



SLOVENSKI STANDARD

SIST EN 60350-2:2013

01-november-2013

Nadomešča:
SIST EN 50304:2009

Gospodinjski električni kuhalni aparati - 2. del: Kuhalne plošče - Metode za merjenje funkcionalnosti (IEC 60350-2:2011, spremenjen)

Household electric cooking appliances - Part 2: Hobs - Methods for measuring performance (IEC 60350-2:2011, modified)

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

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

Ta slovenski standard je istoveten z: EN 60350-2:2013

ICS:

97.040.20	Štedilniki, delovni pult, pečice in podobni aparati	Cooking ranges, working tables, ovens and similar appliances
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60350-2

July 2013

ICS 97.040.20

Supersedes EN 50304:2009 (partially) + A1:2010 (partially)

English version

**Household electric cooking appliances -
Part 2: Hobs -
Methods for measuring performance
(IEC 60350-2:2011, modified)**

Appareils de cuisson électrodomestiques -
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Méthodes de mesure de l'aptitude à la
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This European Standard exists 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.

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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.

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Endorsement notice

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

COMMON MODIFICATIONS

General

Replace all “hotplates” by “cooking zones” except “solid hotplates” and “tubular hotplates”.

2 Normative references

Replace IEC 62301:2005 by

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

Add the following references:

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*

3 Terms and definitions

Replace definitions 3.2 and 3.3 by:

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.

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

3.3

cooking zone

cooking zone has limitative markings on the surface of a **hob** or attached to it where cookware is placed and heated

Note 1 to entry: **Cooking zones** which are used without cookware but by positioning the food directly on the surface are not included.

Note 2 to entry: A **cooking zone** can be

- **single zone and multiple zones** (see 3.3.Z1);
- a **solid hotplate** (see 3.3.Z2);
- a **tubular hotplate** (see 3.3.Z3);
- a **radiant cooking zone** (see 3.3.Z4);
- a **induction cooking zone** (see 3.3.Z5).

Add the following new definitions:

3.3.Z1

single zone and multiple zones

cooking zone marked as **single zone** for one cookware size or as **multiple zones** for more than one cookware size and shape

Note 1 to entry: A **multiple zone** can be circular, elliptical or a combination.

Note 2 to entry: An example for the design of a multiple zones is shown in Annex ZD.

3.3.Z2

solid hotplate

cooking zone having a closed surface which is usually constructed from cast iron with an integrated heating element

3.3.Z3

tubular hotplate

cooking zone having a surface which is formed by the configuration of a tubular heated heating element in a substantially flat plane

3.3.Z4

radiant cooking zone

cooking zone on which the pan is heated by means of a radiant heating element below the glass ceramic. Heater could have a heating ribbon, heating spiral or a tungsten wire which is located in a quartz glass bulb or combination of these

3.3.Z5

induction cooking zone

cooking zone on which the pan is heated by means of an induction element below the glass ceramic or similar. The eddy currents are inducted in the bottom of the pan by magnetic field

Delete definitions 3.4 to 3.8.

Add the following new definitions:

3.Z1

cooking area

area heated by an inducted magnetic field where cookware is placed for heating, and that can be

- an area where no clear limitative markings for cookware are visible on the surface of the **hob** or
- an area marked to show the limits where more than one cookware can be used simultaneously. The cookware pieces can be used and controlled separately from each other at the same time. Additionally the **cooking area** can be used combined for one cookware

Note 1 to entry: The **cooking area** could be also used combined for one big cookware piece even if there is more than one **control**.

Note 2 to entry: **Cooking areas** which are used without cookware but by positioning the food directly on the surface are not included.

Note 3 to entry: There could be a decoration symbol, e.g. a cross on the surface to mark the centre of the **cooking area**.

