

BS EN 30-2-1:2015



BSI Standards Publication

# Domestic cooking appliances burning gas

Part 2-1: Rational use of energy — General

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**National foreword**

This British Standard is the UK implementation of EN 30-2-1:2015. It supersedes BS EN 30-2-1:1998 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GSE/35, Gas cooking appliances (domestic).

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

## Domestic cooking appliances burning gas - Part 2-1: Rational use of energy - General

Appareils de cuisson domestiques utilisant les combustibles gazeux - Partie 2-1 : Utilisation rationnelle de l'énergie - Généralités

Haushalt-Kochgeräte für gasförmige Brennstoffe - Teil 2-1: Rationelle Energienutzung - Allgemeines

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## Contents

Page

Foreword.....	3
1 Scope .....	4
2 Normative references .....	4
3 Terms and definitions .....	4
4 Performance characteristics .....	4
4.1 Efficiencies .....	4
4.1.1 Single uncovered burner .....	4
4.1.2 Single covered burner .....	4
4.1.3 Hob .....	5
4.2 Maintenance consumption of the oven .....	5
5 Tests methods.....	5
5.1 General.....	5
5.1.1 Burner supply.....	5
5.1.2 Test conditions .....	5
5.1.3 Test pans .....	5
5.2 Efficiencies .....	5
5.2.1 Uncovered burners .....	5
5.2.2 Covered burners .....	8
5.3 Maintenance consumption of the oven .....	8
Annex ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives .....	9

## Foreword

This document (EN 30-2-1:2015) has been prepared by Technical Committee CEN/TC 49 “Gas cooking appliances”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by December 2015, and conflicting national standards shall be withdrawn at the latest by December 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 30-2-1:1998.

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, which is an integral part of this document.

The main technical changes with reference to EN 30-2-1:1998 are:

- adaptation to the requirements of EN 30-1-1:2008 and relevant amendments;
- indication on how to carry out the measurement of the efficiency for the hob;
- formula for the calculation of the efficiency for each gas burner and for the gas hob in line with what indicated in Regulation 66/2014;
- adaptation of Annex ZA to include the reference to Regulation 66/2014.

This Part 2-1 “Rational use of energy” of EN 30 complements Part 1-1 “Safety”.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 1 Scope

This European Standard sets out the requirements and the test method for the rational use of energy of gas burning domestic cooking appliances, in accordance with EN 30-1-1:2008+A3:2013, Clause 1.

This European Standard covers type testing only.

NOTE The calorific values specified in this European Standard are based on the gross calorific value (H<sub>s</sub>) as defined in EN 30-1-1:2008+A3:2013.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 30-1-1:2008+A3:2013, *Domestic cooking appliances burning gas - Part 1-1: Safety - General*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 30-1-1:2008+A3:2013 and the following apply.

**3.1 maintenance consumption of the oven**  
quantity of heat to be released per unit of time by the gas combustion, in order to maintain the oven temperature constant

Note 1 to entry: Notion: C<sub>e</sub>  
Unit: kilowatt (kW)

## 4 Performance characteristics

### 4.1 Efficiencies

#### 4.1.1 General

The requirements given in 4.1.2 and 4.1.3 are only applicable to hotplate burners, the nominal heat input of which is higher than 1,16 kW.

#### 4.1.2 Single uncovered burner

The efficiency of each single burner determined under the test conditions specified in 5.2.1 shall be at least 52 %.

#### 4.1.3 Single covered burner

The efficiency of each single covered burner determined under the test conditions specified in 5.2.2 shall be at least:

- 1) 25 % (from cold);
- 2) 35 % (from hot).

#### 4.1.4 Hob

The efficiency of the gas hob shall be determined under the test conditions specified in 5.2.1

### 4.2 Maintenance consumption of the oven

Under the test conditions specified in 5.3, the maintenance consumption of the oven shall not exceed the value obtained using the formula:

$$C_e = 0,93 + 0,035 v$$

where

$v$  is the useful oven volume, expressed in cubic decimetres, defined in EN 30-1-1:2008+A3:2013, 3.4.3.12.

## 5 Tests methods

### 5.1 General

#### 5.1.1 Burner supply

According to the appliance category each burner is individually supplied either with one of the reference gases indicated in EN 30-1-1:2008+A3:2013, 7.1.1.1 or the actual gas distributed complying with the requirements in EN 30-1-1:2008+A3:2013, 7.1.1.3.

The burner is adjusted, within  $\pm 2\%$ , in accordance with EN 30-1-1:2008+A3:2013, 7.1.3.2.4, to its nominal heat input or to the calorific value set in accordance with the indications of Table 1.

