

---

**Plinske gospodinske naprave za pripravo tople sanitarne vode - 4. del:  
Ocenjevanje rabe energije plinskih naprav (mCHP) za sproizvodnjo tople vode in  
elektrike**

Gas-fired domestic appliances producing hot water - Part 4: Assessment of energy consumption of gas combined heat and power appliances (mCHP) producing hot water and electricity

Gasbeheizte Geräte für die sanitäre Warmwasserbereitung für den Hausgebrauch - Teil 4: Bewertung des Energieverbrauchs von Gasgeräten mit Kraft-Wärme-Kopplung (Mikro-KWK) zur Warmwasserbereitung und Stromerzeugung

<https://standards.iteh.ai/catalog/standards/sist/929319c1-e000-45cc-9f2d-3940c6bacc7/osist-pr-en-13203-4-2021>

Appareils domestiques produisant de l'eau chaude sanitaire utilisant les combustibles gazeux - Partie 4 : Evaluation de la consommation énergétique des appareils à gaz de production combinée de chaleur et d'électricité (mCHP) produisant de l'eau chaude et de l'électricité

**Ta slovenski standard je istoveten z: prEN 13203-4**

---

**ICS:**

91.140.65 Oprema za ogrevanje vode Water heating equipment

**oSIST prEN 13203-4:2021**

**en,fr,de**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[oSIST prEN 13203-4:2021](#)

<https://standards.iteh.ai/catalog/standards/sist/929319c1-e000-45ce-9f2d-c9a0c66baec5/osist-pren-13203-4-2021>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 13203-4**

February 2021

ICS 91.140.65

Will supersede EN 13203-4:2016

English Version

## Gas-fired domestic appliances producing hot water - Part 4: Assessment of energy consumption of gas combined heat and power appliances (mCHP) producing hot water and electricity

Appareils domestiques produisant de l'eau chaude sanitaire utilisant les combustibles gazeux - Partie 4 : Évaluation de la consommation énergétique des appareils à gaz de production combinée de chaleur et d'électricité (mCHP) produisant de l'eau chaude et de l'électricité

Gasbeheizte Geräte für die sanitäre Warmwasserbereitung für den Hausgebrauch - Teil 4: Bewertung des Energieverbrauchs von Gasgeräten mit Kraft-Wärme-Kopplung (Mikro-KWK) zur Warmwasserbereitung und Stromerzeugung

This draft European Standard is submitted to CEN members for second 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.

CEN members are the national standards bodies of 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 United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

**Warning** : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

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

<b>Contents</b>	<b>Page</b>
European foreword.....	4
Introduction .....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions .....	6
4 General test conditions .....	8
4.1 Reference conditions .....	8
4.2 Measurement uncertainties .....	8
4.2.1 General.....	8
4.2.2 Steady-state conditions.....	8
4.3 Test conditions.....	8
4.3.1 General.....	8
4.3.2 Test room .....	8
4.3.3 Water supply.....	8
4.3.4 Initial adjustment of the appliance.....	8
4.3.5 Conditions for the determination of the maximum load profile.....	8
4.3.6 Electrical supply .....	8
4.3.7 Delivered electrical energy .....	8
5 Determination of the energy consumption and electrical energy generation of the appliance.....	8
5.1 General.....	8
5.2 Load profiles .....	9
5.3 Measurement of the energy recovered by the useful water .....	9
5.4 Calculation of gas energy .....	9
5.4.1 Calculation of the daily gas energy consumption in summer mode .....	9
5.4.2 Calculation of daily gas energy consumption in winter mode.....	9
5.4.3 Daily gas energy consumption seasonally weighted.....	9
5.5 Calculation of the daily electrical energy .....	9
5.5.1 Calculation of the delivered electrical energy .....	10
5.5.2 Calculation of the produced electrical energy .....	12
5.5.3 Calculation of electrical auxiliary energy.....	13
5.6 5.6 Measurement of energy consumption and production in standby mode.....	13
5.7 Measurement of energy consumption and production in standby mode.....	13
5.7.1 General.....	13
5.7.2 Calculation of daily gas energy consumption in standby mode .....	14
5.7.3 Calculation of daily auxiliary energy in standby mode .....	14
5.8 Measurement of the daily auxiliary electrical energy consumption in off mode .....	15
6 Determination of the wasted water.....	15
7 Eco design Related Product Data.....	15
7.1 Water heating energy efficiency .....	15
7.2 Smart control factor ( <i>SFC</i> ) and <i>smart</i> .....	15
7.3 Annual fuel consumption (AFC) .....	15
7.4 Annual electricity delivery (AED) .....	15
7.5 Mixed water at 40°C (V40) for storage water heaters .....	16
Annex A (informative) Examples of test conditions .....	17
Annex B (informative) Examples of test rig and measurement devices.....	18