3.Z2

control

control is a part of the **hob** independent from technical solution (e.g. knobs, touch **controls** etc). The power and the temperature respectively of the **cooking zone** or **cooking area** can be adjusted by the **control** for one piece of cookware

Note 1 to entry: The power is generally indicated as numbers, but also temperature values and symbols are possible. The **control** can also be outside of the **hob** integrated in a separate device or part of a built-in-oven.

3.Z3

warming zone

warming zone is used for keeping food warm. Its intention for use is not cooking

Note 1 to entry: Normally one power setting exists – on and off.

3.Z4**maximum power**

maximum possible power setting if only one cookware is used

Note 1 to entry: Boost function is considered

3.Z5**set to off mode**

action where the product is switched off using appliance **controls** or switches that are accessible and intended for operation by the user during normal use to attain the lowest power consumption that may persist for an indefinite time while connected to a main power source and used in accordance with the manufacturer's instructions

Note 1 to entry: All actions required to set to off mode like for example remove the cookware etc have to be taken.

Note 2 to entry: For definition of off mode, EN 50564:2011 is relevant.

3.Z6**set to standby mode**

action where the product is switched to standby using appliance **controls** or switches that are accessible and intended for operation by the user during normal use to attain the lowest power consumption that may persist for an indefinite time while connected to a main power source and used in accordance with the manufacturer's instructions

Note 1 to entry: For definition of standby mode, EN 50564:2011 is relevant.

4 List of measurements**4.1 Dimensions and mass**

Replace the second, third and fourth dash items by the following:

- cooking zones per hob (see 6.2);
- level of solid hotplates (see 6.3)
- distance between the cooking zones (see 6.4);

4.2 Hotplates and cooking zones

Replace the title of 4.2 by “Cooking zones and cooking areas”.

Replace the first and second dash items by the following:

- energy consumption and time for heating (see 7.1 and Annex ZA).

5 General conditions for the measurements

Add the following just after the title:

5.Z1 Introduction

Unless otherwise specified, the measurements are made under the following conditions.

If numbers have to be rounded, they shall be rounded to the nearest number according to EN ISO 80000-1:2013, B.3, Rule B. If the rounding takes place to the right of the comma, the omitted places shall not be filled with zeros.

5.1 Test room

Replace the text by:

The tests are carried out in a substantially draught-free room in which the laboratory ambient temperature is maintained at $(20 \pm 5) ^\circ\text{C}$.

For test 7.1, $(23 \pm 2) ^\circ\text{C}$ shall be maintained during the complete test.

This ambient temperature is measured at a point that is at the same height as the **hob** positioned at working height and at a distance of 0,5 m diagonally from one of the front edges of the appliance,

NOTE The working height is between 800 mm and 1 000 mm normally.

The measurement of the ambient temperature shall not be influenced by the appliance itself or by any other appliance.

The absolute air pressure shall be 913 hPa to 1 063 hPa.

5.2 Electricity supply

Add the following before the note:

For test 7.1, the supply voltage shall be maintained at the main terminal at $230 \text{ V} \pm 1 \%$ or at $400 \text{ V} \pm 1 \%$ as defined by the manufacturer's installation guide, while the heating elements are switched on. The supply frequency shall be at a nominal $50 \text{ Hz} \pm 1 \%$.

The supply voltage shall be essentially sinusoidal.

5.3 Instrumentation

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5.3 Instruments and measurements

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Instruments used and measurements made for this document shall comply with the following specifications.

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Table Z1 – Instruments

Parameter	Unit	Minimum resolution	Minimum accuracy	Additional requirements
Mass (7.1)	g	0,5 g	$\leq 1\,000 \text{ g} \pm 1 \text{ g}$ $> 1\,000 \text{ g} \pm 3 \text{ g}$	
Temperature				
– ambient temperature	$^\circ\text{C}$	0,1 $^\circ\text{C}$	$\pm 1 \text{ K}$	
– temperature, water load (7.1)	$^\circ\text{C}$	0,1 $^\circ\text{C}$	$\pm 0,5 \text{ K}$	3 mm steel tube
Time	s	1 s	$\pm 1 \text{ s}$	
Energy	Wh	-	$\pm 1 \%$	Very quick electronic on/off periods shall be taken into account by measurement techniques.
Air pressure	hPa	1 hPa	$\pm 1 \%$	

