SLOVENSKI STANDARD
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Merilna metoda porabe plina v plinskih pečicah

Measuring method of the energy consumption of gas fired ovens

Bestimmung des Energieverbrauchs von Gasbacköfen

Méthode de mesurage de la consommation d'énergie des fours à gaz

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Measuring method of the energy consumption of gas fired ovens

Méthode de mesurage de la consommation d'énergie des fours à gaz

Bestimmung des Energieverbrauchs von Gasbacköfen

This European Standard was approved by CEN on 16 January 2017.

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This European Standard exists 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

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European foreword

This document (EN 15181:2017) 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of an identical text or by endorsement, at the latest by September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

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 15181:2008.

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 changes to the previous version of EN 15181:2008 are the following:

— the implementation of Annex ZA which shows the coverage of Regulation 66/2014 concerning Ecodesign requirements for domestic ovens, hobs and range hoods and of Delegated Regulation 65/2014 on the Energy Labelling of domestic ovens and range hoods;

— the verification procedure for ensuring that the temperature inside the oven cavity reaches the temperature setting of the thermostat and/or the oven control display within the duration of the test cycle for measuring the energy consumption;

— the revision of Clause 9, Uncertainty and verification procedures;

— the amending of Clause 6, Calculated oven volume and mass, to ensure high reproducibility.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The object of this European Standard is to specify, in accordance with Regulation 66/2014 concerning Ecodesign requirements for domestic ovens, hobs and range hoods and of Delegated Regulation 65/2014 on the Energy Labelling of domestic ovens and range hoods:

— energy consumption using a standardized load during a standardized procedure,

— some performance characteristics (like volume, correspondence between set and measured oven temperature, permitted tolerances to values declared by the manufacturer and control procedures for checking the declared values).

1 Scope

This European Standard specifies the method of test for determining the gas energy consumption in gas-fired domestic ovens when they are being used in one or more of the oven cooking modes defined in 3.1. It applies to the gas-fired domestic ovens which are capable of utilizing gases of group H or group E, possibly after conversion according to instructions for use.

This European Standard applies to these gas-fired domestic ovens, whether they are separate appliances or component parts of domestic cooking appliances.

This European Standard also applies to domestic appliances that can utilize gas and/or electrical energy to provide heat for cooking when the ovens are utilizing gas energy to provide heat for cooking, but not when electric energy is used to provide any or all of the heat for cooking in the oven.

It is not applicable to:

— microwave combination ovens;

— small cavities ovens (3.2);

— oven cavities not provided with devices to detect and control the temperature for the preparation of food;

— cooking modes others than defined in 3.1.1 and 3.1.2;

— ovens connected to a chimney in which the gas energy for cooking provides, by design, also space and/or water heating;

— appliances designed for use with gases of the third family only.

This European Standard is concerned neither with safety nor with overall performance requirements.

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*

EN 30-1-2:2012, *Domestic cooking appliances burning gas - Safety - Part 1-2: Appliances having forced-convection ovens and/or grills*

EN 30-1-4:2012, *Domestic cooking appliances burning gas - Safety - Part 1-4: Appliances having one or more burners with an automatic burner control system*

EN 60584-1:2013, *Thermocouples — Part 2: Tolerances (IEC 60584-1)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 30-1-1:2008+A3:2013, EN 30-1-2:2012 or EN 30-1-4:2012, provided the appliance falls within the scope of that standard, and the following apply.

3.1
oven cooking modes

3.1.1
conventional oven cooking mode
operation of the oven for cooking roasts, pastry, etc., in which the transmission of heat is achieved by natural convection and radiation

3.1.2
forced-convection oven cooking mode
operation of the oven for cooking roasts, pastry, etc., in which the transmission of heat by convection is assisted by means of a fan

3.2
small cavity ovens
oven with the following dimensions related to the usable volume:

— both width and depth < 250 mm

— or height < 120 mm

Note 1 to entry: The definition of small cavity ovens in this standard is due to the size of the artificial standard load.

3.3
multiple cavity appliances
appliance that has more than one separate oven cavity in which food is cooked and which can be controlled independently, but cannot be installed separately

3.4
auxiliary electrical energy
electrical energy consumption (during the brick test) of any electric components that cannot be switched off from the control panel by the user when using the oven in accordance with the instructions for use

4 List of measurements

4.1 Dimensions and mass

Dimensions of the calculated oven volume (see 6.2) and mass of the oven (see 6.3).

4.2 Energy consumption and heating time

Heating of the load (7.2).