<b>Annex C (informative) Declaration of the Maximum Load Profile.....</b>	<b>19</b>
<b>Annex D (normative) Test points.....</b>	<b>20</b>
<b>Annex ZA (informative) Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) n° 814/2013 [OJEU L239 of 6 September 2013] aimed to be covered.....</b>	<b>22</b>
<b>Table ZA.1 — Correspondence between this European Standard and Commission Regulation (EU) No 814/2013 of 2 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for water heaters and hot water storage tanks [OJEU L285 of 31 October 2009] and Commission’s standardization request M/534/C (2015) 2625 final.....</b>	<b>22</b>
<b>Annex ZB (informative) Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) No 812/2013 [OJEU L239 of 6 September 2013] aimed to be covered.....</b>	<b>23</b>
<b>Table ZB.1 — Correspondence between this European Standard and Commission Delegated Regulation (EU) No 812/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of water heaters, hot water storage tanks and packages of water heater and solar device [OJEU L153 of 18 June 2010] and Commission’s standardization request “M/534/C (2015) 2626 final” .....</b>	<b>23</b>
<b>Annex ZC (informative) Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) n° 813/2013 [OJEU L239 of 6 September 2013] aimed to be covered.....</b>	<b>24</b>
<b>Table ZC.1 — Correspondence between this European Standard and Commission Regulation (EU) No 813/2013 of 2 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for space heaters and combination heaters [OJEU L285 of 31 October 2009] and Commission’s standardization request M/535/C (2015) 2626 final.....</b>	<b>24</b>
<b>Annex ZD (informative) Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) No 811/2013 [OJEU L239 of 6 September 2013] aimed to be covered.....</b>	<b>25</b>
<b>Table ZD.1 — Correspondence between this European Standard and Commission Delegated Regulation (EU) No 811/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of space heaters, combination heaters, packages of space heater, temperature control and solar device and packages of combination heater, temperature control and solar device [OJEU L153 of 18 June 2010] and Commission’s standardization request “M/535/C (2015) 2625 final” .....</b>	<b>25</b>
<b>Bibliography .....</b>	<b>26</b>

**prEN 13203-4:2021 (E)**

## **European foreword**

This document (prEN 13203-4:2021) 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 2<sup>nd</sup> Enquiry.

This document will supersede EN 13203-4:2016.

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 Annex ZA, B, C or D, which are an integral part of this document.

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 may 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, EN 15502-2-2 and EN 50465:2015.

## **iTeh STANDARD PREVIEW (standards.iteh.ai)**

[oSIST prEN 13203-4:2021](https://standards.iteh.ai/catalog/standards/sist/929319c1-e000-45ce-9f2d-c9a0c66baec5/osist-pren-13203-4-2021)

<https://standards.iteh.ai/catalog/standards/sist/929319c1-e000-45ce-9f2d-c9a0c66baec5/osist-pren-13203-4-2021>

## Introduction

This document refers to clauses of prEN 13203-2:2021 or adapts clauses by stating in the corresponding clause, on the principle:

- shall be according to prEN 13203-2:2021, (clause number) with the following modification;
- shall be according to prEN 13203-2:2021, (clause number) with the following addition;
- prEN 13203-2:2021, (clause number) is replaced by the following;
- prEN 13203-2:2021, (clause number) is not applicable.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 13203-4:2021](https://standards.iteh.ai/catalog/standards/sist/929319c1-e000-45ce-9f2d-c9a0c66baec5/osist-pren-13203-4-2021)

<https://standards.iteh.ai/catalog/standards/sist/929319c1-e000-45ce-9f2d-c9a0c66baec5/osist-pren-13203-4-2021>

## prEN 13203-4:2021 (E)

## 1 Scope

This document is applicable to gas-fired mCHP appliances producing domestic hot water and electricity. The electricity is generated in a process linked to the production of useful heat.

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

- a gas heat input not exceeding 400 kW;
- an electrical output not exceeding 50 kW and
- a hot water storage capacity (if any) not exceeding 2000 l.

prEN 13203-1:2021 sets out in qualitative and quantitative terms the performance in delivery of domestic hot water for a 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 mCHP appliances. 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, enabling the energy performances of different gas-fired appliances to be compared and matched to the needs of the user.

When the mCHP generator does not supply domestic hot water in the summer period, the present standard is not applicable. prEN 13203-2:2021 is used for performance assessment of these generators.

## 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 13203-2:—<sup>1</sup>, *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 prEN 13203-2:2021 and the following apply.

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

- Electropedia I.E.C. available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

### 3.1

#### mCHP appliance

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

- primary heat and power generator;
- supplementary heat generator;

<sup>1</sup> Under preparation. Stage at time of publication: prEN 13203-2:2020



- flue ducts;
- thermal store

### 3.2

#### **mCHP generator**

preferential heat and power generator

### 3.3

#### **supplementary heat generator**

non-preferential heat source providing peak load

### 3.4

#### **power conditioning and control system**

equipment used to change electrical voltage level and waveform, or otherwise alter or regulate the electrical output of the primary heat and power generator to make it suitable and safe for export to other components within or outside the appliance including controls used to operate the primary heat and power generator such a gas valve, safety controls and internal cooling pumps

### 3.5

#### **electric auxiliary energy ( $E_{\text{Auxiliary}}$ )**

electric energy consumed by the mCHP appliance components associated with the supplementary heat generator, thermal management and controls (e.g. pump, fan, valves, control unit)