The corresponding position of the adjusting device or the corresponding value of the burner pressure is noted. The burner is then cooled prior to proceeding to the following test in accordance with 5.2.1 or 5.2.2.

#### 5.1.2 Test conditions

Tests are carried out under the installation conditions specified in EN 30-1-1:2008+A3:2013, 7.1.3.3.

#### 5.1.3 Test pans

Aluminium test pans having a matt base, polished walls, no handles and complying with the characteristics of EN 30-1-1:2008+A3:2013, C.1 or 7.1.4.1, for fish burners, are used.

The pans are equipped with their lids.

### 5.2 Efficiencies

#### 5.2.1 Uncovered burners

Depending on the nominal heat input of the burner being tested, the diameter of the pan to be used and the volume of water which it shall contain are given in Table 1 below.

For the fish burners the water mass is indicated in Table 1 as a function of the nominal heat input of the burner.

**Table 1 — Pan diameter and mass of water depending on the heat input of the burner**

Nominal heat input of the burner kW	Internal diameter of the test pan mm	Mass of water $m_{e1}$ to be used kg
between 1,16 and 1,64 inclusive	220	3,7
between 1,65 and 1,98 inclusive	240 a	4,8
between 1,99 and 2,36 inclusive	260 a	6,1
between 2,37 and 4,2 inclusive	260 a with an adjustment of the heat input of the burner to 2,36 kW $\pm$ 2 % using the method given in EN 30-1-1:2008+A3:2013, 7.3.1.2.1.1 a)	6,1
greater than 4,2	300 a with an adjustment of the heat input of the burner to 4,2 kW $\pm$ 2 % using the method given in EN 30-1-1:2008+A3:2013, 7.3.1.2.1.1 a)	9,4
<p>a If the indicated diameter (300 mm, 260 mm or 240 mm) is greater than this maximum diameter given in the instructions for use, the test will be carried out using a pan with the next lower diameter (260 mm, 240 mm or 220 mm), containing the corresponding quantity of water (6,1 kg, 4,8 kg or 3,7 kg). In that case the burner heat input will be adjusted to 2,36 kW, 1,98 kW or 1,64 kW respectively, to <math>\pm</math> 2 %, using the method described in EN 30-1-1:2008+A3:2013, 7.3.1.2.1.1 a).</p>		

The initial temperature of the water  $t_1$  shall be  $(20 \pm 1) ^\circ\text{C}$ , and the temperature at the time of extinction of the burner shall be  $(90 \pm 1) ^\circ\text{C}$ .

The maximum temperature  $t_2$  observed after extinction of the burner (final temperature expressed in degrees Celsius) is measured.

The temperature sensor is placed in the centre of the volume of water and the temperature is measured using a sensor, the measurement uncertainty of which is less than  $0,1 ^\circ\text{C}$ .

The burner is pre-heated under the following conditions:

- the burner is operated for 10 min at its nominal heat input or at the input adjusted according to Table 1, in the adjustment position defined and noted in 5.1.1;
- whatever the nominal heat input is the burner is covered with the 220 mm diameter pan containing 3,7 kg of water.

Once preheating is completed the 220 mm diameter pan is withdraw and immediately afterwards is replaced by the pan used for the efficiency test. The measurement of the gas consumption then begins and stops after the extinction of the burner, the pan staying in place.

The efficiency is calculated using the formula:

$$EE_{gas\ burner} = \frac{E_{theoric}}{E_{gas\ burner}} \times 100$$



with

$$E_{theoric} = 4,186 \times 10^{-3} m_e (t_2 - t_1)$$

$$E_{gas\ burner} = V_c (or\ M_c) \times H_s$$

where

$EE_{gas\ burner}$  = energy efficiency of a gas burner in % and rounded to the first decimal place;

$E_{gas\ burner}$  = energy content of the consumed gas for the prescribed heating in MJ and rounded to the first decimal place;

$E_{theoric}$  = theoretic minimum required energy for the corresponding prescribed heating in MJ and rounded to the first decimal place.

$m_e$  is the equivalent mass of the pan filled in accordance with the indications given in Table 1.

The mass  $m_e$  is made up as follows:

$$m_e = m_{e1} + 0,213 m_{e2}$$

where

$m_{e1}$  is the mass of the water used in the pan ;

$m_{e2}$  is the mass of the aluminium corresponding to the pan and its lid (the mass  $m_{e2}$  to be taken into account will be the mass measured).

