DRAFT FOR DEVELOPMENT

DD CEN/TS
12983-2:2005

Cookware — Domestic cookware for use on top of a stove, cooker or hob —

Part 2: Further general requirements and specific requirements for ceramic, glass and glass ceramic cookware

ICS 97.040.60

National foreword

This Draft for Development is the official English language version of CEN/TS 12983-2:2005.

This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature because of the need to validate fully the requirements proposed. It should be applied on this provisional basis, so that information and experience of its practical application may be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the European organization responsible for its conversion to a European standard. A review of this publication will be initiated 2 years after its publication by the European organization so that a decision can be taken on its status at the end of its 3-year life. Notification of the start of the review period will be made in an announcement in the appropriate issue of *Update Standards*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into a European Standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent in writing to the Secretary of BSI Technical Committee CW/9, Cooking and catering containers, at British Standards House, 389 Chiswick High Road, London W4 4AL, giving the document reference and clause number and proposing, where possible, an appropriate revision of the text.

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Cross-references

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Summary of pages

This document comprises a front cover, an inside front cover, the CEN/TS title page, pages 2 to 22, an inside back cover and a back cover.

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TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

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CEN/TS 12983-2

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ICS 97.040.60

English version

Cookware - Domestic cookware for use on top of a stove, cooker or hob - Part 2: Further general requirements and specific requirements for ceramic, glass and glass ceramic cookware

Articles culinaires - Articles culinaires à usage domestique pour cuisinières et plaques de cuisson - Partie 2 : Exigences générales supplémentaires et exigences spécifiques pour articles culinaires en verre et en céramique

Kochutensilien - Haushaltskochgeschirre zur Verwendung auf einem Ofen, Herd oder Kochmulde - Teil 2: Weitere allgemeine Anforderungen und spezifische Anforderungen für Keramik- und Glaskochgeschirre

This Technical Specification (CEN/TS) was approved by CEN on 14 September 2004 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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Foreword

This document (CEN/TS 12983-2:2005) has been prepared by Technical Committee CEN/TC 194 “Utensils in contact with food”, the secretariat of which is held by BSI.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This document, part of EN 12983, specifies safety and performance requirements of items of domestic cookware for use on top of a stove, cooker or hob and is applicable to all cookware regardless of material or method of manufacture. It also applies to products intended for use both "on top" and "in oven".

Hob types covered by this document are gas, electricity solid plate, electricity radiant ring, radiant plate in glass ceramic and induction plate in glass ceramic.

This document is complementary to EN 12983-1.

NOTE 1 Requirements for suitability for use with Induction hobs are in the process of being compiled and will be issued as a complementary standard.

NOTE 2 Requirements for suitability for use in automatic dishwashers is under study by a specialist group and will be added by amendment when completed.

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.

EN 12983-1:2000, *Cookware – Domestic cookware for use on top of a stove, cooker or hob - Part 1: General requirement*.

ENV 12875-1, *Mechanical dishwashing resistance of domestic utensils – Part 1: Reference test method*.

EN ISO 4628-2, *Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 2: Assessment of degree of blistering (ISO 4628-2:2003)*.

ISO 2747, *Vitreous and porcelain enamel - Enamel cooking utensils – Determination of resistance to thermal shock*.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12983-1:2000 and the following apply:

3.1
glass
inorganic non-metallic material produced by the complete fusion of raw materials at a high temperature into a homogeneous liquid which is then cooled to a rigid condition essentially without crystallisation

3.2
glass ceramic
inorganic, non-metallic material produced by the complete fusion of raw materials at high temperatures into a homogeneous liquid which is then cooled to a rigid material and heat treated to achieve a certain degree of crystallisation, mainly sub-microscopic small crystallites

4 Resistance to pull of handle assembly

When tested as described in Annex A, a handle assembly shall withstand a dynamic impact of 1,5 N.m without any reduction in the security of the fixing system.

5 Non-stick coatings

5.1 General

The requirements given in this clause apply to any surfaces which are claimed to be non-stick.

NOTE Non-stick coatings are intended to facilitate the release of food after cooking and also cookware cleaning.

5.2 Endurance

When tested as described in Annex B, any surface claimed to be non-stick shall leave no portion greater than 10 % of the surface area of the pancake still adhering to the test surface.

5.3 Corrosion resistance

When tested as described in Annex C, any surface claimed to be non-stick shall show no blistering exceeding size 2 density 2 according to EN ISO 4628-2.

6 Suitability for use with various heat sources

6.1 Declaration of suitability

The manufacturer or supplier shall declare the heat source(s) for which their products are suitable.

6.2 Heat distribution

If suitability for use on solid plate or glass ceramic hobs with radiant or halogen heaters is claimed, when tested as described in Annex D, the temperature at the point where the sugar first melted shall not exceed 290 °C at the completion of the test.

6.3 Suitability

Test methods for the evaluation of suitability for various heat sources are given in Annex E as guidance to manufacturers and suppliers who wish to claim suitability of their cookware for use with solid plate or glass ceramic hobs with radiant or halogen heaters. These tests do not apply to shallow items.

