

INTERNATIONAL STANDARD



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

Standards
(<https://standards.iteh.ai>)
Document Preview

IEC 60350-1:2016

<https://standards.iteh.ai/catalog/standards/iec/9461a206-bf61-4c62-8260-c2138b82171e/iec-60350-1-2016>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2016 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

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

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

INTERNATIONAL STANDARD



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

<https://standards.iteh.ai/standards/iec/9461a206-bf61-4c62-8260-c2138b82171e/iec-60350-1-2016>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 97.040.20

ISBN 978-2-8322-3387-0

Warning! Make sure that you obtained this publication from an authorized distributor.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

IEC 60350-1
Edition 2.0 2016-04

HOUSEHOLD ELECTRIC COOKING APPLIANCES –

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

INTERPRETATION SHEET 1

This interpretation sheet 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 interpretation sheet is based on the following documents:

DISH	Report on voting
59K/322/DISH	59K/325/RVDISH

Full information on the voting for the approval of this interpretation sheet can be found in the report on voting indicated in the above table.

SC 59K interpretation sheet on: Volume measurement in IEC 60350-1:2016

Rationale

When measuring the oven volume in accordance with IEC 60350-1:2016, 6.2, the wording in the standard leaves room for interpretation as to how to proceed with side grids in the oven. In many regions, the volume is used to calculate an energy efficiency index, which always raises the question as to what extent the measurement with and without side grids leads to different statements on energy efficiency.

This document clarifies how to interpret 6.2 of IEC 60350-1:2016 in order to achieve a clearer approach.

Question

According to IEC 60350-1:2016, 6.2, removable items, e.g. the side grids, shall be removed to measure the volume if this is indicated in the user manual. The question that arises is to ascertain when this condition is met, and when the measurement is performed without side grids.

Answer

The usable width of the oven is measured in accordance with 6.2.3 from the left side wall of the cavity to the right side wall of the cavity. In accordance with 6.2.1, parts, such as side grids, shall be removed before the measurement if they are removable and if they are not necessary for any intended operation, in accordance with the user manual.

As a result, side grids shall be removed if:

- 1) the user manual describes the removal of side grids (the extent of the description and the assignment to a chapter is not defined);
- 2) the user manual describes any application for which the removable parts are not required (= intended operation). This is the case when an application on the bottom of the cavity without the use of side grids is given as an example. The number of applications as well as the type of application (heating type, temperature, minor relevance, preheated operation) are not specified in 6.2.1 and are, therefore, irrelevant.

iTech Standards
(<https://standards.iteh.ai>)
Document Preview

IEC 60350-1:2016

<https://standards.iteh.ai/standards/iec/5161a206-bf61-4c62-8260-c2138b82171e/iec-60350-1-2016>

CONTENTS

FOREWORD.....	6
1 Scope.....	9
2 Normative references.....	9
3 Terms and definitions	10
4 List of measurements.....	12
4.1 Dimensions and mass	12
4.2 Oven and combi steam oven	12
4.3 Steam oven and combi steam oven	12
4.4 Grill	13
4.5 Warming compartments.....	13
4.6 Cleaning	13
5 General conditions for the measurement	13
5.1 Test room	13
5.2 Electricity supply.....	14
5.3 Instrumentation	14
5.4 Positioning the appliance.....	15
5.5 Preheating	15
5.6 Setting of controls	15
5.7 Rounding	16
6 Dimensions and mass.....	16
6.1 Overall dimensions.....	16
6.2 Usable internal dimensions and calculated volume.....	18
6.2.1 General.....	18
6.2.2 Usable height.....	20
6.2.3 Usable width.....	20
6.2.4 Usable depth.....	20
6.2.5 Calculated volume.....	20
6.3 Overall internal dimensions and overall volume of ovens	20
6.3.1 General	20
6.3.2 Overall height (H).....	21
6.3.3 Overall width (W).....	21
6.3.4 Overall depth (D)	21
6.3.5 Overall volume of rectangular cavities	21
6.3.6 Overall volume of non-rectangular cavities	21
6.4 Dimensions of shelves and steaming accessories	21
6.5 Dimensions of grill grids	21
6.6 Dimensions of warming compartments.....	21
6.7 Level of shelf	22
6.8 Mass of the appliance	22
7 Ovens and combi steam ovens.....	22
7.1 General.....	22
7.2 Preheating the empty oven.....	23
7.3 Accuracy of the control.....	23
7.4 Energy consumption and time for heating a load	24
7.4.1 General Purpose	24
7.4.2 Test load	25