Table Z2 – Measurements

Parameter	Unit	Minimum resolution	Minimum accuracy	Additional requirements
Voltage	V	-	± 0,5 %	-
Temperature and energy consumption measurement (7.1)		-	-	sampling rate ≤ 1 s (digital measurement data)
For Clause 8, the power measurement requirements shall be in accordance with EN 50564		-	-	According to EN 50564

NOTE The required accuracy of temperature measurement in the water load (7.1) can be fulfilled by calibrating temperature measurement or for instance by a PT100 according to EN 60751.

5.5 Setting of controls

Replace the whole subclause by:

5.5 Initial conditions

The appliance shall be at laboratory ambient temperature at the beginning of each test.

Forced cooling may be used to assist in reducing the temperature.

6 Dimensions and mass

6.2 Dimensions of hotplates and cooking zones

Replace the whole subclause by:

6.2 Cooking zones per hob

SIST EN 60350-2:2013

<https://standards.iteh.ai/catalog/standards/sist/eac16615-5c16-4926-8cf4-94a6747da369/sist-en-60350-2-2013>

6.2.Z1 Number of cooking zones per hob

The number of **cooking zones** is determined by the maximum number of **controls** which can be operated independently all at the same time.

The number of **controls** per **hob** is noted.

6.2.Z2 Dimensions of cooking zones

The main dimensions are determined as follows.

The main dimensions of **cooking zones** are determined by measuring the marked area on the surface. For circular **cooking zones**, the diameter of the largest marked circle is measured.

For **multiple zones**, the dimension for each size is measured.

For **solid hotplates**, the diameter of the surface intended to come into direct contact with the bottom of saucepans is measured.

For **tubular hotplates**, the diameter of the largest periphery excluding any leading section is measured.

If the **cooking zones** are not circular, the dimensions are determined as follows:

- for rectangular and similar shapes, the lengths of the sides are measured;
- for elliptical and similar shapes, the major and minor dimensions are measured.

NOTE The dimension of a radiant or induction **cooking zone** is determined by the printing on the surface independent from the size of heating element.

The dimensions are indicated in millimetres.

6.3 Level of hotplates

Replace the title of 6.3 by “Level of solid hotplates”.

Replace all “hotplates” in 6.3 to “solid hotplates”.

6.4 Distance between hotplates and cooking zones

Replace the title of 6.4 by “Distance between cooking zones”.

Delete all “hotplates” in 6.4.

7 Hotplates and cooking zones

Replace the title of Clause 7 by “Cooking zones and cooking areas”.

Add the following new subclause just after the title:

7.21 General

The tests described in Clause 7 are applicable to **cooking zones** with a diameter ≤ 330 mm and ≥ 100 mm or one of the sides' length ≤ 330 mm and ≥ 100 mm.

In addition, tests are applicable to **cooking areas**. Further requirements concerning **cooking areas** are described in Annex ZA.

For **multiple zones** which include a circular and an elliptical or rectangular part, only the circular part is tested.

7.1 Ability to heat water

Replace the whole subclause by:

7.1 Energy consumption and heating up time

7.1.Z1 Purpose

The purpose is to assess the heating up time of a defined water load. In a second measurement, the energy consumption for heating up a defined water load and keep it at a defined temperature level for 20 min is determined.

NOTE 1 Heating up and keeping the temperature for a defined period represents a typical household cooking process. Additional the quality of control is measured by keeping an amount of water at a defined temperature as exactly as possible.

NOTE 2 The simmering time of 20 min represents an average household cooking duration. Additionally at least 20 min further simmering time is necessary to assess the quality of a **control** which influences the energy consumption.

