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Responsible committee: CPL/59 Performance of household electrical appliances

Interested committees:

Title: Draft BS EN 50733 Electric forced convection ovens, steam cookers and combination ovens professional use - Test methods for measuring the performance.

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- iii) requires additional national guidance or information

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Full document details: 23/30482708 DC

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

English Version

**Electric forced convection ovens, steam cookers and
combination ovens for professional use - Test methods for
measuring the performance**

Fours électriques à convection forcée, cuiseurs à vapeur et
fours combinés à usage professionnel - Méthodes d'essai
pour le mesurage de l'aptitude à la fonction

Elektrische Heißluftöfen, Dampfgeräte und
Heißluftdämpfer für den professionellen Gebrauch -
Verfahren zur Messung der Gebrauchseigenschaften

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2024-01-19.

It has been drawn up by CLC/TC 59X.

If this draft becomes a European Standard, CENELEC 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 CENELEC in three official versions (English, French, German).
A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the 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 Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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

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39 **European foreword**

40 This document has been prepared by CLC/TC 59X "Performance of household and similar electrical
41 appliances".

42 This document is currently submitted to the Enquiry.

43 The following dates are proposed:

- latest date by which the existence of this (doa) dor + 6 months
document has to be announced at national
level
- latest date by which this document has to be (dop) dor + 12 months
implemented at national level by publication of
an identical national standard or by
endorsement
- latest date by which the national standards (dow) dor + 36 months
conflicting with this document have to be
withdrawn (to be confirmed or
modified when voting)

1 Scope

This document applies to electric **forced convection ovens**, **steam cookers** and **combination ovens** for professional use.

These appliances are used in professional kitchens, such as restaurants, canteens, hospitals and in businesses such as butcher shops.

NOTE 1 These appliances are designed for one or more of the following cooking methods: blanching, frying, steaming, proofing, roasting, toasting, au gratin, sous vide cooking, etc

This document does not apply to:

- appliances that exclusively perform rethermalizing processes;

NOTE 2 Rethermalizing process is used for maintaining the temperature of hot food and for the warming of pre-cooked food (e.g. hot cupboard).

- pizza ovens;

- bakery ovens;

- static ovens;

- pressure steam ovens;

- appliances designed exclusively for industrial purposes.

The purpose is to define the principal performance characteristics of electric **forced convection ovens**, **steam cookers** and **combination ovens** for professional use and to describe the standard methods for measuring these characteristics.

This document does not deal with safety, food quality and or minimum performance requirements.

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 631-1, *Materials and articles in contact with foodstuffs - Catering containers - Part 1: Dimensions of containers*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp/>

- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

forced convection oven

appliance intended for the cooking of food by heated air that is circulated by mechanical means within the **cooking chamber**

3.2**steam cooker**

appliance intended for the cooking of food only by means of direct steam contact

Note 1 to entry: The pressure within the **cooking chamber** does not differ significantly from atmospheric pressure.

3.3**combination oven**

appliance intended for the cooking of food either by means of direct steam contact or by heated air circulated by mechanical means within the **cooking chamber** or by combination of these two modes

Note 1 to entry: The pressure within the **cooking chamber** does not differ significantly from atmospheric pressure.

3.4**cooking chamber**

interior of the appliance in which food products are cooked or processed

3.5**sensible heat**

Q_{sensible}

heat which results in an increase in temperature and is therefore measurable

3.6**latent heat**

Q_{latent}

heat which results in the phase change of the water during the cooking process

3.7**brick**

test load not fitted with a temperature measuring sensor

3.8**M-brick**

test load fitted with a temperature measuring sensor at its geometric centre

3.9**GN-container**

chrome-nickel-steel container according to the dimensions of EN 631-1

3.10**volume fraction of water vapour**

ratio between the water vapour partial pressure and atmospheric pressure in %

3.11**oxygen concentration sensor**

electronic device that measures the proportion of oxygen

4 List of measurements

The performance and consumption characteristics are determined as follows:

- preheat-time measurement in convection mode in accordance with 8.2.1;
- time, energy and water consumption measurement with an empty appliance in convection mode in accordance with 8.2.2;

- 119 — time, energy, water consumption and water loss measurement with a loaded appliance in convection mode
120 in accordance with 8.2.3;
- 121 — preheat-time measurement in steam mode in accordance with 8.3.2;
- 122 — time, energy and water consumption measurement with an empty appliance in steam mode in accordance
123 with 8.3.4;
- 124 — time, energy, water consumption with a loaded appliance in steam mode in accordance with 8.3.5.

125 **5 General conditions for measurements**

126 **5.1 General**

127 The instructions for use regarding installation and use of the professional **combination oven** shall be followed,
128 except if they stand in conflict with the requirements in this document. In this case with the requests of this
129 standard, this document shall prevail.

130 All testing shall be performed on the same appliance.

131 Before commencing measurements, the **combination oven** shall be checked to ensure that it is operating
132 properly.

133 All tests shall be started with the appliances at the ambient conditions in accordance with 5.2.

134 For all tests, the appliance shall be free-standing in the room without any excess coverage other than originally
135 equipped. All protective surface cover foils shall be removed.

136 All sides of the **combination oven** shall have a minimum clearance of 0,5 m from any walls.

137 **5.2 Ambient temperature**

138 The following ambient conditions shall be maintained throughout the measurements.

139 — ambient temperature of the room: $(23 \pm 2) ^\circ\text{C}$;

140 — air velocity max: 2 m/s.

141 The ambient temperature shall be measured and recorded during the test.

142 **5.3 Electrical supply**

143 The appliance is supplied at a voltage of 230 V or 400 V with a tolerance of $\pm 2\%$ and shall be maintained at
144 the appliance's terminal throughout the test and a frequency of 50 Hz with a tolerance of $\pm 1\%$.

