

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

Household electric cooking appliances –
Part 1: Ranges, ovens, steam ovens and grills – Methods for measuring
performance

Appareils de cuisson électrodomestiques –
Partie 1: Cuisinières, fours, fours à vapeur et grils – Méthodes de mesure de
l'aptitude à la fonction



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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD ELECTRIC COOKING APPLIANCES –

Part 1: Ranges, ovens, steam ovens and grills –
Methods for measuring performance

AMENDMENT 1

FOREWORD

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Amendment 1 to IEC 60350-1:2016 has been prepared by subcommittee 59K: Performance of household and similar electrical cooking appliances, of IEC technical committee 59: Performance of household and similar electrical appliances.

The text of this Amendment is based on the following documents:

FDIS	Report on voting
59K/328/FDIS	59K/331/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Amendment is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications/.

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- replaced by a revised edition, or
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<https://standards.iteh.ai/catalog/standards/sist/c87cfd76-7fb1-4c9f-9f21-165bad9e2928/iec-60350-1-2016-amd1-2021>

1 Scope

Add the following note after the first paragraph:

NOTE 3 This document is also applicable to portable appliances with similar functionalities that were previously covered by the withdrawn IEC 61817.

In Note 2, delete the 2nd bullet regarding the exclusion of portable appliances.

Replace 6.5 by the following new content:

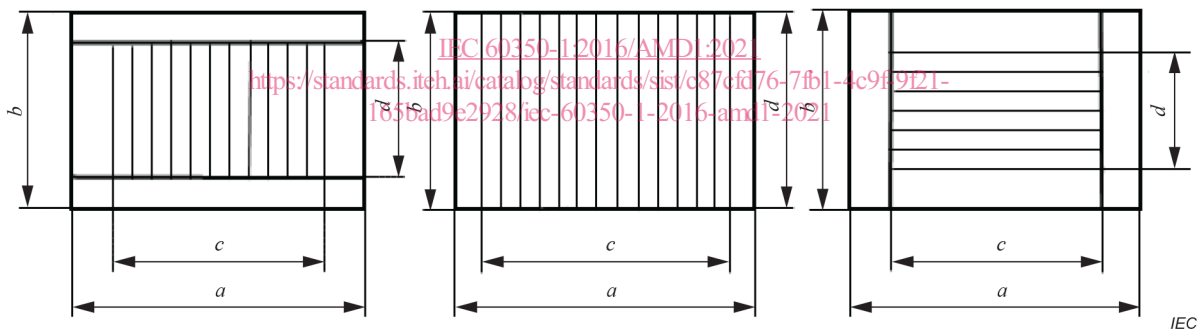
6.5 Dimensions of a grill grid

6.5.1 Entire area

The entire area of the grill grid is determined by measuring the maximum width and the maximum depth of the outer rods. This entire area of the grill grid is calculated and stated in square centimetres, rounded to 10 cm².

6.5.2 Usable area

The usable width and usable depth of the grill grid are measured, by considering only the inner grid, which is suitable for placing food. The usable area of the grill grid is calculated and stated in square centimetres, rounded to 10 cm².



Key:

- a* is the maximum width of the grill grid
- b* is the maximum depth of the grill grid
- c* is the usable width of the grill grid
- d* is the usable depth of the grill grid

Figure 13 – Examples for determining the entire area and usable area of a grill grid

Table 2 – Ingredients

In the row dealing with eggs, replace "Clause C.1" with "Clause C.2".

Replace Clause 9 with the following new content:

9 Effective grilling area

9.1 Purpose

The purpose of this test is to determine the effective grilling area (E). The effective grilling area is the part of the usable area of the grill grid (see 6.5) where white bread reaches a required browning intensity during grilling.

9.2 Ingredients

The measurement is done with factory-made white bread made of wheat (e.g. Golden Toast⁶), which is commonly available and suitable for toasting. The slices of bread shall have an edge length of at least 80 mm and a thickness of 12 mm \pm 1 mm. It shall be fine-pored.

If more than one loaf of bread is necessary, it shall be from the same batch. Therefore, the bread shall be bought from the same supplier, at the same time and stored under same conditions until needed for the measurements. It shall be used before the expiry date.

9.3 Preparation

Discard the first two and the last two slices of one package because these slices often have a different texture. Remove the crust and cut the slices of bread to an edge length of 70 mm \pm 1 mm.