7.1.Z2 Cookware and water amount

Standardised cookware with lid as specified in Figure Z1 is used for 7.1.

Hobs working exclusively with system cookware and not with household like cookware shall be tested with its system cookware, but the system cookware shall be covered with the lid according to Table Z3.

The material of the cookware bottom is stainless steel 1.4016 according to EN 10088-2, the thickness is 6 mm \pm 0,05 mm. The surface shall not be shiny.

The flatness of the bottom plate is specified in Table Z3 for different sizes. Convex shaped bottom plate is not allowed. The flatness of the base has to be checked before starting a measurement.

For the side wall, 1.4301 stainless steel according to EN 10088-2 with 1 mm \pm 0,05 mm thickness shall be used. The cookware is cylindrical without handles or protrusions.

As the dimensions and material of cookware and lid influence the performance, only the cookware specified in Figure Z1, including the lid, shall be used.

The lid is made of aluminium, thickness is 2 mm \pm 0,05 mm. The dimensions for the lid are fixed in Table Z3. Each hole on the hole circle of the lid has a diameter of 16 mm \pm 0,1 mm. The holes shall be evenly distributed on the hole circle.

The lid, which is flat, is adapted to accommodate a temperature sensor in the centre. The temperature sensor is positioned 15 mm above the inner cookware bottom.

In order to reduce measurement noise generated by the electromagnetic field of an **induction cooking zone**, the lid of the cookware shall be connected to ground through a clamp (see Figure Z1, d)). The ground connection of the electric installation of the testing laboratory shall be according to HD 60364-5-54.

NOTE 1 A wire of 2 mm² of section and maximum length of 2 m is welded to the metallic clamp and ends in connection box which is joined to a plug connector.

NOTE 2 A supplier for the stainless steel 1.4016 and for the cookware is indicated in B.Z1 and B.Z2.

NOTE 3 The sidewalls of the cookware can be built up of a metal sheet. The metal sheet is rolled and welded to a sheet-metal jacket. The sidewalls can additionally be fixed by three welding points to the bottom. The requirements for flatness have to be fulfilled afterwards.

NOTE 4 An example how to fix the temperature sensor to the lid is shown in Annex ZB.

NOTE 5 Evaporating water by holes in the lid simulates a cooking process on a higher temperature level. The thermal energy which is needed to be at the 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.

The following standardised cookware sizes are defined.

Table Z3 – Sizes of standardised cookware and water amounts

Diameter of the cookware bottom (outside)	Diameter of the lid	Lid hole circle diameter	Number of holes on the circle	Total cookware height (outside)	Flatness of cookware bottom	Water load	Cooking zone size category	Standardised cookware categories
mm	mm	mm		mm	mm	g	mm	
120 ± 0,5	130 ± 1	80 ± 1	7	125 ± 0,5	≥ 0 < 0,075	650	≥ 100 < 130	A
150 ± 0,5	165 ± 1	110 ± 1	11	125 ± 0,5	≥ 0 < 0,075	1 030	≥ 130 < 160	
180 ± 0,5	200 ± 1	140 ± 1	16	125 ± 0,5	≥ 0 < 0,075	1 500	≥ 160 < 190	B
210 ± 0,5	230 ± 1	170 ± 1	22	125 ± 0,5	≥ 0 < 0,1	2 050	≥ 190 < 220	C
240 ± 0,5	265 ± 1	200 ± 1	29	125 ± 0,5	≥ 0 < 0,1	2 700	≥ 220 < 250	
270 ± 0,5	300 ± 1	230/210 ^a ± 1	18/18 ^a	125 ± 0,5	≥ 0 < 0,15	3 420	≥ 250 < 280	D
300 ± 0,5	330 ± 1	260/210 ^a ± 1	23/22 ^a	125 ± 0,5	≥ 0 < 0,15	4 240	≥ 280 < 310	
330 ± 0,5	365 ± 1	290/270 ^a ± 1	27/27 ^a	125 ± 0,5	≥ 0 < 0,15	5 140	≥ 310 ≤ 330	

^a Number of holes are arranged on two hole circles.

