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**Plinske gospodinjske naprave za pripravo tople sanitarne vode - 6. del:
Ocenjevanje rabe energije adsorpcijskih in absorpcijskih toplotnih črpalk**

Gas-fired domestic appliances producing hot water - Part 6: Assessment of energy consumption of adsorption and absorption heat pumps

Gasgeräte für die häusliche Warmwasserbereitung - Teil 6: Bewertung des Energieverbrauchs von Adsorptions- und Absorptionswärmepumpen

Appareils domestiques produisant de l'eau chaude sanitaire utilisant les combustibles gazeux - Partie 6 : Évaluation de la consommation énergétique des pompes à chaleur à ad-sorption et ab-sorption

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Gas-fired domestic appliances producing hot water - Part 6: Assessment of energy consumption of adsorption and absorption heat pumps

Appareils domestiques produisant de l'eau chaude sanitaire utilisant les combustibles gazeux - Partie 6 : Évaluation de la consommation énergétique des pompes à chaleur à ad-sorption et ab-sorption

Gasbefeuerte Geräte zur Warmwasserbereitung für den Hausgebrauch - Teil 6: Bewertung des Energieverbrauchs von Adsorptions- und Absorptionswärmepumpen

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CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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EN 13203-6:2022 (E)**European foreword**

This document (EN 13203-6:2022) has been prepared by Technical Committee CEN/TC 109 “Central heating boilers using gaseous fuels”, the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.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 EN 13203-6:2018.

The main technical changes compared to EN 13203-6:2018 are the following:

- to provide a means of conforming to requirements of Commission Delegated Regulation (EC) n° 813/2013, (EC) n° 811/2013, (EC) n° 812/2013 and (EC) n° 814/2013;
- incorporation of ECOTESTS results.

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

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, ZB, ZC or ZD, which is an integral part of this document.

The safety operation of the boiler or water heater is not covered by this document. Safety should be proved by means of the essential safety requirements of the Gas Appliances Regulation 2016/426/UE. This may be achieved by compliance with the appropriate existing harmonized standards.

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, Turkey and the United Kingdom.

Introduction

This document refers to clauses of EN 13203-2:2022 or adapts clauses by stating in the corresponding clause, on the principle:

- shall be according to EN 13203-2:2022, (clause number) with the following modification;
- shall be according to EN 13203-2:2022, (clause number) with the following addition;
- EN 13203-2:2022, (clause number) is replaced with the following;
- EN 13203-2:2022, (clause number) is not applicable.

NOTE Useful standards are series EN 15502 and series EN 12309.

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EN 13203-6:2022 (E)

1 Scope

This document is applicable to gas-fired appliances producing domestic hot water. It applies to sorption heat pumps connected to or including a domestic hot water storage tank. It applies to a package marketed as single unit or fully specified that have:

- a heat input not exceeding 400 kW;
- a hot water storage tank capacity (if any) not exceeding 2 000 l.

In the case of gas-fired sorption heat pumps, with or without storage tank, domestic hot water production is integrated or coupled, the whole being marketed as a single unit.

EN 13203-1:2015 sets out in qualitative and quantitative terms the performance in delivery of domestic hot water for a selected variety of uses. It also gives a system for presenting the information to the user. The present document sets out a method for assessing the energy performance of the appliances. It specifies a number of daily load profiles for each domestic hot water use, kitchen, shower, bath and a combination of these, together with corresponding test procedures, enabling the energy performances of different gas-fired appliances to be compared and matched to the needs of the user. Where other technologies are combined with a gas-fired sorption heat pump to produce domestic hot water, specific parts of EN 13203 apply.

Horizontal ground heat sources are not covered by the scope of the present document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Shall be according to EN 13203-2:2022, Clause 2, with the following additions:

<https://standards.iteh.ai/catalog/standards/sist/3276848b-6905-4b32-a72c->
EN 13203-2:2022, *Gas-fired domestic appliances producing hot water — Part 2: Assessment of energy consumption*

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*

3 Terms and definitions

Shall be according to EN 13203-2:2022, Clause 3, with the following additions:

3.1 indoor ambient air
heat source for a heat pump which absorbs heat by a heat exchanger in direct contact with the air inside a building without any dedicated duct

3.2 brine
heat transfer medium which has a freezing point depressed relative to water

3.3 sorption heat pump
encased assembly or assemblies designed as an appliance whose primary function is delivery of domestic hot water or domestic hot water and heating, where the primary function is dependent on circulation of fluid (refrigerant and/or solution) within the absorption, adsorption or refrigerant circuit(s)

3.4

gas-fired sorption heat pump combined with a gas-fired appliance

appliance which is either placed on the market or specified as a complete package to deliver safely and effectively domestic hot water and/or heating, comprising as relevant:

- gas-fired sorption heat pump;
- gas-fired appliance;
- ducts if appropriate;
- thermal store

3.5

ground heat source

heat source of a sorption heat pump for which a heat exchanger, vertically embedded into the ground, is used to extract heat from the surrounding soil or rock by way of a brine circuit through the evaporator

3.6

solar collector source

heat source of a sorption heat pump for which a solar thermal collector is used to capture radiation energy from the sun by way of a brine circuit through the evaporator

3.7

external static pressure difference (Δp_e)

positive pressure difference measured between the air (or water) outlet section and the air (or water) inlet section of the unit, which is available for overcoming the pressure drop of any additional ducted air (or water) circuit

3.8

internal static pressure difference (Δp_i)

negative pressure difference measured between the air (or water) outlet section and the air (or water) inlet section of the unit, which corresponds to the total pressure drop of all components on the air (or water) side of the unit

4 General test conditions

4.1 Reference conditions

Shall be according to EN 13203-2:2022, 4.1, with the following additions:

“The tests shall be carried out at the test conditions specified in Table 1 as appropriate.

