BRITISH STANDARD

BS EN ISO 24998:2008

Plastics laboratory ware — Single-use Petri dishes for microbiological procedures (ISO 24998:2008)

ICS 71.040.20

BSI British Standards

National foreword

This British Standard is the UK implementation of EN ISO 24998:2008. It supersedes BS 611-2:1990 which is withdrawn.

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

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Foreword

This document (EN ISO 24998:2008) has been prepared by Technical Committee ISO/TC 48 "Laboratory glassware and related apparatus" in collaboration with Technical Committee CEN/TC 332 "Laboratory equipment", the secretariat of which is held by DIN.

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INTERNATIONAL STANDARD **ISO 24998:2008(E)**

Plastics laboratory ware — Single-use Petri dishes for microbiological procedures

1 Scope

This International Standard specifies requirements and test methods for plain, single-use Petri dishes for microbiological use.

This International Standard does not apply to products of similar design which may be used for cell or tissue culture purposes. Neither does it apply to dishes supplied ready loaded with microbiological media.

NOTE Petri dishes are used for microbiological routine purposes in very large numbers and consequently, are often handled by robotic equipment. Users of such equipment should satisfy themselves that the Petri dishes of any given manufacturer are suitable for use with such equipment and, if obtained from several sources, are compatible if mixed.

2 Terms and definitions

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

2.1
Petri dish
combination of a dish with an accompanying loose-fitting lid, intended to preserve the microbiological integrity of its unused or in-use enclosed, interior space

2.2
dish
shallow, cylindrical or square, open-topped container comprising a plane base with an integral outer wall

NOTE The dish can be subdivided with internal dividers to form separate compartments.

2.3
lid
cover of similar shape to, and larger size than the dish, over which it is placed, inverted, to enclose a working volume

NOTE The underside of the lid can incorporate one or more small protuberances (venting protrusions) to facilitate free circulation of environmental gases. Lids without such protrusions are designed to impede such free circulation.

3 Principle of use

Under environmentally controlled conditions, selected to avoid introduction of unwanted micro-organisms, the lid of the Petri dish is lifted and a quantity of microbiologically nutrient medium introduced (poured) into the dish. The dish is recovered and allowed to equilibrate with a predetermined environment.

Under similarly suitable conditions, the lid is lifted again and a sample under investigation is then introduced onto the medium in the dish. Following closure and a period of storage under predetermined conditions, growth of any microorganisms originating from the sample may have occurred, enabling further study.

NOTE Attention is drawn to potential national or regional regulations in respect of safe and environmentally compatible disposal of used Petri dishes.

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4 Types

Four types of dish are specified in this International Standard.

Type A: circular dishes, without internal dividers, with or without venting protrusions in the lid

Type B: circular dishes, with internal dividers, with or without venting protrusions in the lid

Type C: square dishes, without internal dividers, with or without venting protrusions in the lid

Type D: square dishes, with internal dividers, with or without venting protrusions in the lid

NOTE There can be variants of Type A to Type D in respect of design and construction as given in Clause 6. In that case, detailed specifications are given by the manufacturer.

5 Material

The Petri dish shall be made from microbiologically inert transparent plastic and may be self-coloured for batch identification purposes, or colourless.

The finished dish shall be free from colour variation or discolouration and physical defects such as striations which may impair its use in microbiology.

6 Design and construction

6.1 General

When subjected to visual examination, the Petri dish shall have no sharp edges, projection or surface roughness capable of cutting, puncturing or abrading the skin or gloves of the user, or damaging the packaging.

The Petri dish shall be free of holes which would permit leakage or compromising of microbiological integrity.

The base of the dish and the closed face of the lid shall be planar, within the limits given in Table 1.

6.2 Dimensions

The dimensions of the Petri dish shall conform to those given in Table 1 and, where applicable, to other detailed dimensions given in 6.3 to 6.5.

