ELEKTRIKOMPRESSORITEGA SOOJUSPUMBAD. KODUMAJAPIDAMISE KUUMAVEESEADMETE KATSETAMINE, TALITLUSE HINDAMINE JA NÕUDED MÄRGISTUSELE

Heat pumps with electrically driven compressors - Testing, performance rating and requirements for marking of domestic hot water units

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 16147:2017+A1:2022 sisaldab Euroopa standardi EN 16147:2017+A1:2022 ingliskeelset teksti.	This Estonian standard EVS-EN 16147:2017+A1:2022 consists of the English text of the European standard EN 16147:2017+A1:2022.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 21.12.2022.	Date of Availability of the European standard is 21.12.2022.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 27.080

EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 16147:2017+A1

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Supersedes EN 16147:2017

English Version

Heat pumps with electrically driven compressors - Testing, performance rating and requirements for marking of domestic hot water units

Pompes à chaleur avec compresseur entraîné par moteur électrique - Essais, détermination des performances et exigences pour le marquage des appareils pour eau chaude sanitaire

Wärmepumpen mit elektrisch angetriebenen Verdichtern - Prüfungen, Leistungsbemessung und Anforderungen an die Kennzeichnung von Geräten zum Erwärmen von Brauchwarmwasser

This European Standard was approved by CEN on 8 October 2016 and includes Amendment 1 approved by CEN on 23 May 2021.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 16147:2017+A1:2022) has been prepared by Technical Committee CEN/TC 113 "Heat pumps and air conditioning units", the secretariat of which is held by AENOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2023, and conflicting national standards shall be withdrawn at the latest by June 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes [A1] EN 16147:2017 [A1].

[A1] The main changes with respect to the previous edition are listed below:

a) correction of the calculation of η_{wh} for heat pump water heaters and heat pump combination water heaters;

b) correction of the calculation of the annual consumption of electric energy;

c) completion of Annexes ZA, ZB, ZC and ZD in line with the standardization requests M/534 (water heaters) and M/535 (space heaters). [A1]

This document includes Amendment 1 approved by CEN on 23 May 2021.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] [A1].

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annexes ZA, ZB, ZC and ZD, which are an integral part of this document.

Note that the following provides details of significant technical changes between this document and the previous edition:

d) re-structuring of the standard into the Clause 5 "Installation requirements", Clause 6 "Settings and test conditions", Clause 7 "Performance tests", Clause 8 „Other tests" and Clause 9 „Test results and test report";

e) update of Table 1 "Uncertainties of measurement for indicated values" in terms of units;

f) update of the performance test regarding the stages (i.e. A. to F.) and the order of the tests (see 7.2);

g) introduction of 7.11 "Calculation of the smart control factor SCF" and 7.12 „Determination of the ambient correction term Q_{cor} " on the basis of the European Standard EN 50440:2015;

h) introduction of 7.13.3 "Calculation of the Annual Consumption of electric energy";

i) re-allocation and revision of the former "tapping cycles" into the new annex "Load profiles" (see Tables A.1 to A.3);

j) introduction of 7.14 “Other performances” regarding rated heat output and seasonal coefficient of performance;

k) addition of the Annex ZA and Annex ZB for the relationship between this European Standard and the requirements of Commission Regulation (EU) No 814/2013 and (EU) No 812/2013;

l) addition of the Annex ZC and Annex ZD for the relationship between this European Standard and the requirements of Commission Regulation (EU) No 813/2013 and (EU) No 811/2013.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

1 Scope

This document specifies methods for testing, rating of performance and calculation of water heating energy efficiency of air/water, brine/water, water/water and direct exchange/water heat pump water heaters and heat pump combination heaters with electrically driven compressors and connected to or including a domestic hot water storage tank for domestic hot water production.

This document comprises only the testing procedure for the domestic hot water production of the heat pump system.

NOTE 1 Testing procedures for simultaneous operation for domestic hot water production and space heating are not treated in this standard. Simultaneous means that domestic hot water production and space heating generation occur at the same time and may interact.

NOTE 2 For heat pump combination heaters the seasonal efficiency of space heating is determined according to EN 14825.

This document only applies to water heaters which are supplied in a package of heat pump and storage tank. In the case of water heaters consisting of several parts with refrigerant connections, this European Standard applies only to those designed and supplied as a complete package.

This document does not specify requirements of the quality of the used 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.

〈A1〉 EN 14511-1:2018, *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors - Part 1: Terms and definitions*

EN 14511-2:2018, *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors - Part 2: Test conditions*

EN 14511-3:2018, *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors - Part 3: Test methods*

EN 60204-1:2018, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*

prEN IEC 60335-2-40:2020, *Household and similar electrical appliances - Safety - Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers (IEC 60335-2-40:2018)*

EN 61000-3-11:2019, *Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection (IEC 61000-3-11:2017)* ⟨A1⟩

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ⟨A1⟩ EN 14511-1:2018 ⟨A1⟩ and the following apply.

3.1
heat pump water heater
water heater that uses ambient heat from air source, water source or ground source, and/or waste heat for heat generation

3.2
heat pump combination heater
heat pump space heater that is designed to also provide heat to deliver hot drinking or sanitary water at given temperature levels, quantities and flow rates during given intervals, and is connected to an external supply of drinking or sanitary water

3.3
domestic hot water
water heated for household or similar purposes

3.4
storage volume
V_m
measured volume of the tank

3.5
non heated space air
heat source for a heat pump which absorbs heat by an air heat exchanger in direct contact with the air inside a non-heated space within a building

3.6
indoor air
heat source for a heat pump which absorbs heat by an air heat exchanger in direct contact with the air inside a heated space within a building

3.7
coefficient of performance for domestic hot water
COP_{DHW}
coefficient of performance which is determined by the use of a reference load profile and which includes the heat losses of the storage tank