SLOVENSKI STANDARD
SIST EN 13203-5:2022

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Plinske gospodinjske naprave za pripravo tople sanitarne vode - 5. del: Ocenjevanje rabe energije plinskih naprav, kombiniranih z električno toplotno črpalko

Gas-fired domestic appliances producing hot water - Part 5: Assessment of energy consumption of gas-fired appliances combined with electrical heat pump

Gasgeräte für die häusliche Warmwasserbereitung - Teil 5: Bewertung des Energieverbrauchs von gasbefeuerten Geräten in Kombination mit elektrischer Wärmepumpe

Appareils domestiques produisant de l'eau chaude sanitaire utilisant les combustibles gazeux - Partie 5 : Évaluation de la consommation énergétique des appareils utilisant les combustibles gazeux combinés à une pompe à chaleur électrique

Ta slovenski standard je istoveten z: **EN 13203-5:2022**

ICS:

27.080	Toplotne črpalke	Heat pumps
91.140.65	Oprema za ogrevanje vode	Water heating equipment

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EUROPEAN STANDARD

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Gas-fired domestic appliances producing hot water - Part 5: Assessment of energy consumption of gas-fired appliances combined with electrical heat pump

Appareils domestiques produisant de l'eau chaude sanitaire utilisant les combustibles gazeux - Partie 5 : Évaluation de la consommation énergétique des appareils utilisant les combustibles gazeux combinés à une pompe à chaleur électrique

Gasbefeuerte Geräte zur Warmwasserbereitung für den Hausgebrauch - Teil 5: Bewertung des Energieverbrauchs von gasbefeuerten Geräten in Kombination mit elektrischer Wärmepumpe

This European Standard was approved by CEN on 13 June 2022.

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

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European foreword

This document (EN 13203-5:2022) 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of an identical text or by endorsement, at the latest by February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.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 13203-5:2018.

The main technical changes compared to EN 13203-5:2018 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 is not covered by this document. Safety is proved by means of the essential safety requirements of the Gas Appliances Regulation n°426/2016/UE. This way 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 by the following;

— EN 13203-2:2022, (clause number) is not applicable.

NOTE Useful standards are EN 26, EN 89, EN 15502-1, EN 15502-2-1 and EN 15502-2-2.

1 Scope

This document is applicable to gas-fired appliances producing domestic hot water. It applies to both instantaneous and storage gas-fired combined with electric heat pump.

It applies to a package marketed as single unit or fully specified by the manufacturer that have:

— a heat input not exceeding 400 kW;

— a hot water storage tank capacity (if any) not exceeding 2 000 l.

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 gas fired appliances combined with heat pump with electrically driven compressor according to EN 16147. 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 boiler or a water heater to produce domestic hot water, specific parts of EN 13203 apply.

The present document does not apply for gas boilers with recovery systems using combustion products as heat source for the electrical heat pump.

When the electrical heat pump does not work for domestic hot water production in the summer period, the present standard is not applicable for energy performances assessing, instead EN 13203-2:2022 is applicable.

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:

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 air
heat source for a heat pump which absorbs heat by a heat exchanger in direct contact with the air inside a building

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

3.3
gas-fired appliance combined with electric heat pump air/water
appliance which is either placed on the market or specified as a complete package to deliver domestic hot water or domestic hot water and heating, comprising as relevant:

— electric heat pump;

— gas-fired appliance;

— ducts if appropriate;

— thermal store

3.4
exhaust air
air from the air-conditioned space entering the outdoor heat exchanger

[EN 14511-1:2018, 3.22]

3.5
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

3.6
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 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		

[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

[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

[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

[d] For units with outdoor heat exchanger surfaces greater than 5 m2, the deviation on the air inlet dry bulb temperature is doubled

“.

4.2 Measurement uncertainties

4.2.1 General

Shall be according to EN 13203-2:2022, 4.2.1.

4.2.2 Steady-state conditions

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

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 electric heat pump (package)**, the tests shall be …”.

and the following sentence added:

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

4.3.2 Test room

EN 13203-2:2022, 4.3.2, is replaced with the following:

"The package shall be installed in a well-ventilated, draught-free room (air speed less than 0,5 m/s).

The package shall be protected from direct solar radiation and radiation from heat generators.

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 1m from the surfaces of the test room; this also applies to any measuring ducts.

The setting of the external static pressure difference on the air side for heat pumps with duct connection is described by 4.4.1.4 of EN 14511-3:2018.

For heat pumps separated from the 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 technical documentation.

The 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 technical documentation.

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

In the case of package incorporating a single split heat pump, the following installation conditions shall be complied with for the tests:

a) each refrigerant pipe shall be installed in accordance with the installation instructions;

b) the connecting pipes shall be installed so that the difference in elevation does not exceed 2,5 m. The length of each connecting pipe shall be between 5 m and 7,5 m;

c) thermal insulation shall be applied to the pipes in accordance with the installation instructions;

d) unless constrained by the design at least half of the interconnecting pipes shall be exposed to the outdoor conditions with the rest of the pipes exposed to the indoor conditions.

For indirect 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.