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Heating and cooling systems in buildings — Method for calculation of the system performance and system design for heat pump systems —

Part 2: Energy calculation

Systèmes de chauffage et de refroissement dans les bâtiments — Méthode de calcul de la performance du système et de la conception du système pour les systèmes de pompes à chaleur —

Partie 2: Calcul énergétique

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 205, *Building environment design*.

ISO 13612 consists of the following parts, under the general title *Heating and cooling systems in buildings — Method for calculation of the system performance and system design for heat pump systems*:

— *Part 1: Design and dimensioning*

— *Part 2: Energy calculation*

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Introduction

This International Standard is a part of a series of standards on the methods for calculation of heating system energy requirements and heating and cooling system efficiencies.

— ISO 13612-1 deals with design and sizing of heat pump systems.

— ISO 13612-2 presents the energy calculation method.

The energy performance can be assessed by determining either the heat generation subsystem efficiencies or the heat generation subsystem losses due to the system configuration.

This part of ISO 13612 presents methods for calculation of the additional energy requirements of a heat generation subsystem in order to meet the distribution subsystem demand. The calculation is based on the performance characteristics of the products given in product standards and on other characteristics required to evaluate the performance of the products as included in the system. Product data, e.g. heating capacity or COP of the heat pump, is determined according to products standards.

This method can be used for the following applications:

— judging compliance with regulations expressed in terms of energy targets;

— optimization of the energy performance of a planned heat generation subsystem, by applying the method to several possible options;

— assessing the effect of possible energy conservation measures on an existing heating/cooling generation subsystem, by calculating the energy use with and without the energy conservation measure.

Only the calculation method is normative. The user shall refer to other standards or to national documents for input data. Additional values necessary to complete the calculations are to be given in a national annex; if no national annex is available, default values are given in an informative annex where appropriate.

NOTE The results of this method can be used to assess the energy performance of the heating/cooling system when summing up the results over a period of calculation.

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Heating and cooling systems in buildings — Method for calculation of the system performance and system design for heat pump systems —

Part 2: Energy calculation

1 Scope

This International Standard is applicable to heat pumps for space heating and cooling, heat pump water heaters (HPWH), and heat pumps with combined space heating and/or cooling and domestic hot water production, in alternate or simultaneous operation, where the same heat pump is used for space heating and domestic hot water heating.

This part of ISO 13612 provides a calculation method under steady conditions that corresponds to one calculation step.

The results of this calculation are incorporated in larger building models and take into account the influence of the external conditions and building control that influence the energy requirements for heating and cooling supplied by the heat pump system.

This part of ISO 13612 specifies the required inputs, calculation methods, and required outputs for output thermal power generation for space heating and cooling and domestic hot water production of the following heat pump systems, including control:

— electrically driven vapour compression cycle (VCC) heat pumps;

— combustion engine-driven vapour compression cycle heat pumps;

— thermally driven vapour absorption cycle (VAC) heat pumps,

using combinations of heat source and heat distribution listed in Table 1.

Table 1 — Heating/cooling sources and energy distribution

Source	Distribution
Outdoor air	Air
Exhaust-air	Water
Indirect ground source with brine distribution	Direct condensation/evaporation of the refrigerant in the appliance (VRF)
Indirect ground source with water distribution	
Direct ground source [Direct expansion (DX)]	
Surface water	
Ground water	

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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