Determine the usable area of the grill grid (A_U) and state it in cm². Cover the usable area of the grill grid completely (without gaps in between) with bread. For this, it can be necessary to trim some slices. The minimum width and length of each slice shall not be less than 35 mm.

9.4 Procedure

Follow the operating instructions with respect to the heating function, temperature, shelf and preheating. If preheating is recommended, the grill grid is placed in the oven when the end of the preheating phase is indicated, for example by visual or acoustic signal, or after a recommended pre-heating time.

If no instructions are given, the grill grid is placed in the highest possible level in the not-preheated oven until it reaches the stop position of the rack, the door is closed, and the bread is grilled with the highest possible setting.

During the grilling process, the door may be opened once for a maximum of 3 s to check the browning, but without moving the grid.

Remove the grill grid when the bread is browned and burnt spots start to appear (\geq shade number 15).

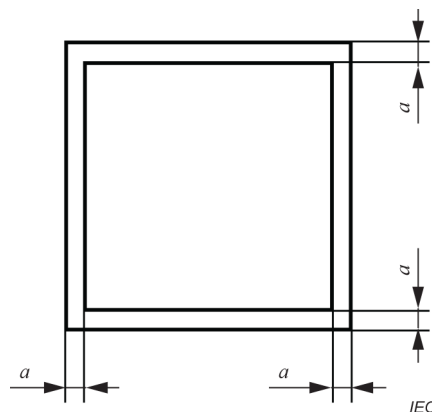
⁶ Golden Toast is the trade name of a product supplied by Lieken Brot und Backwaren GmbH. Golden Toast might be commercially available through other suppliers after the date of publication of this standard. This information is given for the convenience of the users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

9.5 Assessment

9.5.1 General

Assess the browning of the bread within 1 h. Through the grilling process, the slices of bread might bulge, which could increase the browning of the edges. Therefore, the top area of a slice of toast is reduced alongside its outline as shown in Figure 14 by 2 mm to 3 mm from each side.

The assessable area (A_a) is the top area after grilling considering the shrinkage of toast and cutting the slices; see Figure 14.



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Key:

a is the rejected part of each edge length; $2 \text{ mm} \leq a \leq 3 \text{ mm}$

Figure 14 – Determining the assessable area of a slice of toast – Example

<https://standards.iteh.ai/catalog/standards/sist/c87cfd76-7fb1-4c9f-9f21-165bad9e2928/iec-60350-1-2016-amd1-2021>

9.5.2 Criteria of validity

For a valid result, sufficient browning is required. This is ensured if the percentage of burned parts of the assessable area in total is $\geq 3 \%$ to $\leq 15 \%$. Burned areas ($A_{\geq 15}$) are defined by showing a shade number ≥ 15 in accordance with Annex B. To determine the shade numbers, a digital evaluation system in accordance with 7.5.3.6.3 should be used.

If the result is invalid, repeat the test with adapted time.

9.5.3 Criteria of assessment

The relative effective grilling area E_r is calculated with the following formula:

$$E_r = \frac{A_{8-14}}{A_a - A_{\geq 15}} \times 100 \quad (17)$$

where

E_r is the relative effective grilling area, in %;

A_{8-14} is the assessable properly browned area with a shade number within the range of ≥ 8 and ≤ 14 , in cm^2 ;

$A_{\geq 15}$ is the assessable burnt area with a shade number ≥ 15 , in cm^2 ;

A_a is the assessable area, in cm^2 .

The absolute effective grilling area E_a in cm^2 is calculated as follows:

$$E_a = \frac{A_{8-14}}{A_a} \times A_u \quad (18)$$

Additionally, the following areas shall be noted:

- the not browned area N in cm^2 :

$$N = \frac{A_{<8}}{A_a} \times A_u \quad (19)$$

- the burnt area B in cm^2 :

$$B = \frac{A_{\geq 15}}{A_a} \times A_u \quad (20)$$

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where

A_{8-14} is the assessable properly browned area with a shade number within the range of ≥ 8 and ≤ 14 , in cm^2 ; [IEC 60350-1:2016/AMD1:2021](https://standards.iteh.ai/catalog/standards/sist/c87cfd76-7fb1-4c9f-9f21-165bad9c2928/iec-60350-1-2016-amd1-2021)

$A_{\geq 15}$ is the assessable burnt area with a shade number ≥ 15 , in cm^2 ; <https://standards.iteh.ai/catalog/standards/sist/c87cfd76-7fb1-4c9f-9f21-165bad9c2928/iec-60350-1-2016-amd1-2021>

$A_{<8}$ is the assessable not browned area with a shade number <8 ;

A_a is the assessable area, in cm^2 ;

A_u is the usable area of the grill grid, in cm^2 .