7 Glass and glass ceramic ware

7.1 Bodies

When tested as described in ISO 2747, the minimum failure temperature shall be 280 °C.

7.2 Lids

When tested as described in Annex F, there shall be no damage caused to the test piece.

Annex A
(normative)

Test for resistance to pull

A.1 Apparatus

A.1.1 Steel impact hammer, having a mass of 1 kg ± 50 g.

A.1.2 Metal guide for dropping the hammer **(A.1.1)** through a distance of (150 ± 5) mm so that it falls vertically, essentially without friction, to a stop. The guide and stop shall have a mass of 10 kg ± 50 g.

A.1.3 Means of attaching the test piece to a rigid support in a horizontal plane, e.g. a 'G' clamp, which prevents any movement of the test piece.

A.1.4 Means of transferring the force generated by dropping the hammer **(A.1.1)** onto the metal guide **(A.1.2)** to the test piece handle so that said force acts parallel to the pan base.

NOTE A general form of a suitable apparatus is shown on Figure A.1.

A.2 Procedure

A.2.1 Precondition the cookware by subjecting it to the heat resistance test described in Annex B of EN 12983-1:2000.

A.2.2 Attach the cookware to the support **(A.1.3)** as shown in Figure A.1.

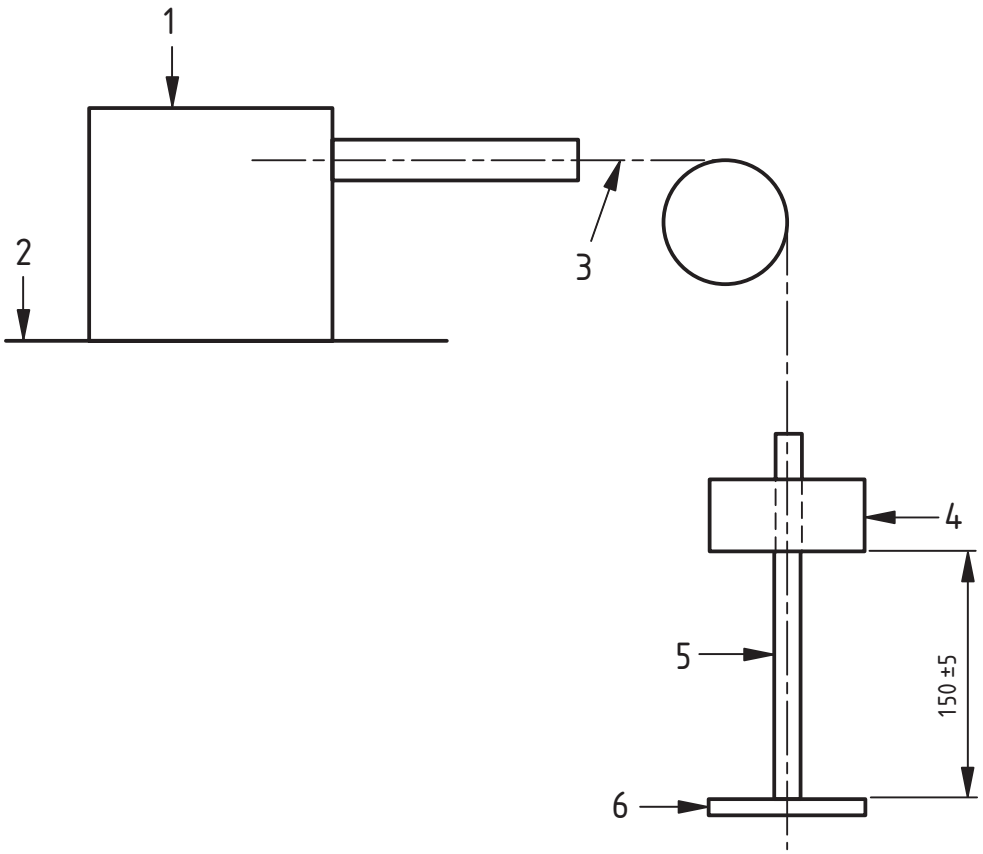
A.2.3 Attach the guide to the cookware handle so that a rigid fixing is obtained.

A.2.4 Position the impact hammer (150 ± 5) mm above the stop and allow it to fall freely.

A.2.5 Examine the security of the fixing system and note any deterioration.

NOTE It is permissible to machine the handle to facilitate the fixing of the metal guide.

Dimensions in millimetres



Key

1 Cookware
2 Support
3 Handle axis 0°± 1° from horizontal
4 Hammer
5 Guide
6 Stop

Figure A.1 — Resistance to pull

Annex B
(normative)

Endurance tests for non-stick coatings

B.1 Apparatus

B.1.1 2,3 kW gas hob with heat diffuser (e.g. of the type shown in Figure B.1) capable of heating the interior base of the utensil up to 250 °C and of maintaining the temperature at (205 ± 10) °C when empty.

NOTE It is permissible to use a higher powered hob if the specified temperature cannot be achieved.

B.1.2 Fixing system to hold the utensil on the heat source during the test.

