BS EN 60350-2:2013

BSI Standards Publication

Household electric cooking appliances

Part 2: Hobs — Methods for measuring performance

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National foreword

This British Standard is the UK implementation of EN 60350-2:2013. It is derived from IEC 60350-2:2011. Together with BS EN 60350-1:2012 it supersedes BS EN 50304:2009+A1:2010 (dual numbered as BS EN 60350:2009+A11:2010) which will be withdrawn on 3 June 2016.

BSI, as a member of CENELEC, is obliged to publish EN 60350-2:2013 as a British Standard. However, attention is drawn to the fact that the UK committee voted against its approval as a European standard. The main technical reasons behind this are summarized below.

Clause 7.1.Z7.3 should address uncertainty of measurement but instead relates to market surveillance tolerances. The uncertainty should be the variation found in round robin testing and is not about the tolerance on declarations. Tolerances will be defined in the Eco-design Directive (Annex III – Verification for market surveillance purposes). It should be noted that the test results in a product's Technical Documentation have to support the values declared for the Directive. The text within the Directive takes precedence if there is a conflict with what is written in this standard.

Providing more than one testing method and different values for T_c in clause 7.1.Z6.2.2 can lead to measurement uncertainty. Text in a note is only informative and therefore the text in the main body might have to be used for compliance to the Directive.

The standard is missing an Annex ZZ which should have been included to list those clauses of the standard which are intended to be used for reference to the Essential Requirements of the Eco-design hob directive. This is required in order for the standard to be listed as a harmonized standard in the Official Journal.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by tags 〖C〉 〈C〗.

The UK participation in its preparation was entrusted to Technical Committee CPL/59, Performance of household electrical appliances.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 September 2014.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60350-2

July 2013

ICS 97.040.20

English version

Household electric cooking appliances - Part 2: Hobs - Methods for measuring performance

(IEC 60350-2:2011, modified)

Appareils de cuisson électrodomestiques - Partie 2: Tables de cuisson - Méthodes de mesure de l'aptitude à la fonction
(CEI 60350-2:2011, modifiée)

Elektrische Kochgeräte für den Hausgebrauch - Teil 2: Kochmulden - Verfahren zur Messung der Gebrauchseigenschaften
(IEC 60350-2:2011, modifiziert)

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60350-2:2013 E

Foreword

This document (EN 60350-2:2013) consists of the text of IEC 60350-2:2011 prepared by IEC/SC 59K "Ovens and microwave ovens, cooking ranges and similar appliances", of IEC/TC 59 "Performance of household and similar electrical appliances", together with the common modifications prepared by CLC/TC 59X "Performance of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-06-03
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2016-06-03

Together with EN 60350-1:2013, this document will supersede EN 50304:2009/EN 60350:2009 + A1:2010/A11:2010.

EN 60350-2:2013 includes the following significant technical changes with respect to EN 50304:2009/EN 60350:2009:

1) a method to measure energy consumption of hobs

    a) that is representative for a real cooking process, for which after the heat up phase a simmering phase has been implemented in the measurement. Water as a standardised load is used. Food is theoretically considered in the experimental setup but not used as that leads to insufficient reproducibility. The ranking between the technologies will not be changed by different methods/applications, so the energy consumption is measured only by one energy optimised method.

    b) that is applicable to compare different electrically heated technologies like e.g. induction, radiant or solid plates

    c) that leads not to a comparison with gas burners. Gas hobs are covered by EN 30-2-1.

    d) that fulfil requirements of repeatability and reproducibility (crucial for energy measuring purposes). Therefore the cooking process is defined on the temperature level 90 °C to avoid influence on the boiling point by ambient pressure.

    e) that is applicable for hobs with different layouts and **cooking zone** / area sizes.

    This method is based on the method described in TC59X/217/DC.

2) definition of cooking areas:

    Following new market trends a definition for cooking areas is given. A definition is necessary as cooking areas have other demands e.g. for positioning the cookware or selecting the cookware sizes than **cooking zones**.

3) definition of standardised cookware also for big **cooking zone** sizes:

    For a high reproducibility a standardised cookware shall be used. Therefore a self made cookware is defined up to a size of 330 mm bottom diameter.Evaporating water by holes in the lid simulates a cooking process on a higher temperature level. The thermal energy which is needed to keep at boiling point for a real cooking process including evaporation and the energy uptake of the food during the simmering phase is considered by the holes.