The final effective grilling area is calculated as an average of three valid tests.

Additionally, if the upper surface of the bread that is assessed is above or below half the usable height measured in accordance with 6.2.2, this shall be reported.

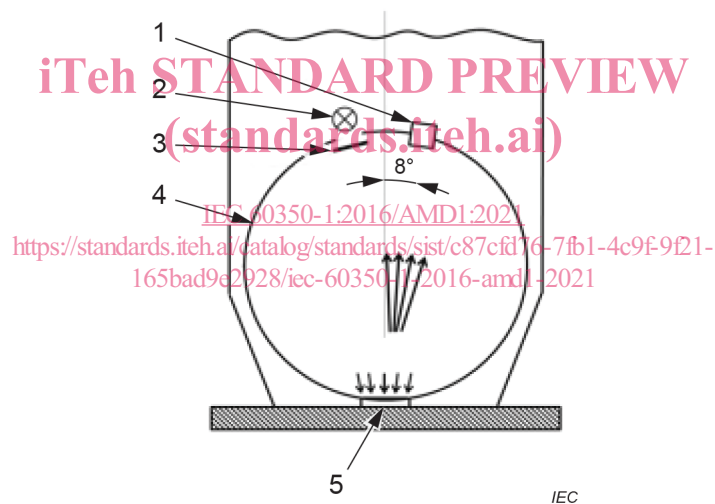
Annex A (normative)

Colour measuring instrument

Replace the existing content of Annex A with the following new content:

The instrument (see Figure A.1) is in accordance with CIE 15 with the following specification:

- measuring geometry: diffuse, 8° vertical deviation;
- measuring aperture: diameter 8 mm to 16 mm;
- calibration standard: white, pressed barium sulfate (BaSO₄), polytetrafluoroethylene (PTFE) or equivalent;
- wavelength range: $400 \text{ nm} \leq \lambda \leq 700 \text{ nm}$;
- wavelength interval: $\leq 10 \text{ nm}$;
- standard illuminant: CIE standard illuminant D65;
- standard observer: 10°;
- evaluation: CIEXYZ (CIE 1931) / CIELAB (CIE).



Key:

- | | |
|-----------------------|-------------------------------------|
| 1 detector | 4 integrating sphere |
| 2 illumination source | 5 specimen under measuring aperture |
| 3 shutter | |

Figure A.1 – Colour measuring instrument

Annex C (informative)

Addresses of suppliers

Replace Clause C.1 with the following new content:

C.1 General

The information given in Annex C is for the convenience of users of this document and does not constitute an endorsement by the IEC of the products named. Equivalent products may be used if they can be shown to lead to the same results.

Replace Clause C.3 with the following new content:

C.3 Food mixer

This clause describes an appropriate food mixer for the dough for the small cakes used in 7.5.3. Mixing times and levels are determined for the Bosch MUM4 series, e.g. Bosch MUM4405⁷.

Specification of an appropriate food mixer:

- power rating (550 ± 50) W;
- revolutions per minute, see Table C.2;

Table C.2 – Food mixer – revolutions per minute

	Revolutions per min			
	Level 1	Level 2	Level 3	Level 4
Wire balloon whisk	(53 ± 5)	(93 ± 5)	(185 ± 5)	(325 ± 5)

- wire balloon whisk;
- bowl, approximately 3,5 l, top diameter (23 ± 2) cm;
- the machine should be able to beat the sugar and butter to a soft and pale mixture in approximately 5 min.

Table C.3 – Mixing time and setting

	Mixing time (small cakes)	Recommended setting
Beat together butter and sugar	Approx. 5 min	After stirring at level 1 speed up to level 4
Add egg mixture	Approx. 2,5 min	Start with level 1 and gradually increase to level 4
Fold in flour, baking powder and salt	Approx. 1 min	After stirring at level 1 process at level 4

⁷ BOSCH MUM 4405 is the trade name of a product supplied by Bosch. It might be commercially available by other suppliers after the date of publication of this document. This information is given for the convenience of the users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.