B.1.3 Wear equipment comprising two parts as follows:

a) brass brush assembly, as shown in Figure B.2; and

b) system to rotate the brush assembly against the surface to be tested, for example of the type shown Figure B.3.

The aluminium discs shall have a diameter of 115 mm, a thickness of 4,5 mm and be freely rotating.

The metal brushes shall be made from brass wire having a diameter of 0,2 mm and be freely rotating. They shall have an external diameter of 50 mm and a width of 5 mm at the fixing point of the wire.

B.1.4 Test weight, comprising (1,000 ± 0,05) kg of steel balls approximately 3 mm in diameter densely packed in fabric.

B.2 Test batter

The test batter shall be pancake batter made from the following ingredients:

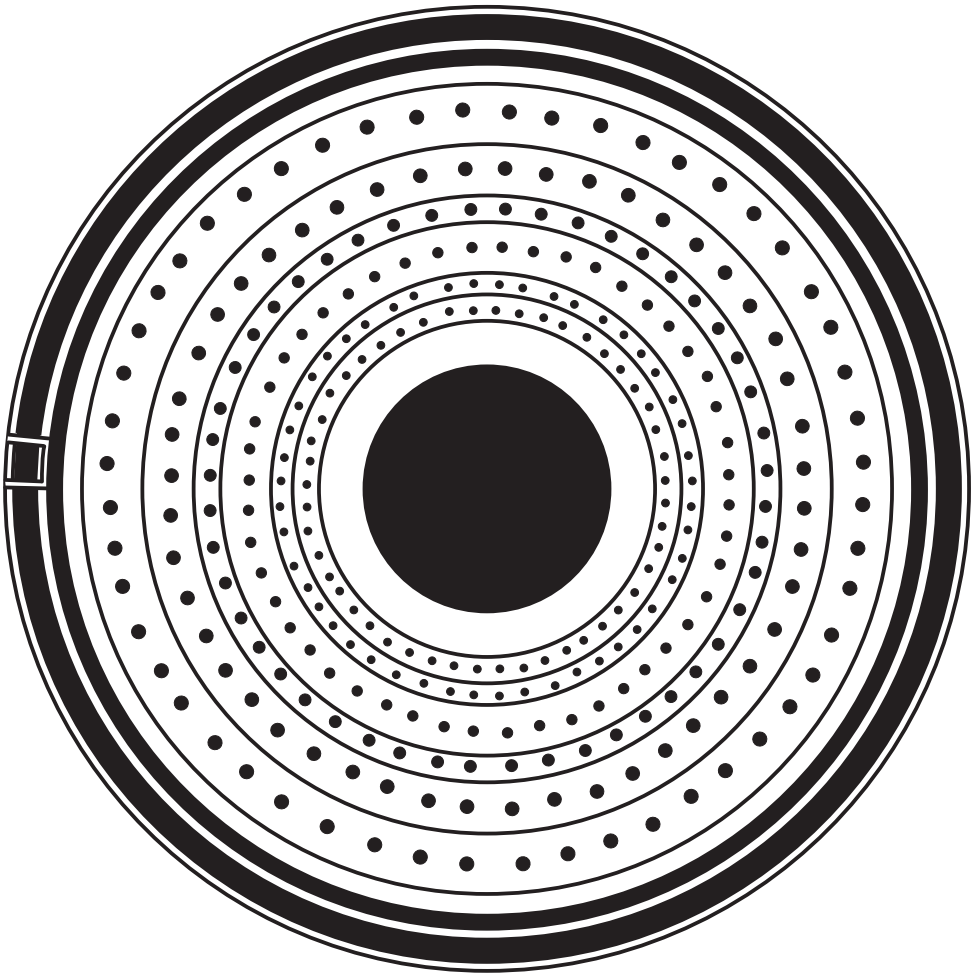
— 300 g plain wheat flour with a fat content between 1,3 g/100 g and 1,5 g/100 g;

— 3 eggs, i.e. 150 g. total mass shelled egg mixture;

— 1 l milk with a fat content of (3,5 ± 0,5) %;

— 1 g salt;

blended together to a smooth consistency and allowed to rest at ambient temperature for 30 min before use. Any batter not used within 8 h shall be discarded.