5 General conditions for measurements

5.1 General

According to good laboratory practice, before installation, it shall be checked that the appliance is free from damage and complies with EN 30-1-1:2008+A3:2013, 6.1.1, Soundness, EN 30-1-2 or EN 30-1-4, as applicable.

The instructions for use regarding installation of the oven shall be followed.

Prior to every test, the whole appliance (this includes the material and the insulation) shall be at ambient temperature. In multiple cavity appliances, each oven cavity shall be measured separately. Only the cavity measured shall be switched on.

In case an oven has several cooking modes as described in Clause 3, the manufacturer can choose the variant to be tested. This shall be reported (see Clause 8).

Unless otherwise specified, measurements are conducted under the following conditions:

5.2 Ambient temperature

The tests are carried out in a substantially draught-free room in which the ambient temperature is maintained at (23 ± 2) °C during the complete test.

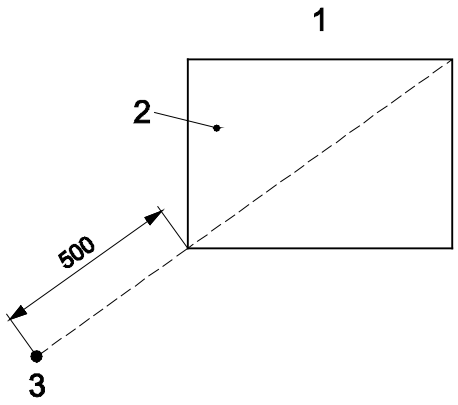
Prior to the measurement the whole appliance (this includes the material and the insulation) shall be at ambient temperature of (23 ± 2) °C.

A change in the ambient temperature of the room during the test could affect the results. Care should be taken during the test to ensure that the ambient temperature is as steady as possible.

This ambient temperature is measured at a point that is at the same height as the centre of the calculated oven volume of the oven cavity and at a distance of 0,5 m diagonally from one of the front edges of the appliance; see Figure 1.

The measurement of the ambient temperature shall not be influenced by the oven itself or by any other appliance.

Dimensions in millimetres



Key

1 top view
2 oven
3 thermocouple

Figure 1 — Position of the thermocouple

5.3 Test gases and test pressures

The appliance is fitted with the appropriate injector(s) for utilization of gas group H or gas group E. The primary air adjuster, if any, shall be adjusted according to the technical instructions.

The appliance is then supplied with G 20, with a composition of at least 95 % methane, at a pressure of 20 mbar.

5.4 Electrical supply

The supply voltage shall be maintained at 230 V ± 1 %. The supply frequency shall be at 50Hz ± 1 %.

5.5 Load

The load for test 7.2 shall be a brick with two holes for temperature measurements as shown in Annex A.

Before using it for the first time a new brick shall be dried in forced air circulation in an oven of about 50 l volume at ≥ 175 °C for three hours. No more than two bricks shall be dried at the same time in the same oven.

The mass m_d of the completely dry brick without thermocouples shall be measured within 5 min after removal from the oven and shall be noted in grams. The dry mass m_d shall be in accordance with the dry mass specified in Annex A. The brick shall be identified with a reference number for accurate calculation of the water absorption according to 7.2.2.

Place markings 32 mm from the measuring point of the two thermocouples with steel tube and insert the thermocouples into the holes until the marking matches with the surface of the brick. The thermocouples shall be fixed to ensure that the measuring points remain at a depth of 32 mm during the whole test procedure.

The weighing machine should be protected from the effects of the hot brick.

The thermocouples may be fixed by means of a droplet of silicon glue at the surface of the brick or by other suitable means.

Care should be taken, that the measuring point is the first contact point of the two thermowires.

Between test series, the brick should be stored in a refrigerator, preferably not soaked with water. The brick soaking water should be kept away (to reduce dissolving processes); i.e. re-use of the brick storage water. A brick that has already been soaked in water needs at least eight hours to be dried as described above.

Due to the porosity of the brick care should be taken that the holes of the brick are not enlarged if the thermocouples are removed and reinserted.

NOTE A brick can be used for about 20 tests when handled with normal care.

5.6 Instrumentation

Air temperature measurements in the empty oven are made with a thermocouple with a welded point (not with a black copper plate), class 1, type K.

Room temperature measurements are made with a thermocouple, class 1, type T.

Other types of thermocouple may be used for the measurement of room temperatures provided they are known to provide equivalent or better accuracy and reproducibility than a type T.

Temperature measurements in the load are made with two thermocouples with 1 mm steel tube diameter, class 1, according to EN 60584-2. The thermocouple shall be accurate to ± 1,5 K.

NOTE The steel tube of the thermocouple eases the insertion of the thermocouple into the brick. See also 5.5, 6th paragraph.