All masses are expressed in kilograms:

$V_c$  is the volume of dry gas consumed, in cubic metres, determined from the measured volume, by the following formula:

$$V_c = V_{mes} \cdot \frac{p_a + p - p_w}{1013,25} \cdot \frac{288,15}{273,15 + t_g}$$

where

$V_{mes}$  is the measured gas volume, in cubic metres;

$p_a$  is the atmospheric pressure, in millibars;

$p$  is the gas supply pressure at the point where the heat input is measured, in millibars;

$p_w$  is the partial vapour pressure, in millibars;

$t_g$  is the gas temperature at the point where the heat input is measured, in degrees Celsius;

$M_c$  is the mass of dry gas consumed, in kilograms;

$H_s$  is the gross calorific value of the gas, as defined in EN 30-1-1:2008+A3:2013, 3.3.1.5.

The requirement in 4.1.2 shall be satisfied.

Efficiency of the gas hob:

The energy efficiency of the gas hob ( $EE_{gas\ hob}$ ) is calculated as the average of the energy efficiency of the different gas burners ( $EE_{gas\ burner}$ ) of the hob.

$$EE_{gas\ hob} = \frac{1}{n} \cdot \sum_{i=1}^n EE_{gas\ burner, i}$$

where

$EE_{gas\ hob}$  is the energy efficiency of the gas hob in % and rounded to the first decimal place;

n is the number of burners with a minimum power of 1,16 kW;

$EE_{gas\ burner, i}$  is the energy efficiency of the gas burner i in % and rounded to the first decimal place.

### 5.2.2 Covered burners

The efficiencies are determined, with any plates in position, under the following conditions:

In accordance with 5.2.1, the pan corresponding to the nominal heat input of the burner being tested containing the corresponding mass of water, is placed at the most appropriate point on the hot plate.

NOTE For this test, footnote a of Table 1 is not applicable.

The smallest number of pans of the largest possible diameter, selected from Table 1, and containing the corresponding masses of water are placed on the remaining surface area, if any, of the hot plate.

The temperature is determined in the same manner as for an uncovered burner: the initial water temperature  $t_1$  being  $20\text{ °C} \pm 1\text{ °C}$ , the final temperature  $t_2$  for each pan is the highest temperature observed after extinction of the burner, which takes place as soon as the water temperature of any of the pans reaches  $90\text{ °C} \pm 1\text{ °C}$ .

The test is carried out at the nominal heat input, with the burner adjusted in accordance with 5.1.1.

The efficiency is the ratio of the sum of the quantities of heat absorbed by the pans and the water which they contain and the quantity of heat consumed at the burner (see formula in 5.2.1).

This first test is carried out starting from cold, a second test is carried out, starting from hot. It is assumed that the hot plate is hot when the water contained in the largest pan used for the efficiency test, used on its own, has been brought to boiling point. When the plate is hot, the pans are withdrawn. The test is then carried out under the same conditions as the test from cold, by placing pans containing water at  $20\text{ °C} \pm 1\text{ °C}$  on the plate.

The requirements in 4.1.3 shall be satisfied.

### 5.3 Maintenance consumption of the oven

With the oven empty, the burner central device is adjusted so that, under steady-state conditions, the mean temperature rise, measured at the geometric centre oven as defined in EN 30-1-1:2008+A3:2013, 3.4.3.9, using a bare thermocouple, is 180 K above the ambient temperature.

The corresponding gas consumption is measured and it is verified that the requirements of 4.2 are satisfied.

## Annex ZA (informative)

### Clauses of this European Standard addressing essential requirements or other provisions of EU Directives

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of the EU Directive 2009/142/CE on the approximation of the laws of Member States concerning gas appliances and of Commission Regulation (EC) No 66/2014 of 14 January 2014 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for domestic ovens, hobs and range hoods.

The clauses of this standard listed in Table ZA.1, are likely to support requirements of EU Directive 2009/142/CE on the approximation of the laws of Member States concerning gas appliances.

**Table ZA.1**

Essential requirement	Subject	Requirements of this standard	Comment
3.5	Rational use of energy	Clause 1 Clause 2 Clause 3 Clause 4 Clause 5	

Within its scope this standard covers only the following requirements out of those given in ensuring that the prospective harmonized standard provides, where appropriate, revised and/or new definitions for at least the appliances and parameters included in the Commission Regulation (EU) No 66/2014:

- ensuring that the prospective harmonized standard provides procedures and methods to measure the consumption and to calculate at least the energy efficiency during heating-up time, as included in the Commission Regulation (EU) No 66/2014;
- The following clauses of this standard are relevant for the Coverage of Requirements of Commission Regulation (EU) No 66/2014:
  - Clause 1;
  - Clause 2;
  - Clause 3, excluding 3.1;
  - 4.1;
  - 4.1.4;
  - 5.1;
  - 5.2.1.

Compliance with this standard provides means of conformity with the specified requirements of the Commission Regulations concerned.

**WARNING** — Other requirements and other EU Directives or Commission Regulations may be applicable to the products falling within the scope of this standard.





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