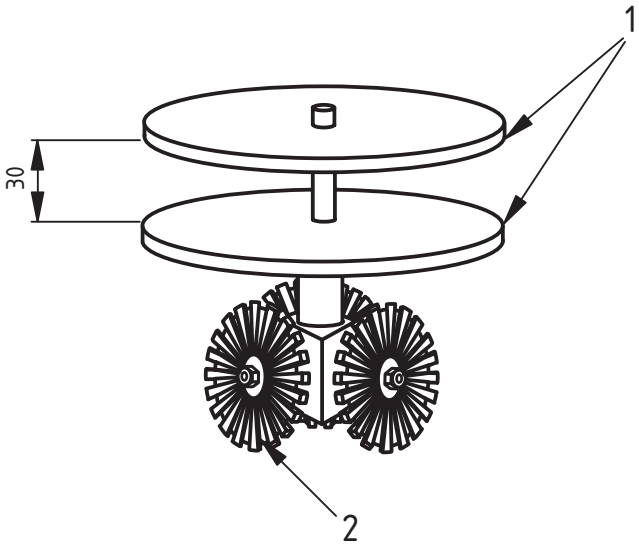


a) Plan view

b) Cross section

Figure B.1 — Heat diffuser

Dimensions in millimetres

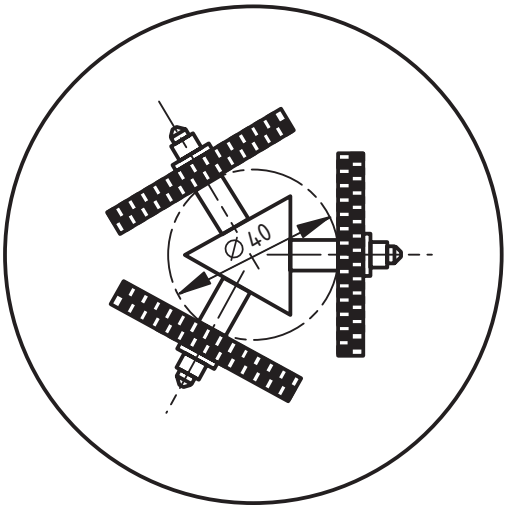


Key

1 Aluminium discs

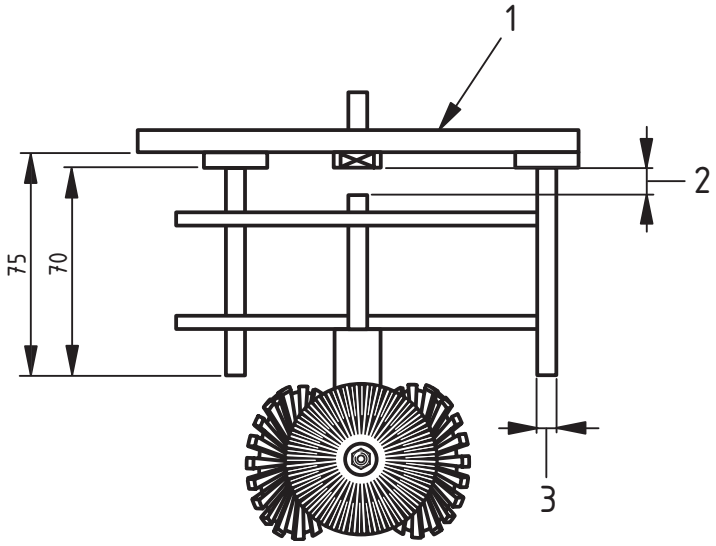
2 Metal brush

a) Brush assembly



b) Plan view

Figure B.2 — Metal brush system



Key

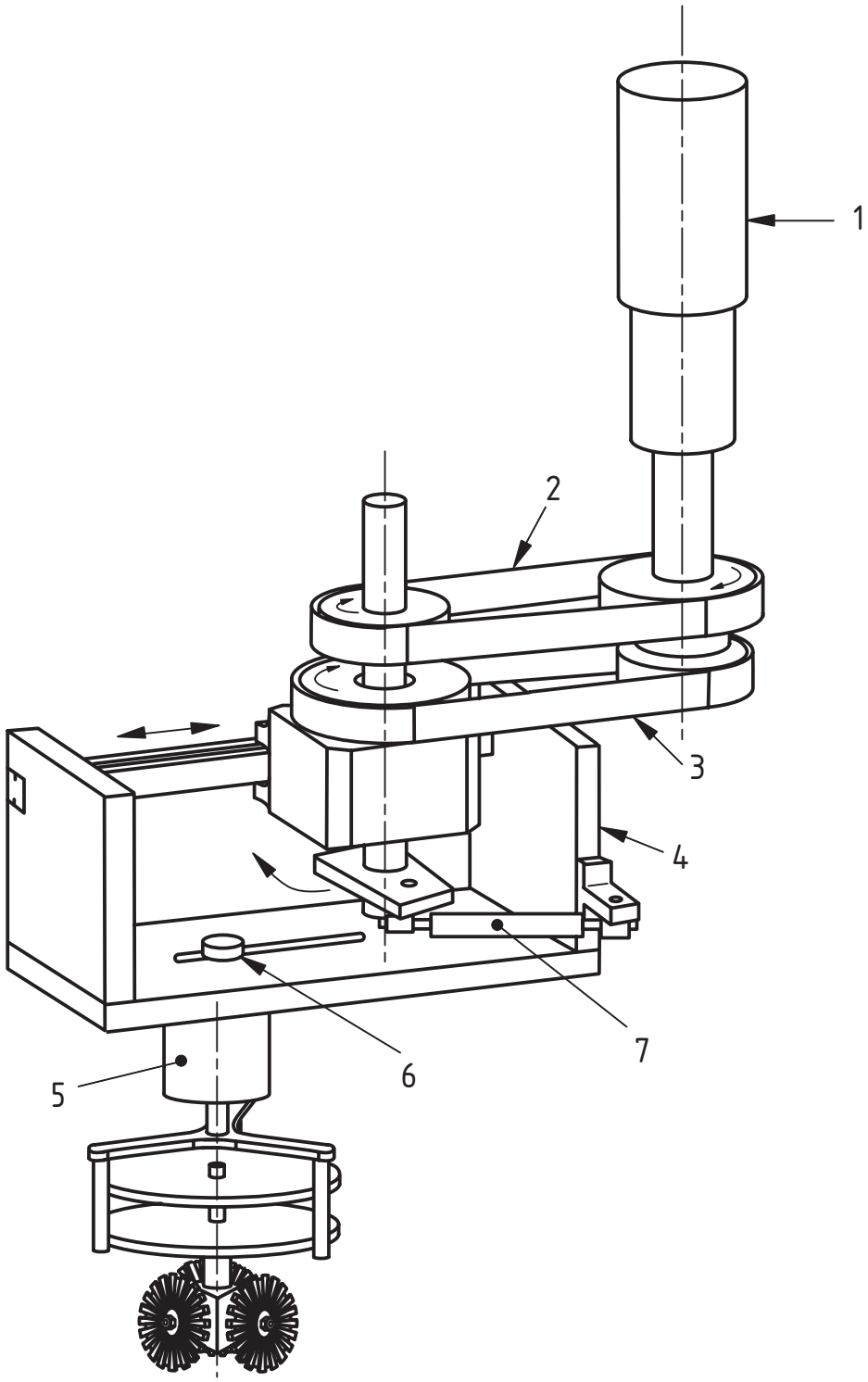
1 System driven by friction, comprising three axes at 120°

