Solarno-plinske gospodinjske naprave za pripravo tople sanitarne vode - Naprave z močjo do vključno 70 kW in s 500-litrskim hranilnikom vode - 3. del: Ocenjevanje rabe energije

Solar supported gas-fired domestic appliances producing hot water - Appliances not exceeding 70 kW heat input and 500 litres water storage capacity - Part 3: Assessment of energy consumption

Solar unterstützte gasbeheizte Geräte für die sanitäre Warmwasserbereitung für den Hausgebrauch - Geräte, die eine Nennwärmebelastung von 70 kW und eine Speicherkapazität von 500 Liter Wasser nicht überschreiten - Teil 3: Bewertung des Energieverbrauchs

Appareils domestiques produisant de l'eau chaude sanitaire utilisant les combustibles gazeux couplés à un capteur solaire - Appareils de débit calorifique inférieur ou égal à 70 kW et de capacité de stockage inférieure ou égale à 500 litres - Partie 3 : É

Ta slovenski standard je istoveten z: prEN 13203-3

ICS:

91.140.65	Oprema za ogrevanje vode	Water heating equipment

oSIST prEN 13203-3:2021   **en,fr,de**

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

**DRAFT
prEN 13203-3**

February 2021

ICS 91.140.65

Will supersede EN 13203-3:2010

English Version

Solar supported gas-fired domestic appliances producing hot water - Appliances not exceeding 70 kW heat input and 500 litres water storage capacity - Part 3: Assessment of energy consumption

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 109.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 13203-3:2021) has been prepared by Technical Committee CEN/TC 109 "Central heating boilers using gaseous fuels", the secretariat of which is held by NEN.

This document is currently submitted to the CEN Enquiry.

This European Standard refers to clauses of prEN 13203-2:2020 or adapts clauses by stating in the corresponding clause, on the principle:

— shall be according to prEN 13203-2:2020, (clause number) with the following modification;

— shall be according to prEN 13203-2:2020, (clause number) with the following addition;

— prEN 13203-2:2020, (clause number) is replaced by the following;

— prEN 13203-2:2020, (clause number) is not applicable.

The safety operation of the boiler is not covered by this standard. 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.

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 solar supported gas-fired appliances producing domestic hot water. It applies to a system marketed as single unit or a fully specified system that:

— has a gas heat input not exceeding 70 kW; and

— has a hot water storage tank capacity not exceeding 500 l; and

— is equipped with at least one solar collector; and

— is, with regard to the solar hydraulic circuit, considered as a forced circulation system (definition according to EN ISO 9488:1999).

The appliances covered by this European Standard are described in Annex E (normative).

This document does not apply to thermo-siphon or integral collector storage tank systems according to definitions given by EN ISO 9488:1999.

In principle, the energy consumption of thermo-siphon solar preheat systems and integral collector storage tank preheat systems can also be assessed on the basis of this document. One appropriate procedure for that purpose is to calculate the temperature level of the domestic hot water withdrawn from the thermal solar system for the reference conditions defined in this standard by using the numerical system model and the thermal solar system performance parameters according to ISO 9459-5. Based on the temperature level of the hot water withdrawn from the store the energy consumption of the gas appliance is determined. This determination can either be done by means of calculations or by performing a test according to prEN 13203-2:2020 and using instead of the cold water inlet temperature the hot water temperature withdrawn from the store.

This document is not intended to assess the performance:

— of the solar collector(s), which should comply with EN 12975-1+A1:2010 and EN 12975-2:2006; and

— thermal solar systems and components, which should comply with EN 12976-1:2017 and EN 12976-2:2019.

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 presenting the information to the user.

The present document sets out a method for assessing the energy performance of a solar supported appliance. It defines a number of daily tapping cycles for each domestic hot water use, kitchen, shower, bath and a combination of these, together with corresponding test procedures including information about the available solar radiation. It enables the energy performances of different gas-fired appliances to be compared and matched to the needs of the user.

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.

EN 12975-1:2010, *Thermal solar systems and components — Solar collectors — Part 1: General requirements*

EN 12975-2:2006, *Thermal solar systems and components — Solar collectors — Part 2: Test methods*

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EN 12976-1:2017, *Thermal solar systems and components - Factory made systems - Part 1: General requirements*

EN 12976-2:2019, *Thermal solar systems and components - Factory made systems - Part 2: Test methods*

EN 13203-1:2015, *Gas fired domestic appliances producing hot water - Part 1: Assessment of performance of hot water deliveries*

prEN 13203-2:2020, *Gas-fired domestic appliances producing hot water – Part 2: Assessment of energy consumption*

ISO 9459-5:2007, *Solar heating — Domestic water heating systems — Part 5: System performance characterization by means of whole-system tests and computer simulation*

3   Definitions

For the purposes of this document, the terms and definitions given in prEN 13203-2:2020 apply.

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

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

• ISO Online browsing platform: available at http://www.iso.org/obp

3.1
aperture area of solar collector
maximum projected area through which solar radiation enters the collector

NOTE   See definition and explanation according to EN ISO 9488:1999.

3.2
controls
all hydraulic, thermal and electronic components necessary for the operation of the system

3.3
solar collector field
either one or a combination of more than one solar collector

3.4
solar collector simulator
device delivering the thermal power to the system (store) instead of a real solar collector based on solar collector efficiency parameters

Note 1 to entry   solar collector efficiency parameters are according to EN 12975-2:2006.