145 It is recommended to use a stabilized power source.

146 The voltage and frequency shall be reported.

147 **5.4 Water supply**

148 The actual water temperature maintained during the tests shall be measured and recorded.

149 The temperature of the water supply shall be $(15 \pm 2) ^\circ\text{C}$.

150 **5.5 Instrumentation and quantities to be measured and calculated**

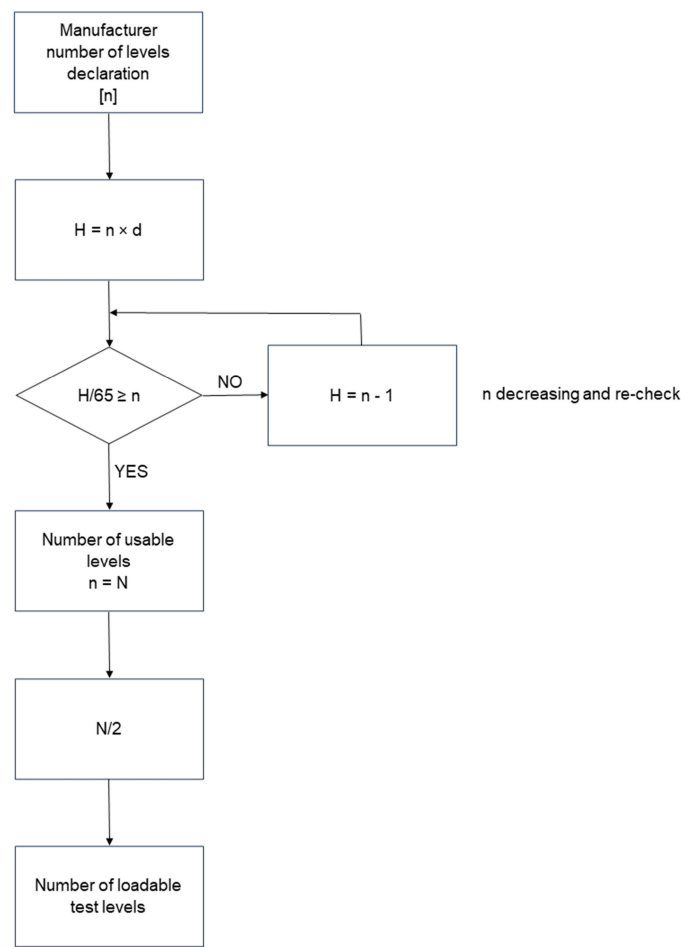
151 All measurements shall be carried out with instruments that have been calibrated. The following measurement
152 accuracies shall be met:

- 153 — thermocouple used for temperature measurement shall be flexible, insulated (no steel tube) and the
154 thermocouple probe on the top of the thermocouple shall have a diameter from 0,5 mm to 3,0 mm. The
155 thermocouple shall be made to an accuracy of $\pm 1,5\text{ K}$;

- 156 NOTE For example, type K class 1 or type T class 1 or 2 can be used.
- 157 — ambient temperature of the room: $(23 \pm 2) ^\circ\text{C}$; temperature measurements, excluding the ones performed
158 with thermocouple, shall be made to an accuracy of $\pm 1 \text{ K}$;
- 159 — electrical energy shall be measured to an accuracy of $\pm 1,5 \%$ or $\pm 10 \text{ Wh}$, whatever is the greater;
- 160 — supply voltage shall be measured to an accuracy of $\pm 0,5 \%$;
- 161 — frequency shall be measured to an accuracy of $\pm 0,5 \%$;
- 162 — mass shall be measured to an accuracy of $\pm 3 \text{ g}$;
- 163 — time interval measured shall be measured to an accuracy of $\pm 1 \text{ s}$;
- 164 — for all continues measurements, the sampling shall be at least one value per 1 s ;
- 165 — for Formulae (6) and (7) the time sampling shall be 1 s ;
- 166 — **oxygen concentration sensor** and control board, for measuring the oxygen concentration inside the cavity
167 to ensure the presence of saturated steam, having a range of oxygen concentration from $0,1 \%$ O_2 to 25%
168 O_2 , an uncertainty of $\pm 0,5 \%$ O_2 .
- 169 — water consumption shall be measured with a range of flow rates of $0,1 - 5 \text{ l/min}$ with an accuracy of $\pm 3 \%$
170 momentary value;
- 171 — altitude (m) shall be reported to an accuracy of $\pm 40 \text{ m}$.

172 6 Calculation of the number of loadable test level

- 173 For the identification of the loads to be used in the tests, number of loadable test levels (N) shall be determined
174 as shown in Figure 1.



Key

- n the number of GN-container usable levels declared by the manufacturer
- d the average distance between the levels [mm]. (also the distance between the lowest level and the lower door opening frame is considered in the average calculation)
- N number of usable levels according to number of loadable test level verification
- H height parameter

Figure 1 — Number of loadable test level verification

Height parameter (H) is calculated by the Formula (1):

$$H = n \times d \tag{1}$$

7 Loading scheme

7.1 Number and position of GN-containers

- For the test with a loaded appliance, **bricks** according to Annex A shall be used. The dry mass of each **brick** used shall be measured and recorded.
- The test is carried out with **bricks** and **GN-containers**, with a depth of 20 mm. The weight of each **GN-container** shall be measured and recorded.
- Usable **GN-containers**, shall be selected according to instructions for use:
- appliances intended for 2/3 **GN-containers**, shall be tested with one 2/3 **GN-container** per usable level;