2 Play 10 mm

3 Play between 5 mm and 10 mm

c) Brush assembly mounted onto test system (see Figure B.3)

Figure B.2 — Metal brush system *(continued)*



Key

1 Rotation speed of drive unit (40 ± 1) rpm
2 Upper drive ratio (rod axis) 5:4
3 Lower drive ratio (frame) 4:5
4 Speed of rotation of arm (10 ± 1) rpm
5 Motor to drive brush system
6 System for manual adjustment of distance of travel
7 Connecting rod for adjustment of arm length

Figure B.3 — Endurance test system

B.3 Procedure

B.3.1 The test shall be performed on an unused utensil.

B.3.2 Clean the utensil using a domestic washing up detergent and hot water. Rinse and dry.

B.3.3 Centre the utensil on the heat source fitted with the diffuser. Adjust the movement of the brushes so that they cover a surface, the test surface, extending to 20 mm from the edge of the base of the utensil. Remove the brushes, activate the heat source and bring the temperature, at a point on the half radius of the pan base, to (205 ± 10) °C and maintain this temperature throughout the test.

B.3.4 Check that the brushes are clean and without damage (loss of wires, bending, wear etc.) and place them in contact with the test surface.

B.3.5 Switch on the rotation apparatus and run for 3 min/dm^2 of the test surface.

B.3.6 Switch off the rotation apparatus, raise the rotating device and remove the brush assembly.

NOTE Care should be taken as parts of the apparatus will be very hot.

B.3.7 Allow the utensil to cool to ambient temperature and wipe the test surface with a clean dry cloth to remove any particles.

B.3.8 Replace the utensil on the heat source. Adjust the temperature to (205 ± 10) °C at a point on the half radius of the test surface. Maintain this temperature for 5 min.

B.3.9 Pour in an amount of the test pancake batter **(B.2)** representing 30 g/ dm^2 of the test surface. Spread evenly across the test surface.

B.3.10 Remove approx. 1,5 cm^2 of the batter at a point situated on a circle at half the radius of the pan base, the measuring point, for temperature measuring purposes.

B.3.11 If the temperature at the measuring point has reached 195 °C before 7 min, reduce the heat and keep at 195 °C until 7 min have elapsed. Otherwise, when the temperature at the measuring point reaches 195 °C, gently loosen approx. 0,5 cm of the pancake around its periphery from the surface of the utensil. Remove the utensil from the heat source and place upside down on a wooden surface. Within 20 s of removing the utensil from the heat source, position the test weight **(B.1.4)** at a distance of 100 mm ± 10 mm above the centre of the pan base and let it drop freely. Check and note the percentage of the surface area of the pancake still adhering to the surface.

Annex C
(normative)

Corrosion resistance of non-stick surfaces

C.1 General

C.1.1 Hot plate of diameter as specified in Table E.1 for the base diameter of the pan being tested.

C.1.2 Commercially available automatic dishwasher.

C.2 Procedure

C.2.1 Fill the pan under test to 1/3 of its capacity with a corrosion mixture containing the following ingredients by mass:

— 46 % tinned peeled whole plum tomatoes with liquid, pH (4,0 ± 0,5);

— 40 % mashed tomatoes (passata), pH (4,0 ± 0,5);

— 7 % brown rice;

— 7 % salt.

If the pH is out of range, correct it by the addition of acetic acid or sodium carbonate, as appropriate.

C.2.2 Cover, bring the mixture to the boil and boil for 20 min.

C.2.3 Remove the pan from the hot plate and allow to cool down to (23 ± 5) °C.

NOTE For automation purposes it is permissible to leave the pan on the heat source for the total duration of the test.