Note 2 to entry   The solar collector simulator is described in Annex D (informative).

3.5
solar collector simulator circuit
circuit containing the piping, the pump, the controls, the heat-exchanger and the collector solar simulator

3.6
solar cycle
day of a year representative for middle European climate conditions

Note 1 to entry   The total daily radiation of that day is 3,0 kWh/m² and the mean value of the outdoor ambient temperature is 6,7 °C.

3.7
solar supported system
system marketed as single unit or a fully specified system, composed of solar collector, water storage tank, controls, pipework and the gas appliance

4   General test conditions

4.1 Reference conditions

Shall be according to prEN 13203-2:2020, 4.1 with the following addition:

"In order to apply the test procedures specified in this standard, it is required:

— that the collectors of the system fulfil the requirements of EN 12975-1+A1:2010 and are already tested according to EN 12975-2:2006; and

— that factory made thermal solar systems fulfil the requirements of EN 12976-1:2017 are tested according to EN 12976-2:2019."

4.2 Measurement uncertainties

4.2.1 General

Shall be according to prEN 13203-2:2020, 4.2.1.

4.2.2 Steady-state conditions

Shall be according to prEN 13203-2:2020, 4.2.1.

4.3 Test conditions

4.3.1 General

Shall be according to prEN 13203-2:2020, 4.3.1.

4.3.2 Test room

Shall be according to prEN 13203-2:2020, 4.3.2, with the following additions:

"The installation for testing, including thermal insulation of the components, shall be in accordance with the installation instructions.

The maximum length of the piping between the gas appliance and the storage tank(s) shall not exceed 3 m in total (inlet plus outlet).

The minimum length of the piping between the solar collector simulator and the storage tank(s) shall be 6 m in total (inlet plus outlet) and shall not exceed 10 m.

If not specified in the installation instructions, the piping shall be in accordance with EN 12976-2:2019, Annex B and Table B.2 (pipe diameter and insulation thickness).

For drain back solar thermal systems only the mass flow rate according to the specification for the collector circuit ($\dot{m}$) shall be used."

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4.3.3 Water supply

Shall be according to prEN 13203-2:2020, 4.3.3.

4.3.4 Initial adjustment of the appliance

Shall be according to prEN 13203-2:2020, 4.3.1 except the second sentence modified as follows:

"The heat input of the gas appliance shall be adjusted to within ± 2 % of the nominal domestic hot water heat input **under the conditions prevailing at the time of the test with solar collector simulator off**."

4.3.5 Conditions for the determination of the maximum load profile

Shall be according to prEN 13203-2:2020, 4.3.5.

4.3.6 Electrical supply

Shall be according to prEN 13203-2:2020, 4.3.6.

The following Clauses 4.3.7 and 4.3.8 are added:

4.3.7 Solar circuit

For the tests, the fluid used in the solar collector simulator circuit is water at the pressure specified by the in the installation instructions.

4.3.8 Solar thermal input

The solar thermal input is supplied to the solar heat exchanger of the solar tank as follows.

Instead of installing the solar collector field, a solar collector simulator is connected to the hydraulic connections of the storage tank originally foreseen for the connection to the solar collector field as described in Annex D. The flow rate in the solar hydraulic circuit shall be according to the specifications of the appliance in accordance with the installation instructions. If not specified in the installation instructions, a flow rate of 50 l/h for each square metre of aperture area of the solar collector field shall be used.

5 Determination of the energy consumption of the solar supported gas-fired appliance

5.1 General

Shall be according to prEN 13203-2:2020, 5.1.

5.2 Load profiles

Shall be according to prEN 13203-2:2020, 5.2, the title is changed, the clauses are renumbered and Clause 5.2.2 is added as follows:

"**5.2 Load profiles and solar cycle**

5.2.1 Load profiles

Shall be according to prEN 13203-2:2020, 5.2.1, with the following additions:

"For appliances with and without energy consumption between deliveries (gas or electricity), the test is performed in the following way.

The time of the tapping cycle is synchronous with the time of the solar cycle.

During the test one specific tapping cycle is carried out in conjunction with the solar cycle.

NOTE   The measurement period can be shortened by pre-heating the solar section of the storage tank.

5.2.2   Solar cycle

The solar cycle given in Table 9 defines a 24 h cycle for the total solar radiation available at the surface of the aperture area of the solar collector field and the outdoor ambient temperature. The data from Table 9 is required for the generation of the solar thermal input by the solar collector simulator.

Table 9 — Solar cycle

Hour	Total radiation on collector aperture area (kWh/m²)	Outdoor ambient temperature (°C)
01.00	0	5
2	0	4,7
3	0	4,4
4	0	4,3
5	0	4,3
6	0	4,3
7	0	4,6
8	0,10	5,1
9	0,16	5,8
10	0,38	6,7
11	0,32	7,7
12	0,28	8,6
13	0,42	9,5
14.00	0,47	10,1
15	0,55	10,4
16	0,36	10,4
17	0	9,9
18	0	9,2
19	0	8,3
20	0	7,4
21	0	6,5
22	0	5,6
23	0	4,8
00.00	0	4,1

"