of several parts with refrigerant or water connections, this document applies only to those designed and supplied as a complete package.

The seasonal coefficient of performance depends, inter alia, on the climate conditions and temperature regime of the space heating distribution network.

This document defines:

— three design conditions, each of them being characterized by a design temperature which represents the lowest temperature that can occur in that design condition;

— three water temperature distribution regimes, namely “temperature application” in the text.

The user of this document is free to determine the seasonal coefficient of performance for one or more of the defined design conditions and for one or more of the defined temperature applications.

This document also provides a full description of three heating seasons that can be used with the associated design conditions.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
active mode
mode corresponding to the hours with a heating load of the building and whereby the heating function of the unit is activated

Note 1 to entry: This condition can involve on/off-cycling of the unit in order to reach or maintain a required indoor air temperature.