7.4.3	Measurement.....	26
7.4.4	Evaluation and calculation.....	30
7.4.5	Reporting of test results.....	31
7.5	Heat distribution.....	31
7.5.1	General.....	31
7.5.2	Shortbread.....	31
7.5.3	Small cakes.....	34
7.6	Ability to supply heat.....	40
7.6.1	Fatless sponge cake.....	40
7.6.2	Apple pie.....	41
8	Steam ovens and combi steam ovens.....	43
8.1	Distribution of steam.....	43
8.1.1	General.....	43
8.1.2	Ingredients.....	43
8.1.3	Quantity.....	43
8.1.4	Procedure.....	43
8.1.5	Assessment.....	43
8.2	Ability to supply steam.....	43
8.2.1	General.....	43
8.2.2	Ingredients.....	43
8.2.3	Procedure.....	43
8.2.4	Assessment.....	43
8.3	Performance test with maximum load.....	43
8.3.1	General.....	43
8.3.2	Ingredients.....	43
8.3.3	Quantity.....	43
8.3.4	Procedure.....	43
8.3.5	Assessment.....	43
8.1	Ability to supply steam.....	48
8.1.1	Purpose.....	48
8.1.2	Ingredients and steaming accessory.....	49
8.1.3	Procedure.....	49
8.1.4	Assessment.....	50
8.2	Distribution of steam.....	51
8.2.1	Purpose.....	51
8.2.2	Ingredients, steaming accessories and number of levels.....	51
8.2.3	Procedure.....	52
8.2.4	Assessment.....	52
8.3	Determination of the capacity.....	54
8.3.1	Purpose.....	54
8.3.2	Ingredients.....	55
8.3.3	Mass of peas, steaming accessories and number of levels.....	55
8.3.4	Procedure.....	55
8.3.5	Assessment.....	56
8.4	Accuracy of the temperature control.....	57
9	Grills.....	58
9.1	General Purpose.....	58
9.2	Grilling area.....	58
9.2.1	General Purpose.....	58

9.2.2	Procedure	58
9.2.3	Assessment	58
9.3	Grilling	59
9.3.1	General Purpose	59
9.3.2	Ingredients	59
9.3.3	Procedure	59
9.3.4	Assessment	59
10	Warming compartments	59
11	Cleaning	60
11.1	Pyrolytic self-cleaning ovens	60
11.2	Ovens with catalytic cleaning	60
12	Standby power Consumption measurement of low power modes	61
	Annex A (normative) Colour measuring instrument	63
	Annex B (normative) Brown shade charts	64
	Annex C (informative) Addresses of suppliers	66
	C.1 General	66
	C.2 Testing ingredients for small cakes	66
	C.3 Food mixer	68
	C.4 Lamps for digital measurement systems	68
	C.5 Digital measurement system	69
	C.6 Colour measuring instrument	69
	C.7 Brick for testing energy consumption of ovens	69
	C.8 Steaming basket	69
	Annex D (normative) Description of the test brick	70
	D.1 Specification	70
	D.2 Supplier and order specification	70
	Annex E (informative) Data and calculation sheet: Energy consumption of electric ovens for heating a load (7.4)	72
	Annex F (normative) Green shade charts — Cooked peas and broccoli	77
	Annex G (informative) Reference system for assessing the steaming performance	
	Annex G (informative) Measurement of the energy consumption of the cooling down period	80
	G.1 Purpose	80
	G.2 Preliminary measurements	80
	G.3 Measuring the energy consumption of the cooling down period	81
	Annex H (informative) Check of applied microwave energy during the measurement according to 7.4	82
	H.1 General	82
	H.2 Procedure	82
	Annex I (informative) Marking the temperature setting for checking the oven temperature	83
	Bibliography	84
	Figure 1 – Position of the thermocouple for measuring ambient temperature	14
	Figure 2 – Dimensions of appliances	17
	Figure 3 – Dimensions of built-in ovens appliances	18
	Figure 4 – Usable internal dimensions and calculated volume of ovens	19

Figure 5 – Gauge for measuring these dimensions	19
Figure 6 – Device for checking the level of shelves	22
Figure 7 – Example of a method of fixing a thermocouple for the test of 7.4	25
Figure 8 – Shape of the nozzle for extruding pastry	32
Figure 9 – Position of pastry strips on the baking sheet	32
Figure 10 – Convex colour sample	38
Figure 11 – Template for the sectioning of small cakes	39
Figure 12 – Reference values of cooking time (t_{ref})	57
Figure A.1 – Colour measuring instrument	63
Figure D.1 – Position of the thermocouples	71
Figure G.1 – Phases of energy consumption measurement – Example	80
Figure H.1 – Filament lamp	82
Figure I.1 – Polar coordinate paper – Example	83
Table 1 – Oven settings	27
Table 2 – Ingredients	34
Table B.1 – Classification of shade numbers	64
Table B.2 – Examples for the shade charts	64
Table C.1 – Ingredient specification	66
Table C.2 – Food mixer – Revolutions	68
Table C.3 – Mixing time and setting	68
Table F.1 – Specification of relevant green shade charts	77

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD ELECTRIC COOKING APPLIANCES –

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

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60350-1 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.