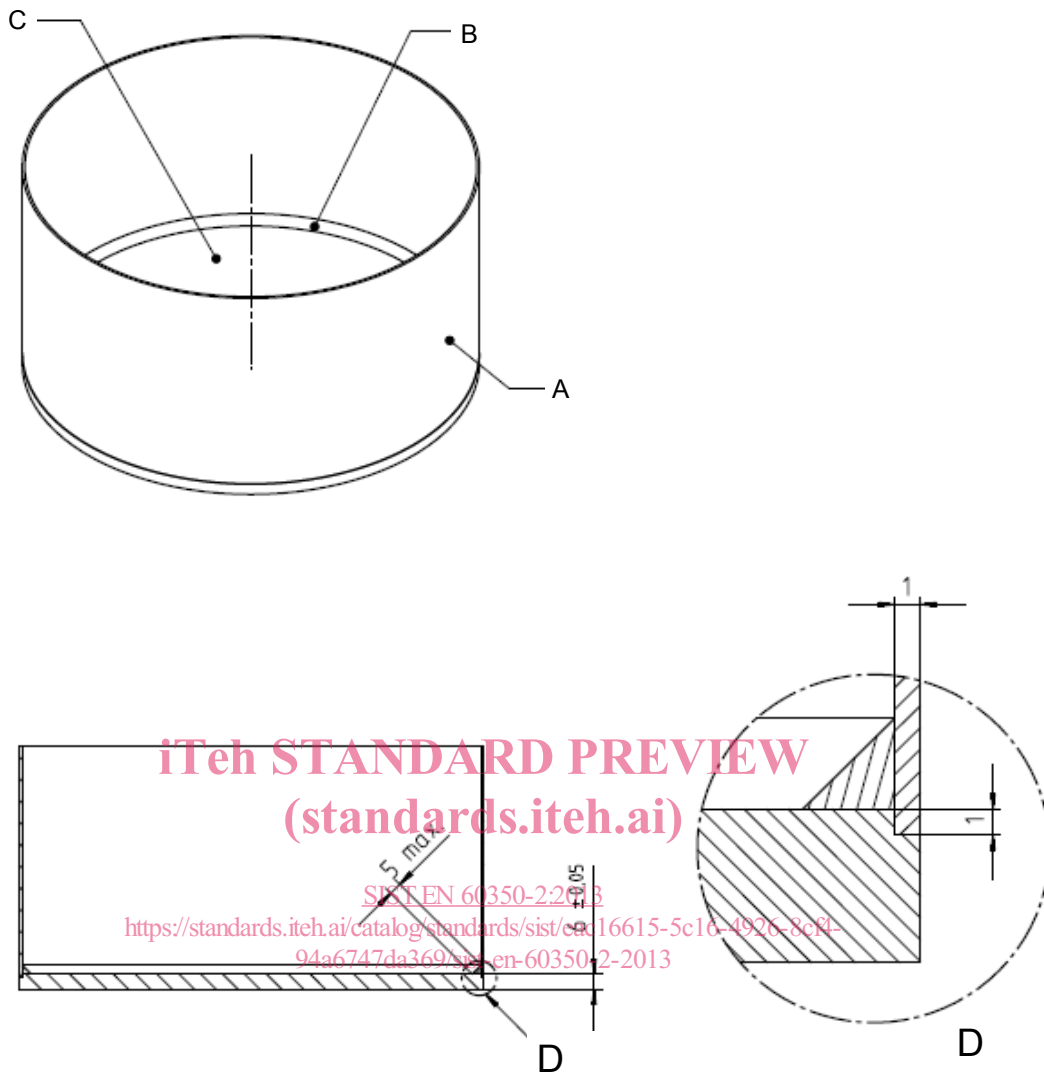
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NOTE 6 Standardised cookware categories are only relevant for cookware defined in Table Z3. Categories are necessary to make sure that different cookware sizes – as relevant in a household – are considered.