C.2.4 Carry out the procedure described in **C.2.2** and **C.2.3** three times a day for five consecutive days. It is permissible to add water when necessary to keep the mixture sufficiently liquid.

C.2.5 After 168 hours (7 x 24) from the beginning of the test, remove the corrosion mixture and wash the pan in a domestic dishwasher at 65 °C using detergent and rinsing agent as specified in ENV 12875-1.

NOTE The test lasts seven days. During the periods between boiling and during the waiting time after completion of the boiling, the mixture should remain in the pan at ambient temperature (23 ± 5) °C.

Annex D
(normative)

Heat distribution

D.1 Apparatus

D.1.1 Aluminium block, as shown in Figure D.1, made of at least 96 % aluminium, with a hard anodised surface, black 682, coating thickness of 25 µm.

D.1.2 Solid plate hob, rating 2000W, capable of maintaining the temperature at the top of the aluminium block at (350 ± 5) °C.

D.1.3 Temperature control equipment capable of controlling the heat source to comply with the requirements of **D.1.2.**

NOTE Recommended equipment: DPID-control e.g. Phillips KS40 type 407, jacketed thermocouple type K (Ni Cr Ni), jacket diameter 1,5 mm, e.g. Degussa FT 2[1)] , ensuring that the thermocouple is inserted to the deepest point of the hole and is in good metallic contact with the aluminium. Contact paste may be used to improve contact.

D.1.4 Equipment of the fast response type, capable of measuring surface temperature.

NOTE Typical specification; pyrometer measurement spot diameter 11 mm at 20 cm distance, diameter 20 mm at 60 cm distance, e.g. Scotchtrak type IR 1600 L[1)].

If a thermocouple device is used, clean its measuring surface after each cycle.

If a pyrometer is used, adjust the emission factor setting to 0,84.

D.2 Materials

D.2.1 Commercially available icing sugar, beet sugar, grain size 100 % < 0,2 mm, powder grade RP.

D.2.2 Isopropanol, technical grade 98 %.

D.3 Procedure

D.3.1 Precondition the cookware by subjecting it to the base stability test described in Annex M of EN 12983-1:2000.

D.3.2 Place the aluminium block on the heat source and switch on the power source.

D.3.3 Heat the aluminium block to (350 ± 5) °C and maintain this temperature for 15 min.

D.3.4 Wash the test piece in hot water containing domestic washing up liquid, rinse and dry well.

D.3.5 Prepare a mixture 1:1 mass / mass icing sugar in isopropanol.

D.3.6 Cover the inner base of the cookware evenly with between 3 g/dm^2 and 5 g/dm^2 of the icing sugar/isopropanol solution. Let the mixture dry at ambient temperature.

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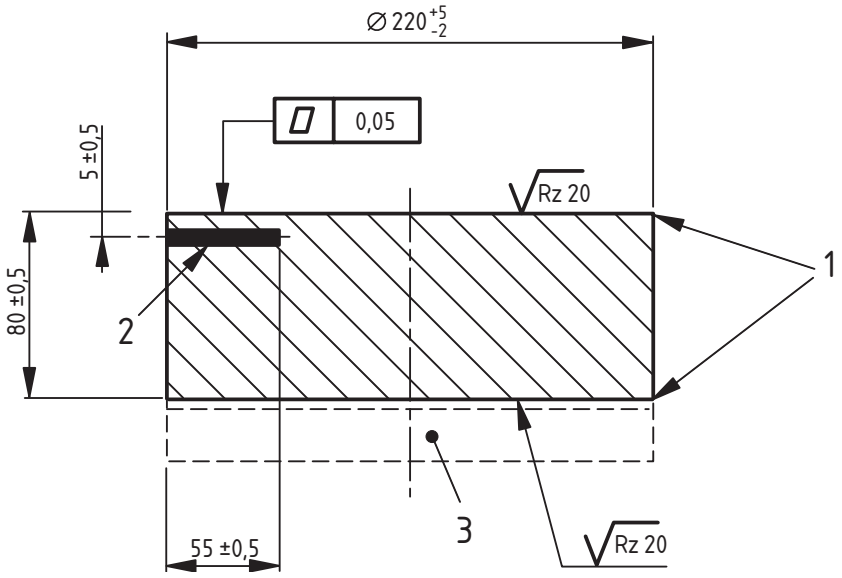
1) These are examples of suitable products available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by CEN of these products.

Dimensions in millimetres



Key

1 Edge 0,5/45° broken

2 Hole for thermocouple

3 Heat source

Figure D.1 — Aluminium block

D.3.7 Mark the appropriate test diameter (see definition 3.11 of EN 12983–1:2000) on the sugar coating by means of a compass or a suitable template (e.g. adaptable mould) to a maximum diameter of 220 mm. For non-circular bases, use the largest diameter circle that can fit within the base, up to a maximum diameter of 220 mm.

D.3.8 Centre the test piece on the block.

D.3.9 Record the location of the first hot spot indicated by the icing sugar becoming transparent.

D.3.10 Position the surface temperature probe **(D.1.4)** on this spot to a maximum diameter of 15 mm. If a pyrometer is used, ensure that the emission factor is set to 0,84.