This second edition cancels and replaces the first edition published in 2011. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- new definitions for "**set to off mode**" and "**set to standby mode**" are included in Clause 3;
- reference to ISO 80000 regarding rounding;
- more exact determination of the mass of the appliances (6.2);
- update of the existing 7.3 in order to improve the clarity of procedure;
- additional temperature requirement in 7.4.3 to ensure an adequate temperature setting during the energy measurement process;
- editorial changes in 7.6.1.3, 7.6.2.1, 7.6.2.2 and 7.6.2.3;
- revision of Clause 8 in order to increase the repeatability for the measurements for steam ovens;
- Clause 12 "Standby power" is renamed to "Consumption measurement of low power modes" and the content is adapted for IEC 62301:2011;
- replacing the supplier for the colouring measurement device in Clause C.6, because the previous device is no longer available;
- adaptation of Annex A to the new supplier of colouring measurement devices;
- adaptation of Annex E;
- measurement method for measuring the consumption of the **cooling down period** is added in the informative, new Annex G;
- measurement method to check applied microwave energy during the measurement according to 7.4 is added in the informative Annex H;
- new Annex I for marking the temperature setting for checking the oven temperature.

This publication contains an attached file in the form of an Excel 97 file. This file is intended to be used as a complement and does not form an integral part of the publication.

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

FDIS	Report on voting
59K/273/FDIS	59K/277/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

Words in **bold** in the text are specifically defined in Clause 3.

A list of all parts in the IEC 60350 series, published under the general title *Household electric cooking appliances*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The contents of the Interpretation Sheet 1 of March 2021 have been included in this copy.

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

Withdrawing

iTech Standards
(<https://standards.itih.ai>)
Document Preview

<https://standards.itih.ai/standards/iec/5161a206-bf61-4c62-8260-c2138b82171e/iec-60350-1-2016>

HOUSEHOLD ELECTRIC COOKING APPLIANCES –

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

1 Scope

This part of IEC 60350 specifies methods for measuring the performance of electric **cooking ranges, ovens, steam ovens, and grills** for household use.

The **ovens** covered by this standard may be with or without microwave function.

Manufacturers should define the primary cooking function of the appliance – microwave function or thermal heat. The primary cooking function ~~has to~~ **should** be measured with an existing method according to energy consumption. If the primary cooking function is declared in the instruction manual as a microwave function, IEC 60705 is applied for energy consumption measurement. If the primary cooking function is declared as a thermal heat, then IEC 60350-1 is applied for energy consumption measurement.

NOTE 4 If the primary function is not declared by the manufacturer, **the performance of the microwave function and thermal heat should be measured as far as it is possible.**

NOTE 1 For measurement of energy consumption and time for heating a load (see 7.4), this standard is furthermore not applicable to:

- microwave combination function;
- ovens with reciprocating trays or turntable;
- small cavity ovens;
- ovens without adjustable temperature control;
- heating functions other than defined in 3.12 to 3.14;
- appliances with only solo **steam function** (3.15).

NOTE 2 This standard does not apply to

- microwave ovens (IEC 60705),
- portable appliances for cooking, grilling, steaming and similar functions (IEC 61817).

This standard defines the main performance characteristics of these appliances which are of interest to the user and specifies methods for measuring these characteristics.

This standard does not specify ~~requirements~~ **a classification or ranking** for performance.

NOTE 3 Some of the tests which are specified in this standard are not considered to be reproducible since the results may vary between laboratories. They are therefore intended for comparative testing purposes only.

NOTE 4 This standard does not deal with safety requirements (IEC 60335-2-6 and IEC 60335-2-9).

NOTE 5 Appliances covered by this standard may be built-in or for placing on a working surface or the floor.

NOTE 6 There is no measurement method for the energy consumption for grilling and **steam functions** available.

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.

IEC 60584-2:~~1982~~, *Thermocouples – Part 2: Tolerances*
~~Amendment 1(1989)~~

IEC 62301:~~2005~~¹, *Household electrical appliances – Measurement of standby power*

~~ISO 7724 (all parts), *Paints and varnishes – Colorimetry*~~

~~ISO 11664-2², *Colorimetry – Part 2: CIE standard illuminants for colorimetry*~~

ISO 80000-1:2009, *Quantities and units – Part 1: General*

CIE 15:~~2:1986~~, *Colorimetry*

3 Terms and definitions

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

3.1

cooking range

appliance having a **hob** and at least one **oven** and which may incorporate a **grill**

3.2

hob

appliance or part of an appliance which incorporates one or more **cooking zones** and/or **cooking areas** including a **control unit**

Note 1 to entry: A **hob** is also known as a cooktop. ~~Methods for measuring performance of hobs are described in IEC 60350-2~~

Note 2 to entry: The **control unit** can be included in the **hob** itself or integrated in a **cooking range**.

3.3

oven

appliance or compartment of a **cooking range** in which food is cooked by radiation, by natural convection, by forced-air circulation or by a combination of these heating methods

3.4

pyrolytic self-cleaning oven

oven in which cooking deposits are removed by heating the **oven** to a sufficiently high temperature

3.5

steam oven

appliance or compartment of a **cooking range** in which food is cooked mainly by steam condensation at ambient pressure. ~~Appliance are fitted with an own steam generator~~

Note 1 to entry: Appliances are fitted with their own steam generator.

Note 2 to entry: Steam does not mean the evaporated water from the food.

3.6

combi steam oven

appliance or compartment of a **cooking range** in which food is cooked by a combination of **oven** (3.3) and **steam oven** (3.5)

¹—This document has been replaced by a new edition (2011), but for the purposes of this standard, the 2005 edition is cited.

²—Also published as CIE S 014-2.