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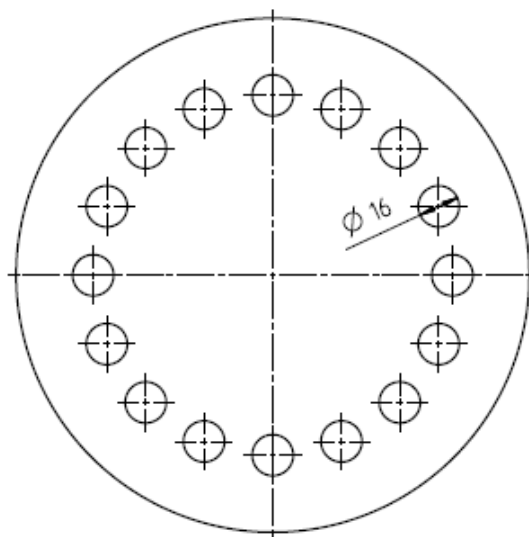
Dimensions in millimetres

**Key**

- A side wall
- B glue heat resistant
- C bottom plate
- D detail of the edge

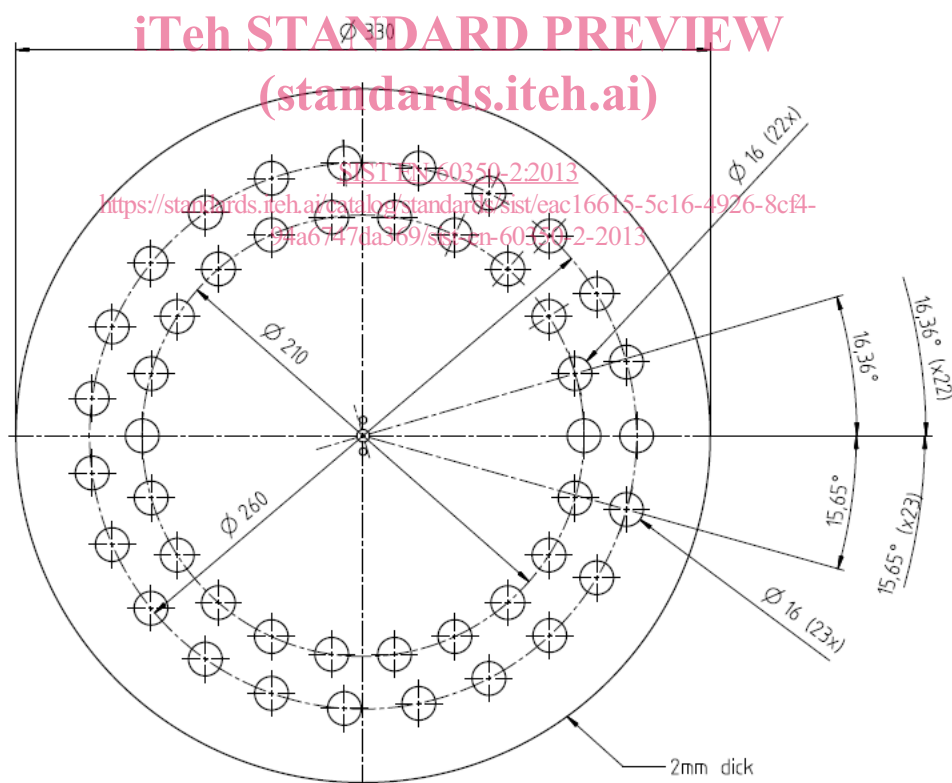
a) Example for cookware size of 180 mm diameter

Dimensions in millimetres



b) Example lid for Ø 180 mm cookware

Dimensions in millimetres



c) Example lid for Ø 300 mm cookware"