D.3.11 Record the surface temperature at the first hot spot at the moment the last of the icing sugar covering within the test diameter melts.

Annex E
(informative)

Conditions for deciding suitability for use with solid plate and ceramic hobs with radiant or halogen heating

E.1 Apparatus

E.1.1 Solid plate diameter 14,5 cm 1 000 W.

E.1.2 Solid plate diameter 18,0 cm 1 500 W.

E.1.3 Solid plate diameter 22,0 cm 2 000 W.

NOTE Solid plates should not have any form of thermal limitation. More detailed specifications will be developed during the lifetime of this document to improve reproducibility.

E.1.4 Glass ceramic hob with radiant or halogen heaters, diameter 21/12,0 cm 2 100/700 W (12 cm is the inner ring of a two-ring hob).

E.1.5 Glass ceramic hob with radiant or halogen heaters, diameter 14,5 cm 1 200 W.

E.1.6 Glass ceramic hob with radiant or halogen heaters, diameter 18,0 cm 1 700 W.

E.1.7 Glass ceramic hob with radiant or halogen heaters, diameter 21,0 cm 2 100 W.

NOTE The following parameters are recommended for glass ceramic heat sources:
High transmission type T(λ=1500 nm)>70%, thickness (4 $\pm$ 2) mm.
Temperature limiter set to (540 ± 10) °C.

E.1.8 Thermocouple, accurate to within ± 1 °C, and having a maximum response time of 2 s.

E.1.9 Stop watch.

E.1.10 Power meter, class 1.

E.1.11 Energy meter, class 1.

E.1.12 Voltage regulator, to obtain the nominal power output.

E.2 Test conditions

Carry out the test under the following conditions:

— room temperature (23 $\pm$ 5) °C;

— water temperature (15 $\pm$ 0,5) °C;

— thermocouple positioned in the centre of the utensil at half the liquid depth;

— nominal voltage stabilised to maintain rated power to within ± 1,5 % of hot plate rating in accordance with **E.1**;

— at the beginning of each test procedure the hob shall be at ambient temperature;

— the test hob shall comply with the requirements of **E.4**.

E.3 Procedure

E.3.1 Precondition the cookware by subjecting it to the base stability test described in annex M of EN 12983-1:2000.

E.3.2 Load the test piece with the quantity of water given in Table E.1 and place it on the size of hotplate given in Table E.1, or, if the geometry of the cookware under test is non-cylindrical, place it on the hotplate with the largest diameter being fully covered by the base of the item.

E.3.3 Switch on hot plate and set it to its rated power input by means of the voltage regulator.

E.3.4 Measure and note the time, to the nearest second, required to raise the initial temperature of the water by 75 K.

E.3.5 Calculate the suitability coefficient of the item under test using the following formula:

$$\sigma = \frac{m \times C\ \Delta T}{P_i \times t_h}$$

where

m is the mass of water according to Table E.1, expressed in grams;

C is the heat capacity of water, 4,187 J/g K;

ΔT is the temperature difference in K according to E.3.4;

P_i is the power rating of the hot plate in watts according to Table E.1;

t_h is the heating up time, expressed in seconds.

Table E.1 — Requirements necessary to satisfy the conditions for claiming suitability for use with solid plate and glass ceramic with radiant and halogen heaters

Claimed diameter (cm)	Heat source	Rating (W)	Mass of water[a] (kg)	Minimum suitability coefficient
16	solid plate 14,5 cm	1 000	1,00	0,45
18	solid plate 14,5 cm	1 000	1,50	0,45
20	solid plate 18 cm	1 500	2,00	0,45
22	solid plate 18 cm	1 500	2,5	0,45
24	solid plate 22 cm	2 000	3,00	0,45
28	solid plate 22 cm	2 000	4,00	0,45
14	ceramic hob 12 cm	700	0,70	0,50
16	ceramic hob 14.5 cm	1 200	1,50	0,50
18	ceramic hob 14.5 cm	1 200	1,00	0,50
20	ceramic hob 18 cm	1 700	2,00	0,50
22	ceramic hob 18 cm	1 700	2,50	0,50
24	ceramic hob 21 cm	2 100	3,00	0,50
28	ceramic hob 21 cm	2 100	4,00	0,50

E.4 Hob efficiency

E.4.1 General

Test hobs shall be regularly checked using the appropriate test block specified in Table E.2, Figure E.1 and Table E.3. Their efficiency shall comply with the requirements given in Table E.2 and the limiter shall not be activated during the procedure described in **E.4.2.**

The test block shall be made of at least 96 % aluminium and shall have a specific heat capacity of 0,266 J/gK at 20 °C.

NOTE It is recommended that the specific gravity be 2,7 kg/dm³ and the Brinell hardness be between 90 kg/mm³ and 120 kg/mm³.

The surface shall be turned all over with a depth of cut of 0,02 mm. The bottom of the block shall not be convex, although a concave tolerance of 0,05 mm max, is allowed.

The thermocouple shall be inserted at the deepest point of the hole, taking care to obtain good metallic contact between the thermocouple and the aluminium.