4) additional requirements (according to EN 50564) how to measure low power modes.

5) under consideration:

   A control procedures for checking measured values in comparison to values declared by the manufacturer under consideration of permitted tolerances. WG10 with the support and sponsorship of CECED believes that it is fundamental to proceed with a Round Robin Test procedure of this draft amendment to confirm requirements of repeatability and reproducibility and to estimate the standard deviation of the method itself.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60350-2:2011 are prefixed “Z”.

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

According to the decision D137/061 for CLC/TC 59X, this European Standard has been drawn up as a document which follows, as far as suitable, the structure of IEC 60350-2:2011.

It also describes the evaluation of data declared by the manufacturer and control procedures for checking these values.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

This European Standard is suitable for direct comparison and is considered sufficiently reproducible within given limits for the purpose of setting the ecodesign requirements for hobs according to the Directive ERP 2009/125/EC.

Endorsement notice

The text of the International Standard IEC 60350-2:2011 was approved by CENELEC as a European Standard with common modifications.

Annex ZA
(normative)

Further requirements for measuring the energy consumption and heating up time for cooking areas

ZA.1 General

For **cooking areas**, the following requirements are additional to 7.1.

ZA.2 Hob with cooking area

ZA.2.1 General

For a **hob** with a **cooking area,** the cookware set is selected depending on the layout.

If a **hob** is a combination from ZA.2.2 and ZA.2.3, than these are evaluated separately.

ZA.2.2 Hob with cooking area without limitative marking

The number of **controls** determines the number of cookware pieces.

The number of **controls** is defined by the number of cookware which can be used independently on the **cooking area** all together at the same time.

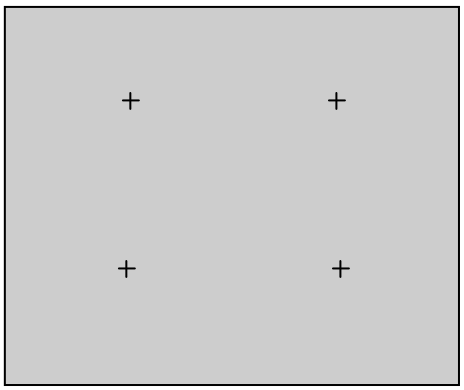

Figure ZA.1 — Exemplary layout for a hob with cooking area without limitative marking

Table ZA.1 – Criteria for cookware set – Cooking areas without limitative marking

Number of controls	Selected cookware set
1 **control**	Cookware with 210 mm diameter
2 **controls**	Two cookware pieces with a diameter of 180 mm and 210 mm
3 **controls**	Three cookware pieces with a diameter of 150 mm, 180 mm and 210 mm
4 **controls**	Four cookware pieces with a diameter of 150 mm, 180 mm and 210 mm twice
5 **controls**	Five cookware pieces with a diameter of 150 mm, 180 mm twice and 210 mm twice

NOTE Further specification (lid, height etc.) for cookware pieces are fixed in Table Z3.

If a cookware size is not detected, the next bigger not already covered category according Table Z3 is selected.

If a selected cookware size is out of the range of the sizes allowed by the user manual, then the closest diameter compatible with the defined range has to be chosen.

ZA.2.3 Hob with cooking area with limitative marking

If the **cooking area** has a limitative marking which mark the area where more than one cookware can be used simultaneously, the cookware set is selected as following.

Table ZA.2 – Criteria for cookware set – Cooking areas with limitative marking

Number of controls	Selected cookware set
2 **controls**	Three cookware pieces with a diameter of 150 mm, 180 mm and 210 mm
3 **controls**	Three cookware pieces with a diameter of 150 mm, 180 mm and 210 mm

NOTE Further specification (lid, height etc.) for cookware pieces are fixed in Table Z3.

If a cookware size is not detected, the next bigger not already covered category according Table Z3 is selected.

If a selected cookware size is out of the range of the sizes allowed by the user manual, then the closest diameter compatible with the defined range has to be chosen.

The number of **controls** is defined by the number of cookware which can be used independently on the **cooking area** all together at the same time.

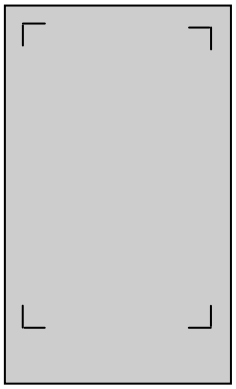

Figure ZA.2 – Exemplary layout for a hob with cooking area with limitative marking

ZA.2.4 Hob with cooking area and cooking zones

Cookware for **cooking zone** and **cooking area** are selected independently.

The cookware set of a combination of **cooking areas** and **cooking zones** in one **hob** is selected for the **cooking zones** according to 7.1.Z3 and for the **cooking area** according to Annex ZA.

ZA.3 Positioning on a cooking area

ZA.3.1 General

All indications of centre positions are considered in the test.

Symbols of **controls** should be considered to define the cookware position.

ZA.3.2 Positioning on a cooking area without limitative markings

The biggest cookware piece has to be placed on a **cooking area** without limitative markings in accordance with the following order of precedence:

a) having higher **maximum power**;

b) being located at the rear of the **hob**;

c) being located at the left.

NOTE Different sizes of indications are not considered.

ZA.3.3 Positioning on a cooking area with limitative markings

The biggest cookware (diameter 210 mm) is positioned in the centre of the **cooking area**. The centre is defined by the geometric centre.

The other cookware pieces (with 180 mm and 150 mm) are positioned in the segmented parts of the **cooking area**. The number of segmented parts is defined by the number of **controls**.

If the centers of the segments are marked than the cookware pieces are positioned on the centre indications. If the segments are marked without centre indications the cookware is positioned in the geometric centre. If the segments are not marked the segments are determined by dividing the long axis of the **cooking area** by the number of **controls**. The cookware pieces are positioned on the geometric centre of these determined segments.

The bigger cookware piece has to be placed in accordance with the following order of precedence:

a) segmented area having higher **maximum power**;

b) segmented area being located at the rear of the **hob**;

c) segmented area being located at the left.

Annex ZB
(informative)

Aids for measuring the energy consumption (see 7.1.Z6)

ZB.1 Fixing the temperature measurement instrument to the lid – Example

The temperature measurement instrument according to 5.3 should be fixed in the centre of the lid (see 7.1.Z2) as shown in Figure ZB.1. The mounting part shall be made of plastic material. For the positioning of the right temperature sensor position screws are used.

Dimensions in millimetres

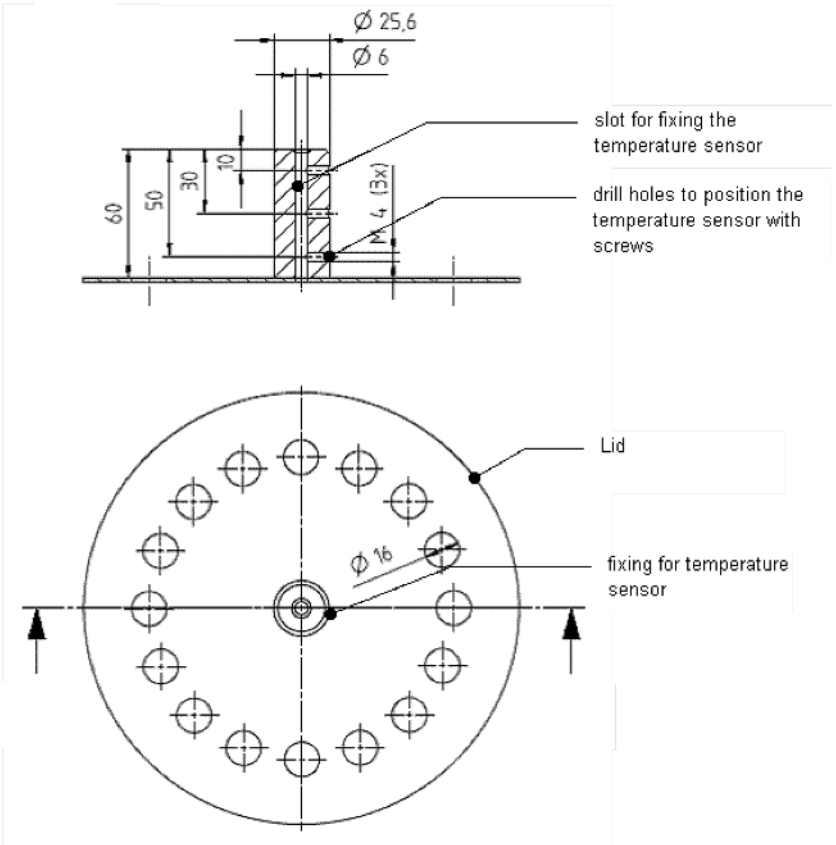

Figure ZB.1 – Position of the temperature measurement instrument

ZB.2 Marking the lowest possible simmering power setting

For marking the lowest possible simmering power setting on the panel, a polar coordinate paper can be useful. Polar coordinate paper has concentric circles divided into small arcs to allow an exact marking around a knob.

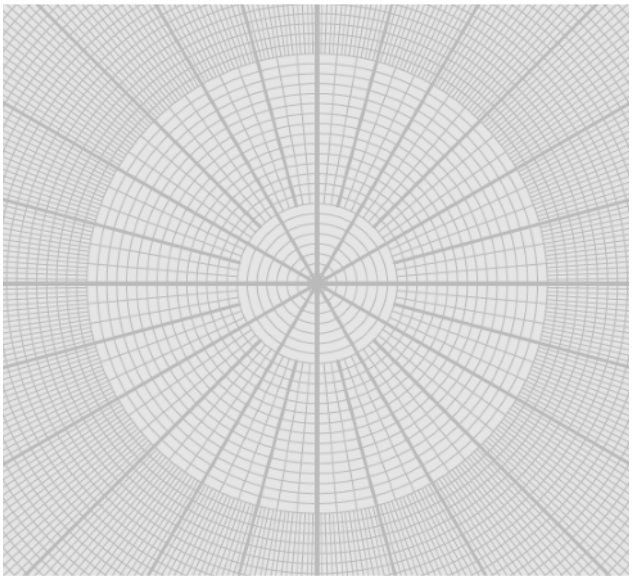

Figure ZB.2 – Polar coordinate paper – Example

Annex ZC
(informative)

Examples how to select and position a cookware set for measuring the heating up time (7.1.Z5) and energy consumption (7.1.Z6)

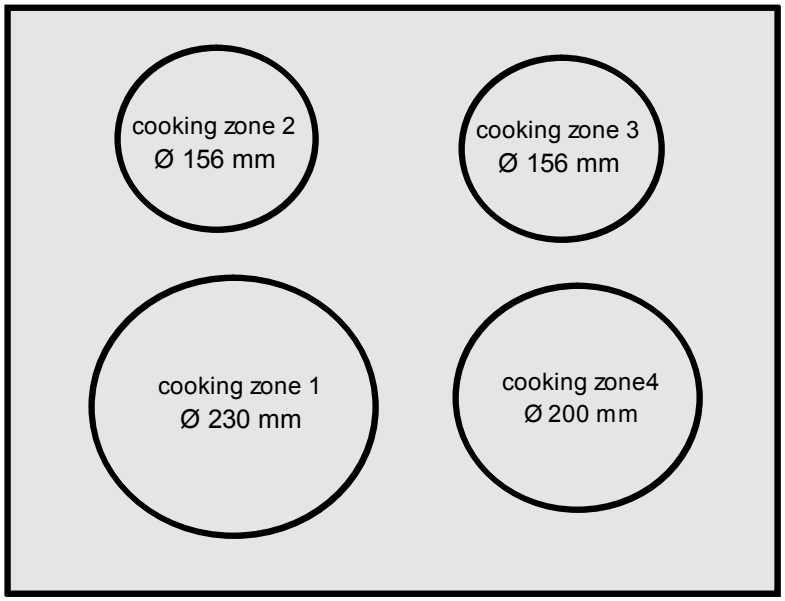

Figure ZC.1 – Example 1: Tubular hotplates, solid hot plates, radiant cooking zone or induction cooking zone

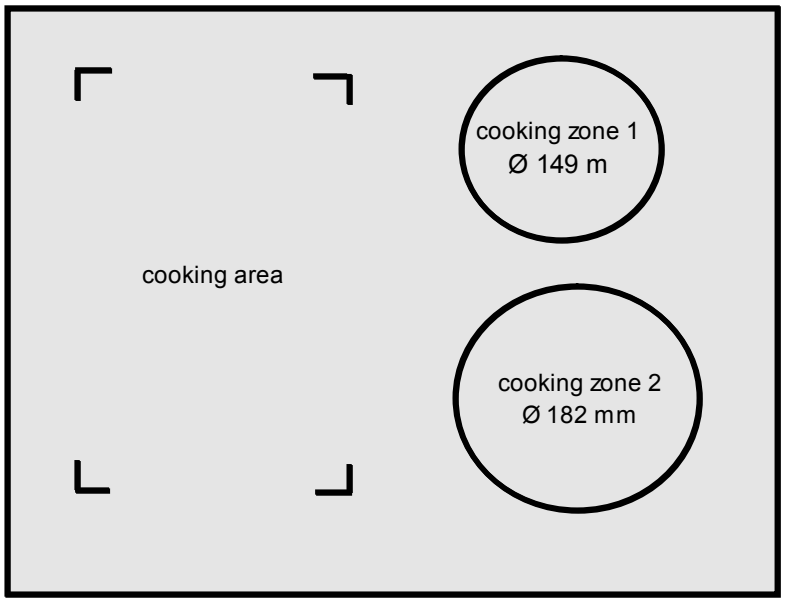

Figure ZC.2 – Example 2: Cooking area combined with two induction or radiant cooking zones

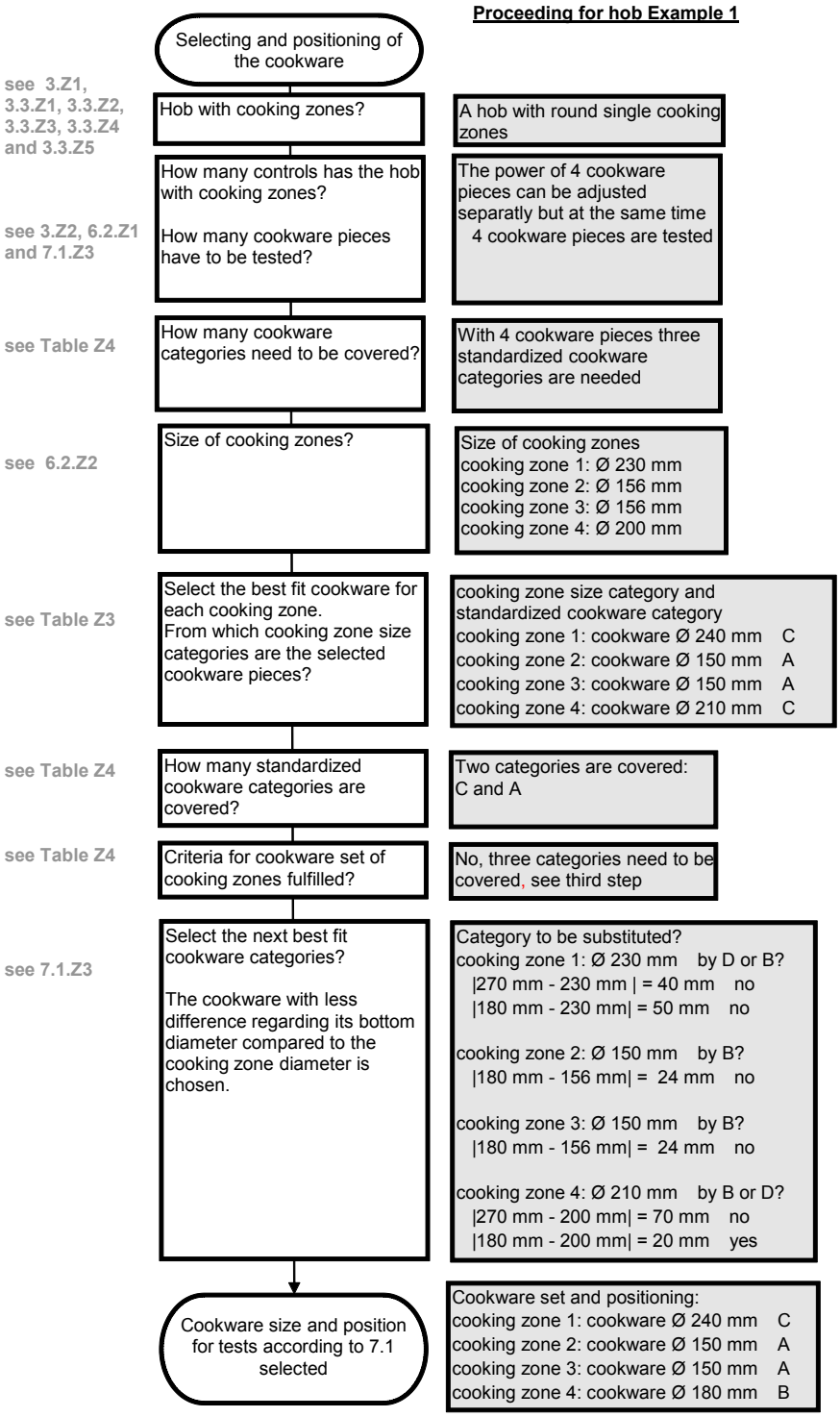

Figure ZC.3 – Proceeding for hob – Example 1

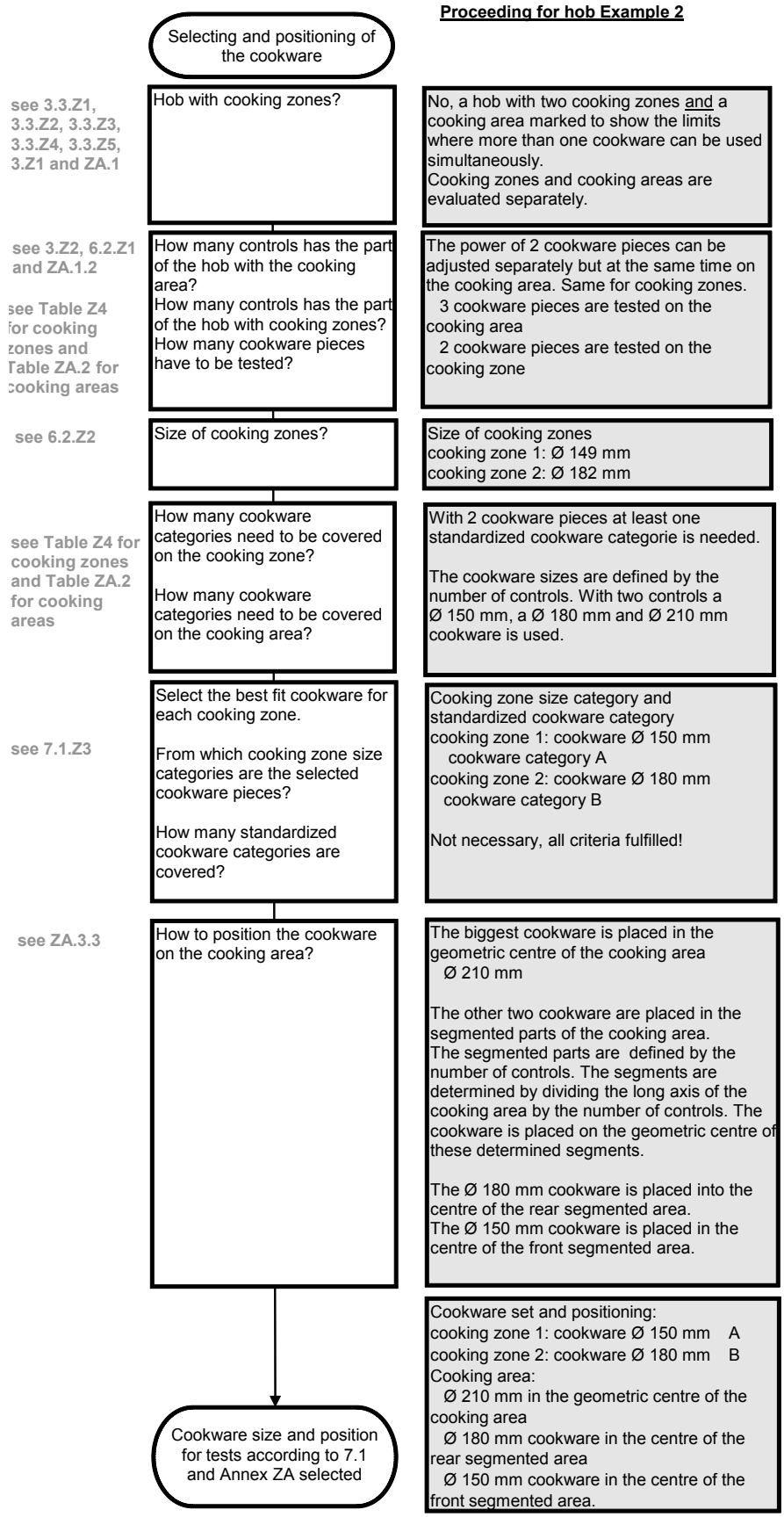

Figure ZC.4 – Proceeding for hob – Example 2

Annex ZD
(informative)

Example – Multiple zones

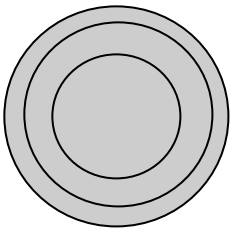

Figure ZD.1 – Circular multiple zones for three different cookware sizes

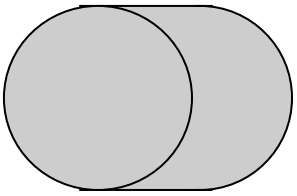

Figure ZD.2 – Combination of circular and elliptical – Multiple zone

Annex ZE
(informative)

Data and calculation sheet: energy consumption of a cooking process (see 7.1.Z6)

Brand & Factory:		Hob Type / Model:		Testlab:	
Rated Voltage:	V	Supply Voltage:	V	Operator:	
Rated Power:	kW	Number of Controls (see 6.2.Z1):		Date:	

Cooking zone:		Cooking area:		Cookware Diameter:	mm
Type of cooking zone (see 3.3)		without limitave marking:	☐	Water load (m_{cw})	g
Cooking Zone Dimension (see 6.2.Z2):	mm	with limitative marking:	☐	Cookware Position:	

7.1.Z6.2.2 Determine Tc

no.	ambient air pressure (hPa)	ambient temperature (°C)	start water temperature (°C)	time when power level is switched off (hh:mm:ss)	T_{70} (°C)	Highest temperature value (°C)	Overshoot T_O (K)	Result Tc (°C)
							calc.	calc.

7.1.Z6.3 Measuring energy consumption

no.	ambient air pressure (hPa)	ambient temperature (°C)	start water temperature (°C)	t_c (hh:mm:ss)	Tc target (°C)	Tc (°C)	continous level	average continous power (W)	t_{90} (hh:mm:ss)	energy consumption t90 (Wh)	T_s (°C)	total test time (hh:mm:ss)	E_{cw} total energy consumption (Wh)

Energy consumption of a single cookware under test, normalized to 1000 g water (W_h) **calc.**

Cells with content “calc.” should be calculated.

Annex ZF
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
-	-	Stainless steels Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes	EN 10088-2	-
IEC 60364-5-54	-	Low-voltage electrical installations Part 5-54: Selection and erection of electrical equipment - Earthing arrangements and protective conductors	HD 60364-5-54	-
IEC 62301 (mod.)	2011	Electrical and electronic household and office equipment – Measurement of low power consumption	EN 50564	2011
ISO 80000-1 + Cor 1	2009 2011	Quantities and units Part 1: General	EN ISO 80000-1	2013

CONTENTS

HOUSEHOLD ELECTRIC COOKING APPLIANCES –

Part 2: Hobs – Methods for measuring performance

1 Scope

This part of IEC 60350 defines methods for measuring the performance of electric **hobs** for household use.

NOTE 1 Appliances covered by this standard may be built-in or for placing on a working surface or the floor. The hob can also be a part of a cooking range.

NOTE 2 This standard does not apply to

– portable appliances for cooking, grilling 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.

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.

This standard does not specify requirements for performance.

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

2 Normative references

The following referenced documents are indispensable for the application 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.

〖C〉 *Text deleted* 〈C〗

〖C〉 EN 50564:2011, *Electrical and electronic household and office equipment – Measurement of low power consumption (IEC 62301:2011, mod.)*

HD 60364-5-54, *Low-voltage electrical installations – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors (IEC 60364-5-54)*

EN ISO 80000-1:2013, *Quantities and units – Part 1: General (ISO 80000-1:2009 + Cor 1:2011)*

EN 10088-2, *Stainless steels — Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes* 〈C〗

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**. It may incorporate a **grill**

NOTE Methods for measuring performance of ovens are described in IEC 60350-1.