Table 1 — Test conditions for particular types of systems

Type of heat source	Heat source Air Dry (Wet) bulb temperature (°C)	Heat source inlet / outlet or bath ^a temperature (°C)	Range of ambient temperature of heat pump (°C)	Ambient temperature of storage tank (°C)
Outdoor air heat pump (placed indoor side) Average Colder Warmer	7 (6) 2 (1) 14 (13)		from 15 to 30	20
Outdoor air heat pump (outdoor side) Average Colder Warmer	7 (6) 2 (1) 14 (13)		Heat source temperature	20
Non heated space air	15 (12)		Heat source temperature	15
Indoor air	20 (15)		Heat source temperature	20
Exhaust air	20 (12)		from 15 to 30	20
Water		10 / 7	from 15 to 30	20
Brine		0 / -3	from 15 to 30	20
Direct evaporation		4 ^a	from 15 to 30	20

^a Brine bath mean temperature for direct evaporation testing case, the ambient temperature.

In addition the permissible variations allowed for the test conditions when the heat pump is running shall not exceed shall not exceed the values specified in Table 2.

Table 2 — Variations allowed for the test conditions when the heat pump is running

Readings	Variations of arithmetical mean values from specified test conditions			Variations of individual readings from specified test conditions		
	Interval H ^a	Interval D ^b	Interval S ^c	Interval H ^a	Interval D ^b	Interval S ^c
Air temperature						
dry bulb ^d	±0,6 K	±1,5 K		±1,0 K	±5,0 K	±2,5 K
wet bulb	±0,4 K	±1,0 K		±0,6 K	-	
Volume flow	±5 %			±10 %		
Static pressure difference	-			±10 %		
ambient temperature of the tank (if not used as heat source)	±1,0 K			±2,0 K		
<p>^a Interval H applies when the heat pump is operating, except for the first 10 min after termination of a defrost cycle, and the first 10 min after a restart of the heat pump.</p> <p>^b Interval D applies during a defrost cycle and during the first 10 min after the termination of a defrost cycle when the heat pump is operating in the heating mode.</p> <p>^c Interval S applies when the compressor is stopped and during the first 10 min after the hot water thermostat has started again the heat pump.</p> <p>^d For units with outdoor heat exchanger surfaces greater than 5 m², the deviation on the air inlet dry bulb temperature is doubled.</p>						

4.2 Measurement uncertainties

4.2.1 General

Shall be according to EN 13203-2:2022, 4.2.1, with the following additions: “

- air as heat source dry bulb temperature: ± 0,2 K;
- air as heat source wet bulb temperature: ± 0,3 K;
- water/brine as heat source: ± 0,15 K;
- brine from ground or solar source: ± 0,2 K.”.

4.2.2 Steady-state conditions

Shall be according to EN 13203-2:2022, 4.2.2.

EN 13203-6:2022 (E)

4.3 Test conditions

4.3.1 General

Shall be according to EN 13203-2:2022, 4.3.1, except the second sentence modified as follows:

“For gas fired appliances combined with gas heat pump, the tests shall be ...”.

and the following sentences added:

“If liquid heat transfer media other than water is used, the specific heat capacity and density of such heat transfer media shall be determined and taken into consideration in the evaluation.

When the gas-fired sorption heat pump combined with a gas-fired appliance does not operate in heat pump mode for domestic hot water production according to data in Table 1, the test shall be performed according to EN 13203-2:2022 instead.”.

4.3.2 Test room

Shall be according to EN 13203-2:2022, 4.3.2, with the following additions:

“If the package incorporates an air source outdoor heat exchanger a further test room is needed. The size of this test room shall be designed to avoid any resistance to air flow at the air inlet and air outlet orifices of the test object. The air flow through this room shall not cause any short circuit between the two orifices, and therefore the velocity of air flow at these two locations shall not exceed 1,5 m/s when the test object is switched off. The air velocity in the room shall also not be greater than the mean velocity through the unit inlet.

Unless otherwise stated in the technical documentation, the air inlet and air outlet orifices shall not be less than 1 m from the surfaces of the test room; this also applies to any measuring ducts.

For sorption heat pumps separated from the storage tank, the liquid flow rate has to be set on the liquid outlet side of the heat pump to the nominal flow rate specified in the installation and/or operation manual.

The sorption heat pump and/or package shall be installed and connected for the test as specified in the installation instructions.

Temperature and pressure measuring points shall be situated in order to obtain significant mean values.

Set points for internal control equipment of the unit such as thermostats, pressure switches or mixing valves shall be set to the values stated in the installation and/or operation instructions.

Air and entrained gases shall be removed from all water and other heat transfer liquid systems.

Each water pipe shall be installed in accordance with the installation instructions to the maximum stated length or 5 m whichever is shorter. Thermal insulation shall be applied to the pipes in accordance with the installation instructions.”.

4.3.3 Water supply

Shall be according to EN 13203-2:2022, 4.3.3.

4.3.4 Initial adjustment of the appliance

Shall be according to EN 13203-2:2022, 4.3.4.

4.3.5 Conditions for the determination of the maximum load profile

Shall be according to EN 13203-2:2022, 4.3.5.

4.3.6 Electrical supply

Shall be according to EN 13203-2:2022, 4.3.6.