



**SLOVENSKI STANDARD**  
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**Plinske gospodinjske naprave za pripravo tople sanitarne vode - 3. del:**  
**Ocenjevanje rabe energije solarno-plinskih naprav**

Gas-fired domestic appliances producing hot water - Part 3: Assessment of energy consumption of solar supported gas-fired appliances

Gasgeräte für die häusliche Warmwasserbereitung - Teil 3: Bewertung des Energieverbrauchs solargestützter Gasgeräte

Appareils domestiques produisant de l'eau chaude sanitaire utilisant les combustibles gazeux - Partie 3 : Évaluation de la consommation énergétique des appareils utilisant les combustibles gazeux couplés à un capteur solaire

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**ICS:**

91.140.65 Oprema za ogrevanje vode Water heating equipment

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## Gas-fired domestic appliances producing hot water - Part 3: Assessment of energy consumption of solar supported gas-fired appliances

Appareils domestiques produisant de l'eau chaude sanitaire utilisant les combustibles gazeux - Partie 3 : Évaluation de la consommation énergétique des appareils utilisant les combustibles gazeux couplés à un capteur solaire

Gasgeräte für die häusliche Warmwasserbereitung - Teil 3: Bewertung des Energieverbrauchs solargestützter Gasgeräte

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## EN 13203-3:2022 (E)

### European foreword

This document (EN 13203-3:2022) 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of an identical text or by endorsement, at the latest by February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.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 13203-3:2010.

The main technical changes compared to EN 13203-3:2010 are directly aligned with evolutions of EN 13203-2, and are the following:

- improvement of editorial errors;
- 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.

**NOTE** The present document does not meet the requirement in Regulation n° 814/2013, Annex III measurement, point 4 - Conditions for testing solar water heaters which states: “The solar collector, solar hot water storage tank, pump in the collector loop (if applicable) and heat generator shall be tested separately...”. The basis of the present document is that the parts are tested simultaneously, under one set of ambient conditions. The same applies to Regulation n° 812/2013, Annex VII, point 4.

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.

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**EN 13203-3:2022 (E)****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;
- has a hot water storage tank capacity not exceeding 500 l;
- is equipped with at least one solar collector;
- 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 document 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.

**NOTE** In principle, the energy consumption of thermo-siphon solar preheat systems and integral collector storage tank preheat systems can also be assessed based on 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 specified 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 EN 13203-2:2022 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 12975-1:2006+A1:2010 and EN 12975-2:2006;
- of thermal solar systems and components, which should comply with EN 12976-1:2021 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 specifies a few 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.

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

EN 12975-1:2006+A1:2010, *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*



EN 12976-1:2021, *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*

EN 13203-2:2022, *Gas-fired domestic appliances producing hot water — Part 2: Assessment of energy consumption*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13203-2:2022, Clause 3 and the following additions apply:

- ISO and IEC maintain terminological databases for use in standardization at the following addresses: IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

#### 3.1

##### **aperture area of solar collector**

maximum projected area through which solar radiation enters the collector

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

Note 1 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/m<sup>2</sup> and the mean value of the outdoor ambient temperature is 6,7 °C.

**EN 13203-3:2022 (E)****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 EN 13203-2:2022, 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 12975-1:2006+A1:2010 and are already tested according to EN 12975-2:2006;
- that factory made thermal solar systems fulfil the requirements of EN 12976-1:2021 are tested according to EN 12976-2:2019.”.

**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, 4.2.1.*

**4.3 Test conditions****4.3.1 General**

*Shall be according to EN 13203-2:2022, 4.3.1.*

**4.3.2 Test room**

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

**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, 4.3.1 except the second sentence modified as follows:*

“The heat input of the gas appliance shall be adjusted to within  $\pm 2\%$  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 EN 13203-2:2022, 4.3.5.*

#### 4.3.6 Electrical supply

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

*The following subclauses 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 EN 13203-2:2022, 5.1.*

### 5.2 Load profiles and solar cycle

*Shall be according to EN 13203-2:2022, 5.2, the title is changed, the subclauses are renumbered and subclause 5.2.2 is added as follows:*

#### 5.2.1 Load profiles

*Shall be according to EN 13203-2:2022, 5.2., 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 specifies 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.