Note 1 to entry  $E_{\text{Auxiliary}}$  is expressed in kWh

iTech STANDARD PREVIEW  
(standards.iteh.ai)

### 3.6

#### **produced electrical energy ( $E_{\text{CHP}}$ )**

electrical energy produced by the mCHP generator

Note 1 to entry  $E_{\text{CHP}}$  is expressed in kWh

### 3.7

#### **delivered electrical energy ( $E_{\text{delivered}}$ )**

electrical energy delivered by the mCHP appliance to the grid

Note to entry  $E_{\text{delivered}}$  is expressed in kWh

### 3.8

#### **electrical output CHP ( $P_{\text{CHP}}$ )**

electrical output including electrical consumption of auxiliaries

### 3.9

#### **delivered electrical output ( $P_{\text{delivered}}$ )**

electrical output excluding electrical consumption of auxiliaries

### 3.10

#### **electrical consumption of auxiliaries**

difference between the electrical output including electrical consumption of auxiliaries ( $P_{\text{CHP}}$ ) and the electrical output excluding electrical consumption of auxiliaries ( $P_{\text{delivered}}$ )

prEN 13203-4:2021 (E)

## 4 General test conditions

### 4.1 Reference conditions

Shall be according to EN 13203-2:2021, 4.1 with the following addition:

After the last indent “— electrical supply voltage”: add “— (410 ± 4) V three phase.”

### 4.2 Measurement uncertainties

#### 4.2.1 General

Shall be according to prEN 13203-2:2021, 4.2.1.

#### 4.2.2 Steady-state conditions

Shall be according to prEN 13203-2:2021, 4.2.1.

### 4.3 Test conditions

#### 4.3.1 General

Shall be according to prEN 13203-2:2021, 4.3.1 except the second sentence modified as follows:

"For combination mCHP generator, the tests shall be ...".

#### 4.3.2 Test room

Shall be according to prEN 13203-2:2021, 4.3.2.

#### 4.3.3 Water supply

Shall be according to prEN 13203-2:2021, 4.3.3.

#### 4.3.4 Initial adjustment of the appliance

Shall be according to prEN 13203-2:2021, 4.3.4.

#### 4.3.5 Conditions for the determination of the maximum load profile

Shall be according to prEN 13203-2:2021, 4.3.5.

#### 4.3.6 Electrical supply

Shall be according to prEN 13203-2:2021, 4.3.6.

The following Clause 4.3.7 is added:

#### 4.3.7 Delivered electrical energy

Arrangement shall be made to enable the delivered electrical energy to be measured.

NOTE The delivered electrical energy to be measured may be dissipated by a resistor or exported to the grid.

## 5 Determination of the energy consumption and electrical energy generation of the appliance

### 5.1 General

Shall be according to prEN 13203-2:2021, 5.1.

## 5.2 Load profiles

Shall be according to prEN 13203-2:2021, 5.2.

## 5.3 Measurement of the energy recovered by the useful water

Shall be according to prEN 13203-2:2021, 5.3.

## 5.4 Calculation of gas energy

### 5.4.1 Calculation of the daily gas energy consumption in summer mode

Shall be according to prEN 13203-2:2021, 5.4.1.

### 5.4.2 Calculation of daily gas energy consumption in winter mode

Shall be according to prEN 13203-2:2021, 5.4.2 with the following modifications:

Formula (5) is replaced by the following:

$$Q_{\text{gas,W}} = \frac{Q_{\text{gas,S}}}{1 + 0,5 \cdot \left[ \frac{\eta_{\text{CHP,Th-100}} \cdot Q_{\text{gas,S}}}{Q_{\text{ref}}} - 1 \right]} \quad (5)$$

Into the key, “ $\eta_{\text{CH-nom}}$ ” is replaced by “ $\eta_{\text{CHP,Th-100}}$ ” as follows:

“ $\eta_{\text{CHP,Th-100}}$  is the useful thermal efficiency at nominal heat input of the mCHP generator (100 % by mCHP and 100 % by the supplementary heater) at the temperature regime specified in the product standard EN 50465:xxxx for the appliance space heating function or at the maximum declared average temperature. The useful thermal efficiency at nominal heat input will be determined including hydraulic circuit and storage tank if applicable. See the Figures D.1 and D.2.”

The last 4th paragraphs are replaced by the following:

“The heat engine for a combination mCHP appliance in winter mode spends most of the demand time on space heating, outside any night (or day) set-back periods (which require a lower room temperature and hence heating load).

When a combination mCHP appliance switches from space heating to domestic hot water mode and back to space heating the standby losses usually generated from the domestic hot water mode are not lost but are instead used in the space heating mode.

That means combination heaters have lower domestic hot water heat losses in winter mode than in summer mode.

These energy savings benefits of combination mCHP appliances have to be taken in account.”

### 5.4.3 Daily gas energy consumption seasonally weighted

Shall be according to prEN 13203-2:2021, 5.4.3.

## 5.5 Calculation of the daily electrical energy

prEN 13203-2:2021, 5.5 is replaced by the following: