



BSI Standards Publication

Household electric cooking appliances

Part 2: Hobs — Methods for measuring performance
(IEC 60350-2:2011, modified)

National foreword

This British Standard is the UK implementation of EN 60350-2:2013+A11:2014. It is derived from IEC 60350-2:2011. It supersedes BS EN 60350-2:2013 which is withdrawn. Together with BS EN 60350-1:2013+A11:2014, it supersedes BS EN 50304:2009+A1:2010 (dual numbered as BS EN 60350:2009+A11:2010), which will be withdrawn on 3 June 2016.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, was 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.

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 start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CENELEC text carry the number of the CENELEC amendment. For example, text altered by CENELEC amendment A11 is indicated by A11 A11.

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.

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Amendments/corrigenda issued since publication

Date	Text affected
31 July 2015	Electronic file containing data and calculation sheet introduced in Annex ZE.
31 May 2016	Implementation of CENELEC amendment A11:2014

**Household electric cooking appliances -
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Methods for measuring performance
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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)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

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CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

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with this document have to be withdrawn

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.

Foreword to amendment A11

This document (EN 60350-2:2013/A11:2014) has been 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) 2015-09-29
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2017-09-29

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

The new amendment covers following issues:

- Description about determining the dimensions of **cooking areas**;
- Determine the energy consumption for a **cooking zone** and for a **cooking area** (see 7.1.Z7.2);
- Cancel 7.1.Z7.3 Measurement uncertainty of results;
- Amending Annex ZA to give clear instructions about cookware set and position for **cooking areas** with more than 3 **controls**;
- Amending Annex ZE to give clear advice how to calculate the final energy consumption for a hob;
- Implementation of Annex ZZ which shows the coverage of Commission Regulation and Commission Delegated Regulation and which lists the relevant paragraphs of this standard.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

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, then these areas will be tested separately.

If a **hob** has more than one **cooking area** with limitative marking (see ZA.2.3), each **cooking area** is tested 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.

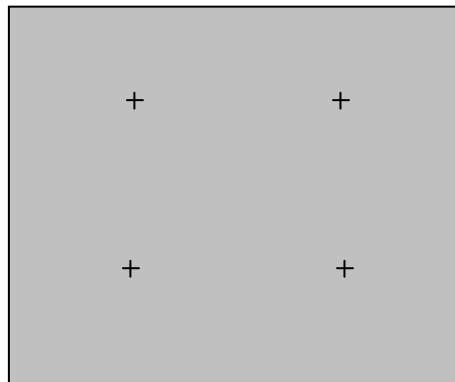


Figure ZA.1 — Exemplary layout for a hob with cooking area without limitative marking

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, 210 mm twice and 240 mm
 6 controls	Six cookware pieces with a diameter of 150 mm, 180 mm twice, 210 mm twice and 240 mm 

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

A11 If a cookware is not detected, the next biggest cookware diameter is chosen independent from the cookware category (see Table Z.3). **A11**

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

A11 Number of controls	Selected cookware set
≤ 3 controls	Three cookware pieces with a diameter of 150 mm, 180 mm and 210 mm
> 3 controls	Five cookware pieces with a diameter of 150 mm 180 mm 210 mm twice and 240 mm

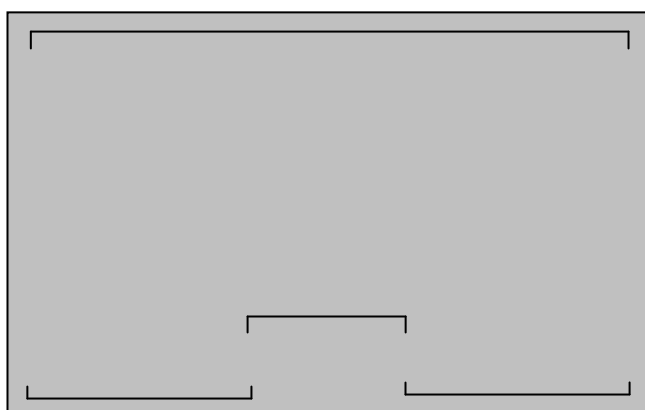
NOTE Further specification (lid, height etc.) for cookware pieces are fixed in Table Z3.

A11 If a cookware is not detected, the next biggest cookware diameter is chosen independent from the cookware category (see Table Z.3). **A11**

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.

A11 Example 1



Example 2

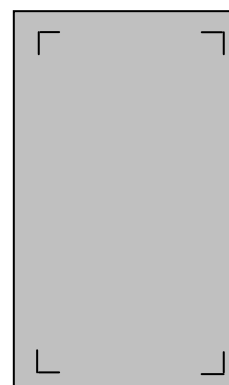


Figure ZA.2 - Example layouts for a hob with cooking area with limitative marking **A11**

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

ZA.3.3.1 with ≤ 3 controls

The largest piece of cookware is positioned in the centre of the **cooking area**. To find the centre the longest vertical and horizontal line within the marking is determined. Bisect the horizontal line and move the vertical line parallel to this half distance point.

NOTE The wording “horizontal” and “vertical” refer to the drawing layer.

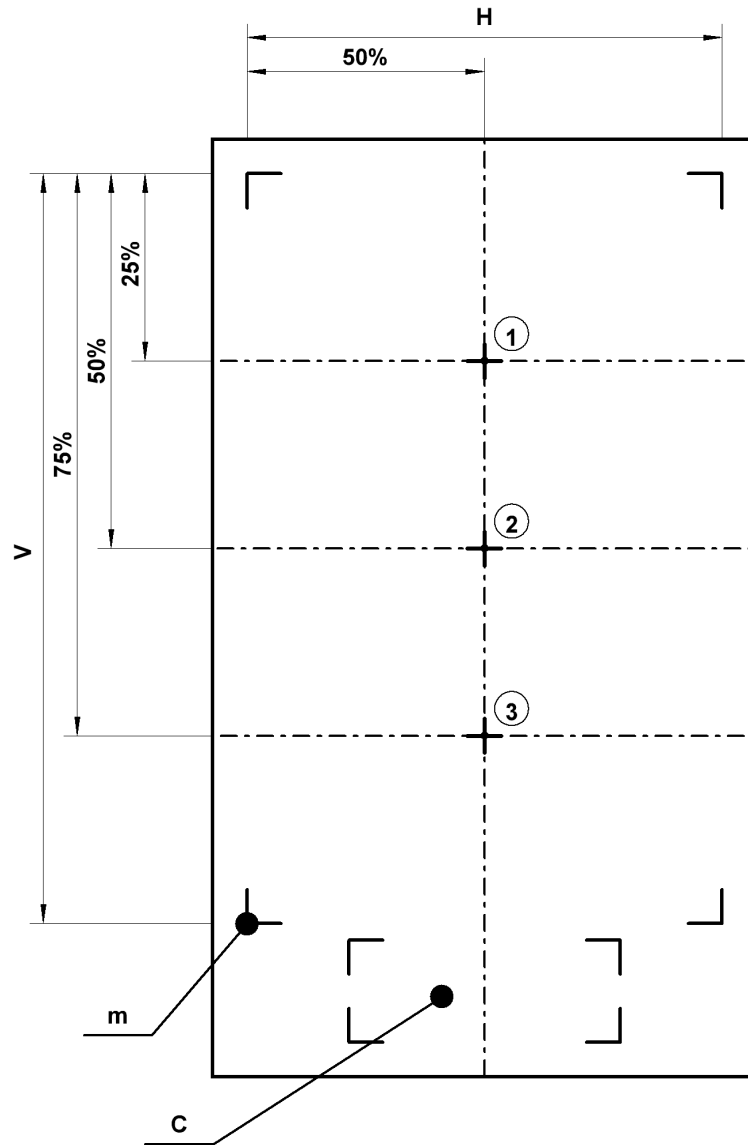


Intersect the horizontal line (longest possible) at 25 %, 50 % and 75 %. 25 % determines the position marker ①, 50 % determines the position marker ② and 75 % determines position marker ③.

The position marker ② determines the center for the largest piece of cookware.

The smaller pieces of cookware are positioned centrally on the position marker ① and ③, (see Figure ZA.3). 

A11



Key

H : longest horizontal line of the marked cooking area

V : longest vertical line of the marked cooking area

c : area of the control

m : limitative marking of the cooking area

①, ③: position marker of the pieces of cookware with 150 mm diameter and 180 mm diameter

②: center position of cookware with 210 mm diameter

Figure ZA.3 - Example - position a cookware set for measuring the energy consumption for cooking areas with limitative markings ≤ 3 controls A11

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

- a) segmented area being located at the rear of the **hob**;
- b) segmented area being located at the left.

If a cookware is not detected at the described position, for this position the next biggest cookware diameter is chosen independent from the cookware category (see Table Z.3).

The positions and sizes of the pieces of cookware used for measuring shall be noted.

ZA.3.3.2 with > 3 controls

The position of the pieces of cookware for a **cooking area** with more than 3 **controls** is defined by following procedure.

First the longest possible horizontal and vertical lines within the marked area which shows the limits where the cookware is used are determined. Bisect the vertical line and move the horizontal line parallel to this half distance point.

Intersect the horizontal line (longest possible) at 20%, 50% and 80%. 20 % determines the position marker ①, 50 % determines the position marker ② and 80 % determines position marker ③.

The position marker ② determines the center for the largest piece of cookware.

The smaller pieces of cookware are positioned tangentially (=outer radius of cookware bottom touches the position markers) one above and one below the horizontal line at the position markers ① and ③, (see Figure ZA.4).

The two pieces of cookware with the diameter of 210 mm are positioned one below the position marker ① and one above the position marker ③. The cookware with the diameter of 180 mm is set above the position marker ① and the cookware with 150 mm diameter is below the position marker ③.

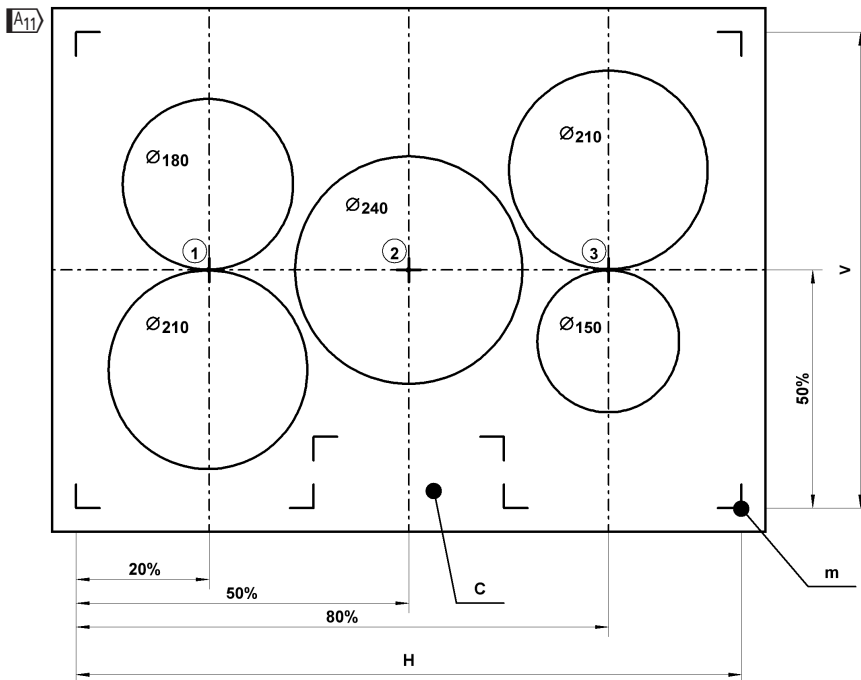
If a cookware is not detected at the described position, for this position the next biggest cookware diameter is chosen independent from the cookware category (see Table Z.3).

If the position of the specified cookware causes the cookware to partially cover the **control**, then the cookware must be moved away, until the cookware no longer covers the **control**. Moreover all pieces of cookware shall be as far as possible within the marked area. If necessary, the biggest cookware on position marker ② is shifted first vertically then horizontally. The other pieces of cookware are shifted first horizontally then vertically.

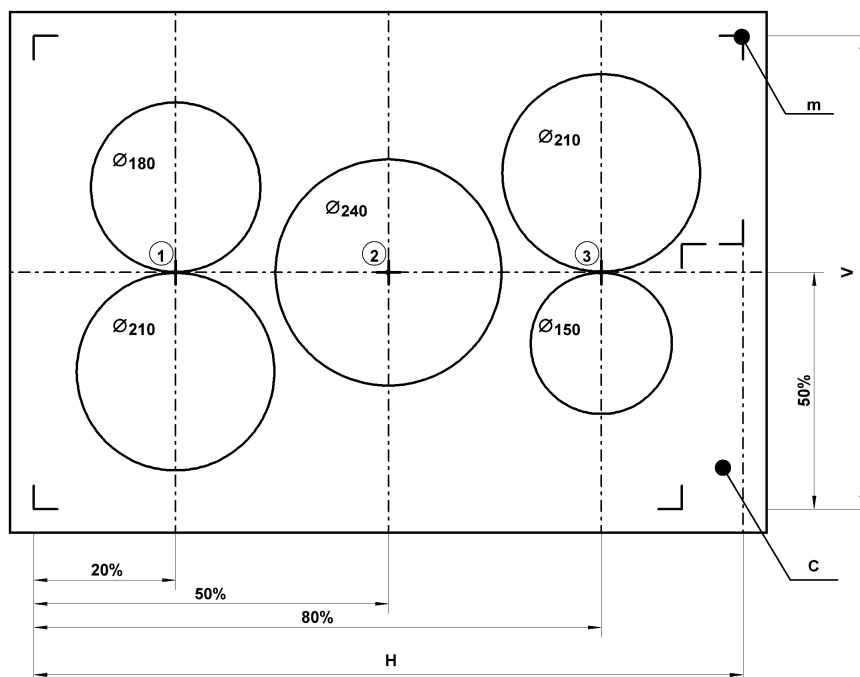
The pieces of cookware should be shifted as little as possible. If the shifting in the first direction is not effective it can be skipped.

The positions and sizes of the pieces of cookware used for measuring shall be noted.

If it is not clear which cookware position is correct, all possibilities are assessed. 



Example 1: **Cooking area with control unit in the front**



Example 2: **Cooking area with control unit on the side**

Key:

H: longest horizontal line of the marked cooking area

V: longest vertical line of the marked cooking area

c: area of the control

m: limitative marking of the cooking area

①, ③: position marker of the pieces of cookware with 150 mm, 180 mm and 210 mm diameter

②: center position of cookware with 240 mm diameter

Figure ZA.4 - Examples - position a cookware set for measuring the energy consumption for cooking areas with limitative markings > 3 controls A11

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

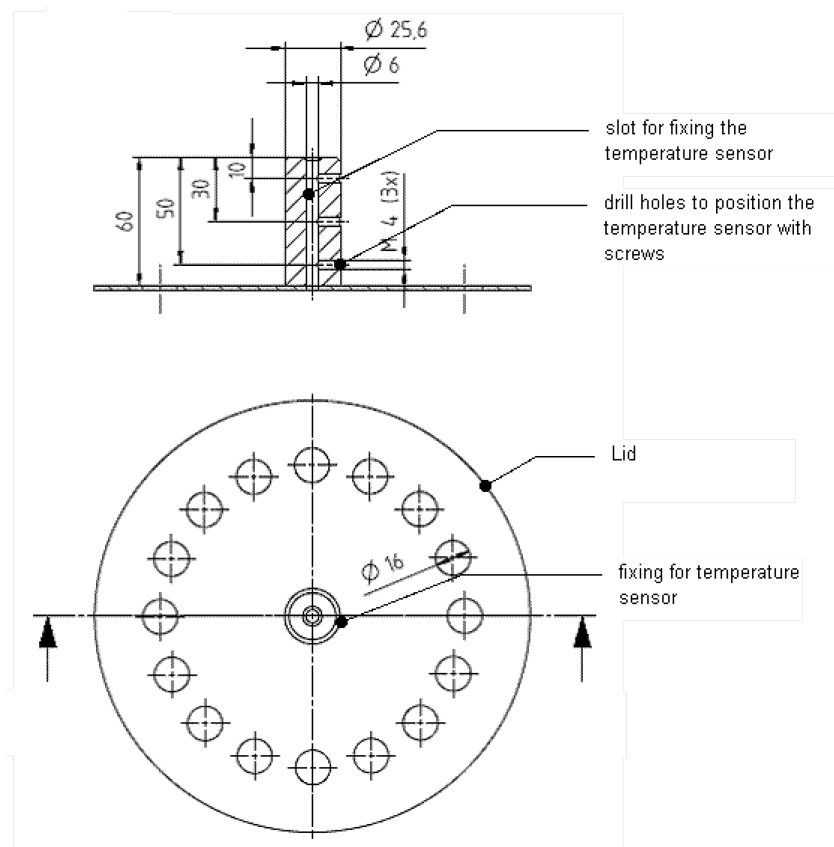


Figure ZB.1 – Position of the temperature measurement instrument

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.

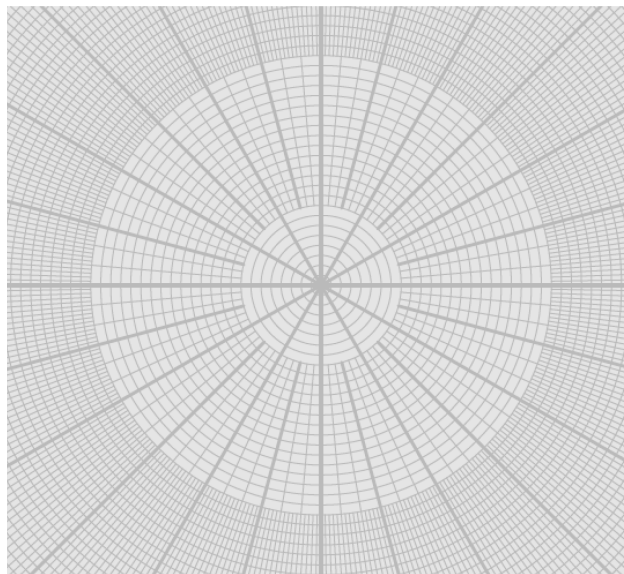


Figure ZB.2 – Polar coordinate paper – Example

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)**

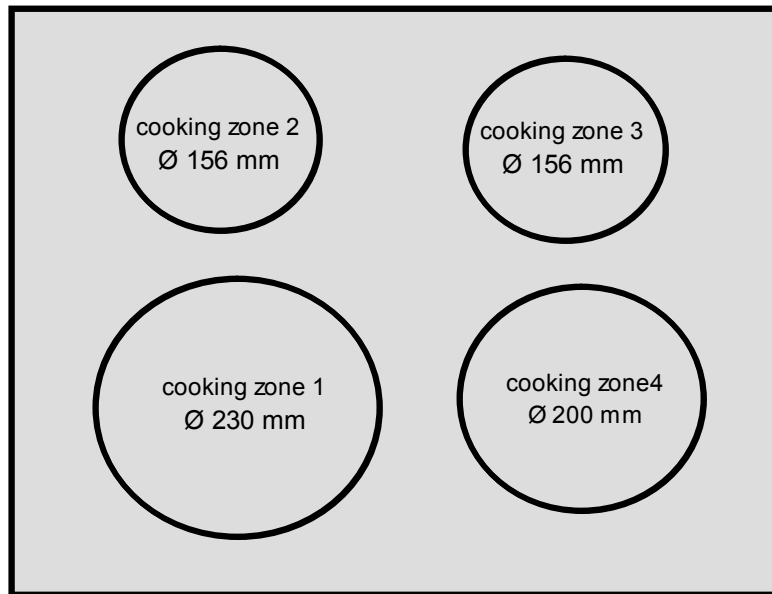


**Figure ZC.1 – Example 1: Tubular hotplates, solid hot plates,
radiant cooking zone or induction cooking zone**

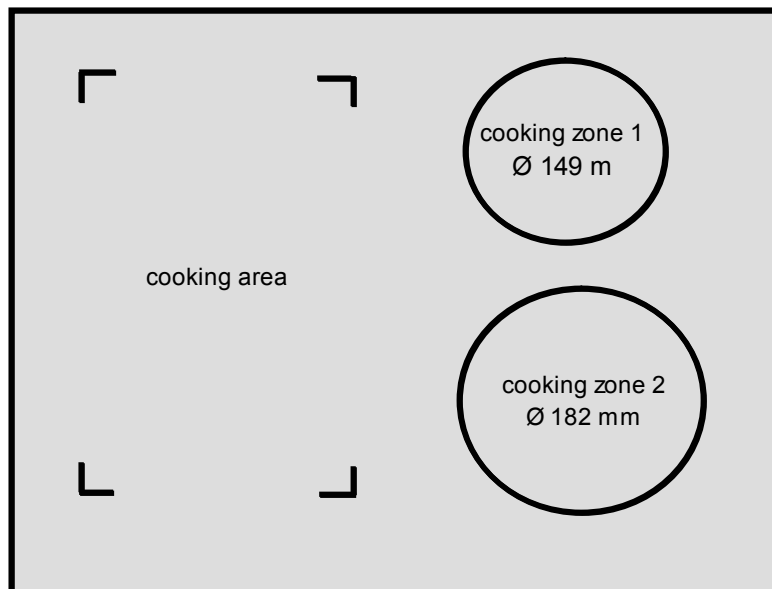


Figure ZC.2 – Example 2: Cooking area combined with two induction or radiant cooking zones

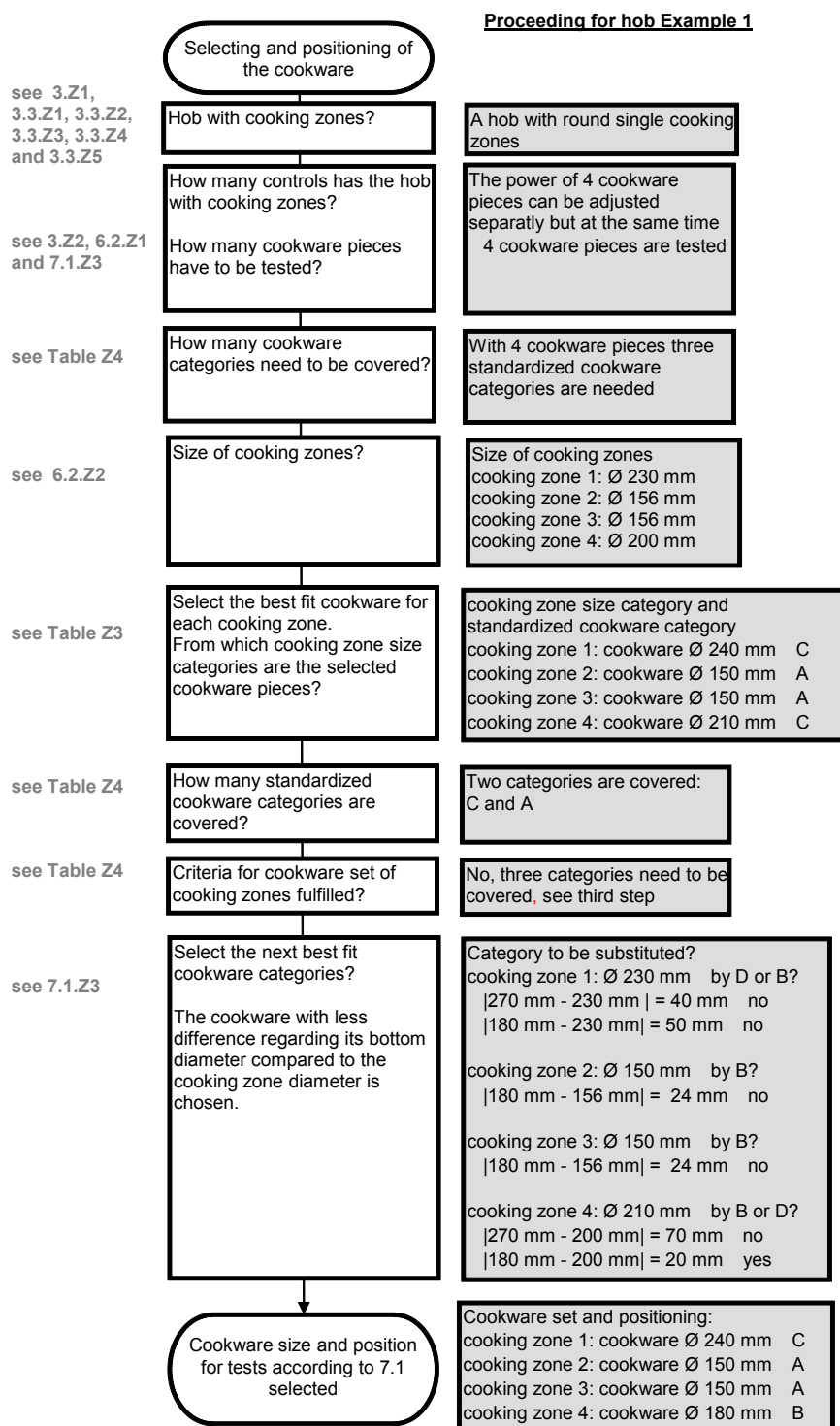


Figure ZC.3 – Proceeding for hob – Example 1

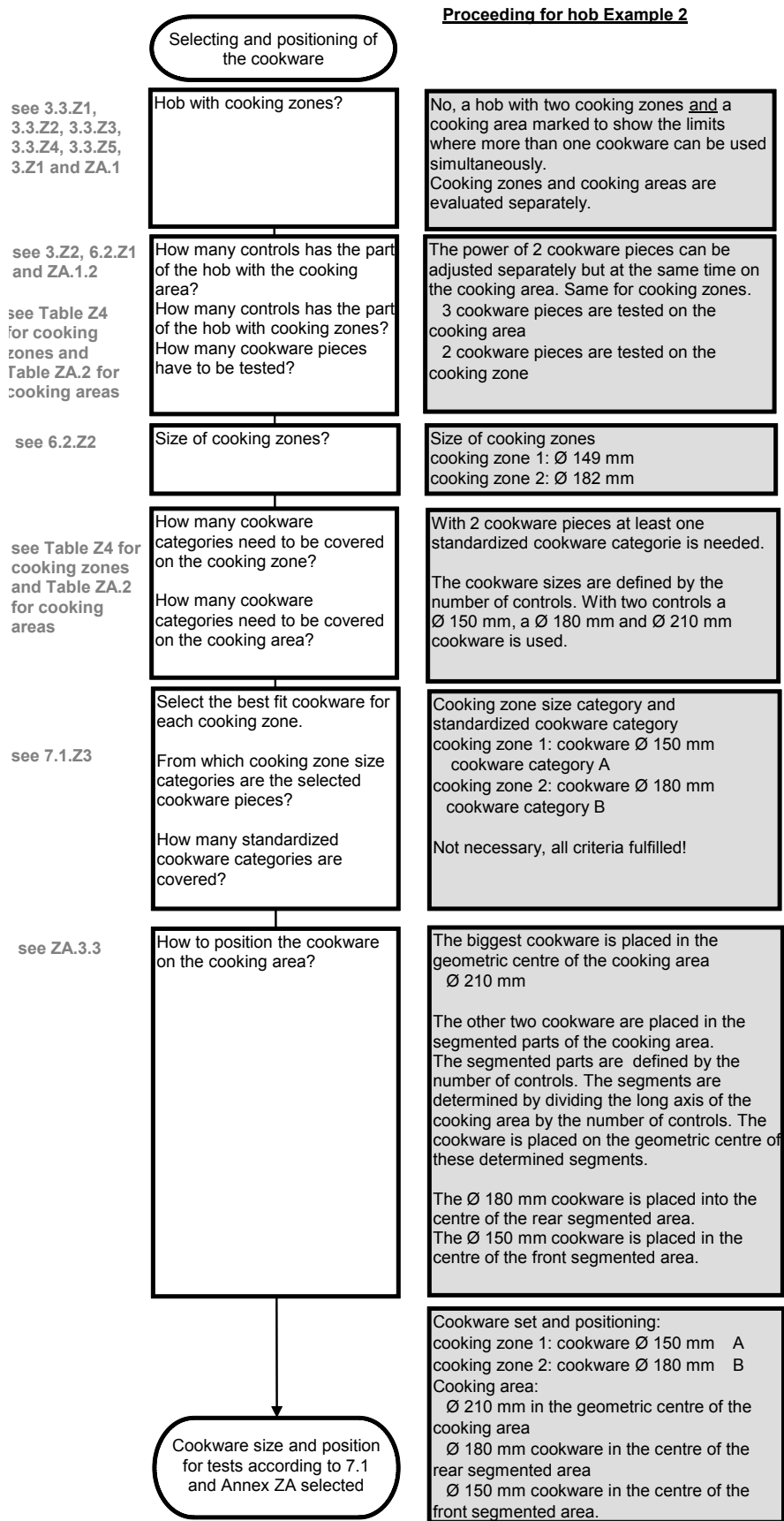


Figure ZC.4 – Proceeding for hob – Example 2

Annex ZC (informative)

Add a third example for **cooking areas** at the end of Annex ZC

Example 3a and b - Proceeding for a hob with a cooking area with limitative markings > 3 controls

For these types of hob five cookware pieces with a diameter of 150 mm, 180 mm, 210 mm twice and 240 mm are applied and positioned as following:
Following key is defined for the figures in this annex:

Key

H: longest horizontal line of the marked cooking area

V: longest vertical line of the marked cooking area

c: area of the control

m: limitative marking of the cooking area

①, ③: position marker of the pieces of cookware with 150 mm, 180 mm and 210 mm diameter

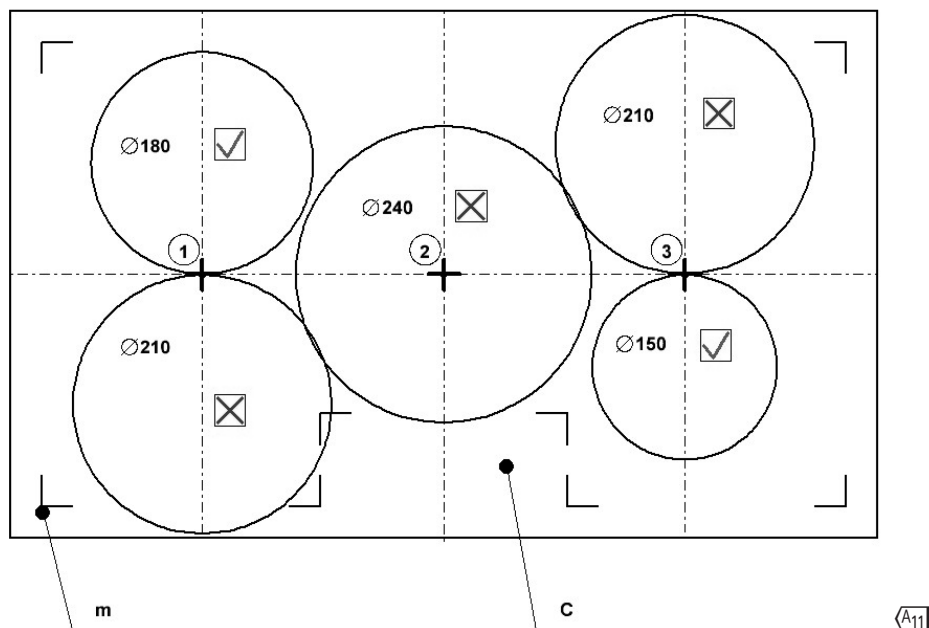
②: center position of cookware with 240 mm diameter

☑: correct position

☒: wrong position, cookware has to be shifted

Example 3a – overview for a cooking area > 3 controls with the area of the control in front

The cookware with a diameter of 240 mm covers partially the area of the **control** and also the cookware with a diameter of 210 mm below the horizontal line. Additionally both pieces of cookware with a diameter of 210 mm are outside the marked area.

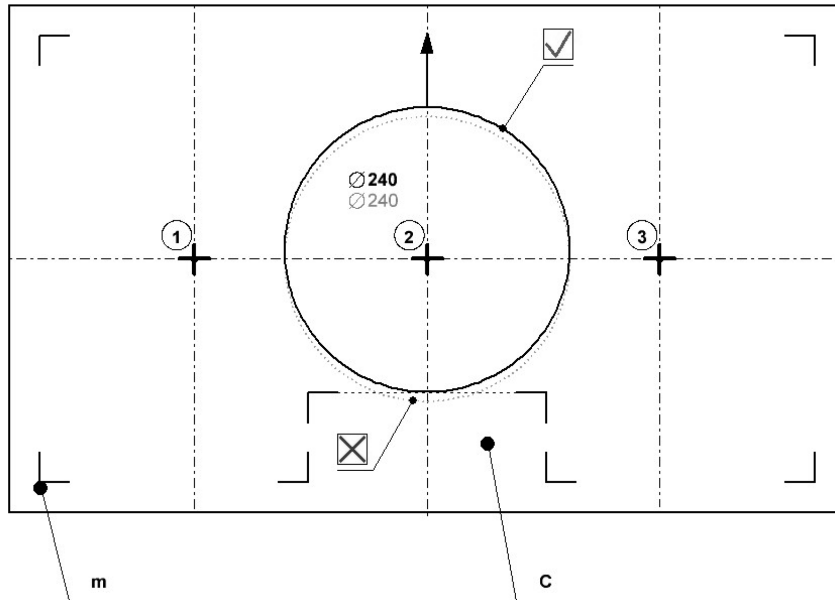


A11

A11 Correct the position of the pieces of cookware with a diameter of 240 mm and 210 mm in following 2 steps:

Step 1

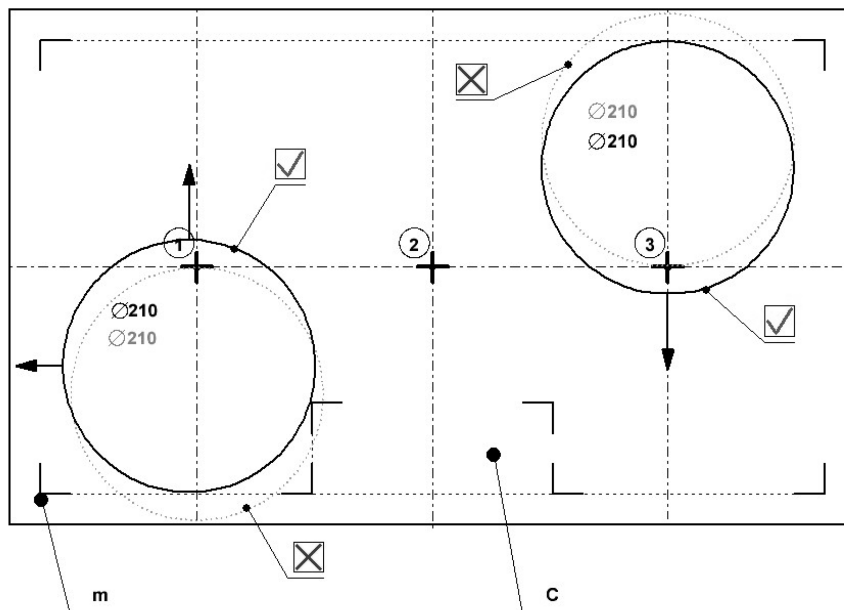
Move the cookware with a diameter of 240 mm vertically until the area of **control** is no longer covered (direction shown by arrow).



Step 2

Move the cookware (210 mm) below the horizontal line horizontally until the area of **control** is no longer covered. Additionally this cookware is moved vertically until the complete cookware is within the marked area.

For the cookware (210 mm) above the horizontal line a horizontal movement is not effective. Move this cookware vertically until the cookware is within the marked area.



A11