E.4.2 Apparatus

The Table E.2 gives the requirements for checking hot plates.

Table E.2 — Requirements for checking hot plates

Type of hot plate	Diameter of hotplate (cm)	Rated power (W)	Test block diameter according to Figure E.1 (mm)	Minimum efficiency %
solid plate	14,5	1 000	160	50
solid plate	18	1 500	190	50
solid plate	22	2 000	230	50
ceramic hob	12	900	120	60
Glass ceramic hob	14,5	1 200	160	60
Glass ceramic hob	18	1 700	190	60
Glass ceramic hob	21	2 100	230	60

E.4.3 Procedure

E.4.3.1 Place the appropriate test block on the hob to be checked.

E.4.3.2 Raise the temperature of the block by 80 K. Note the energy consumption. If the limiter has been activated the hob is not suitable for use in this test.

E.4.3.3 Calculate the efficiency using the following formula:

$$\eta = \frac{m \text{ x } C \text{ x } \Delta T \text{ x } 0{,}2778 \text{ x } 100}{L \text{ x } 1000} \quad \%$$

where:

m is the mass of the aluminium block, expressed in grams;

C is the specific heat capacity of the aluminium alloy, expressed in J/g K;

ΔT is the temperature rise;

L is the energy consumption during the heating up time expressed in Wh.

NOTE Specific heat capacity of AlMgSil is 1,12 J/gK. If a different alloy is used its specific heat capacity should be checked.

Dimensions in millimetres

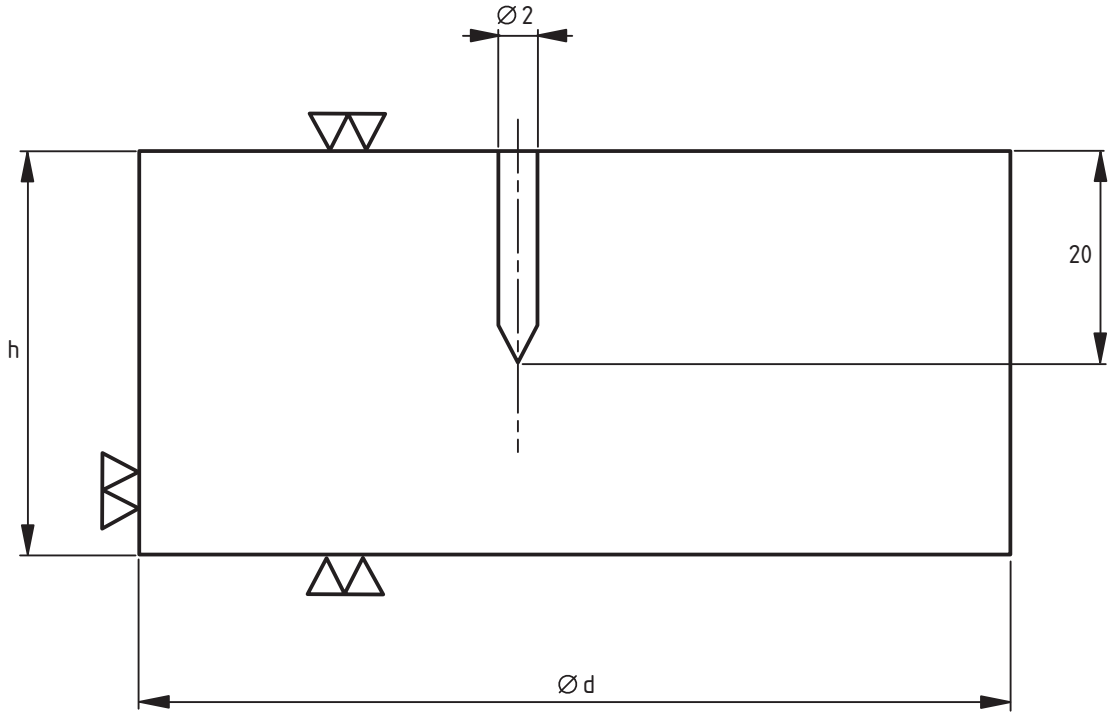


Figure E.1 — Test block

Table E.3 — Aluminium block

d (mm[a])	h (mm)	Mass (kg[b])
120	74	2,26
160	71	3,85
190	74	5,66
230	77	8,65

[a] Tolerance ± 0,5 mm.

[b] Without thermocouple, tolerance ± 0,05 kg.

Annex F
(normative)

Test for the thermal shock resistance of glass lids

F.1 Apparatus

F.1.1 Air circulating oven capable of maintaining the set temperature to within ± 2 °C.

F.1.2 Water bath containing at least ten times the mass of the test pieces and covering them to a minimum depth of 10 cm, maintained at a temperature of (20 ± 5) °C.

F.2 Procedure

F.2.1 Heat the oven to (120 ± 5) °C.

F.2.2 Place the test piece in the oven and allow the oven to return to (120 ± 5) °C.

F.2.3 Leave the test piece in the oven for 30 min.

F.2.4 Remove the test piece from the oven and immediately plunge it into the water bath.

F.2.5 Note any damage to the test piece.

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