NOTE Manufacturing techniques are capable of yielding products conforming to very tight dimensional tolerances – frequently closer than $\pm$ 0,02 mm on products of this order of size. It is for that reason, and to allow manufacturers' freedom to innovate designs, that dimensional tolerances are not specified for the major dimensions in Table 1, but ranges are given from within which manufacturers may choose their basic dimensions. This also allows for innovative wall designs incorporating rims or multiple angles to facilitate automated handling.

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Table 1 — Dimensions of Petri dishes

Dimensions in millimetres

Type	Nominal size	Range for external dimension of dish		Range for external height of dish	Range for external height of lid	Range for lateral clearance between lid and dish (assembled) at point of contact	Flatness: maximum permitted departure of base of dish and face of lid from plane
		Diameter	Length of side				
A (circular)	60	54 to 65	—	13 to 17	7,5 to 10,5	1 to 3	1,0
A and B (circular)	90	85 to 91	—	13 to 17	7,5 to 10,5	1 to 3	1,0
	100	95 to 105	—	13 to 17	7,5 to 10,5	1 to 3	1,5
	140	138 to 144	—	13 to 21	7,5 to 10,5	2 to 4	1,5
C and D (square)	100	—	101 to 104	17 to 21	7,5 to 10,5	1 to 3	1,5
	120	—	121 to 129	13 to 21	7,5 to 10,5	2 to 4	1,5

The flatness (see Table 1) shall be measured as:

— the maximum distance between any part of the top face of the base and a horizontal plane touching that face;

— the maximum distance between any part of the top face of the lid and a horizontal plane touching that face.

6.3 Rim on lid

A slight rim may be provided on the outer, closed face of the lid, close to its circumference or, if square, its outer edge. This rim shall not exceed 1 mm in height.

NOTE Such a rim is to discourage dishes within stacks from sliding over one another laterally.

6.4 Compartments

If the dish has dividers to create internal compartments, the height of the dividers shall be between 50 % and 100 % of the height of the dish and shall not allow leakage between compartments. The number of compartments shall be stated in the labelling of primary packaging, see Clauses 10 and 11.

6.5 Venting

As referred to in 2.3, one or more venting protuberances (protrusions) may be moulded on the inside face of the lid, close to its wall. Such venting protrusions shall extend radially from the wall to exceed the maximum lateral clearance possible between the edge of the dish and the lid.

Single venting protrusion shall have a height within the range 0,12 mm to 0,35 mm.

Multiple venting protrusions shall be symmetrically disposed on the lid and shall have a height within the range 0,25 mm to 0,7 mm.

The provision of venting shall be designated by the letter “V” in the marking of primary packages. See Clauses 10 and 11.

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7 Performance

7.1 Rigidity

7.1.1 Lid

When tested by the method described in Annex A, the internal diameter (for Type A and B) or the internal width (for Type C and D) of the lid, measured in the direction of the applied force, shall not decrease by more than 1 mm.

7.1.2 Dish

When tested by the method described in Annex A, the internal diameter (for Type A and B) or the internal width (for Type C and D) of the dish, measured in the direction of the applied force, shall not decrease by more than 2 mm.

7.2 Resistance to thermal distortion

After being subjected to the test method described in Annex B, the dish shall retain the degree of flatness given in Table 1 and the dish shall not rock or spin on a flat surface.

7.3 Resistance to fracture

7.3.1 Lid

When tested by the method described in Annex C, the lid shall neither fracture nor permanently deform under a load of 9,81 N.

7.3.2 Dish

When tested by the method described in Annex C, the dish shall neither fracture nor permanently deform under a load of 7,36 N.

7.4 Stability in stacking

When tested by the method described in Annex D, it shall be possible to tilt a stack of 10 Petri dishes at an angle of 12° from the vertical without the stack collapsing.

8 Limitation of contamination

Petri dishes shall be free from contamination by loose particles greater than 100 µm in diameter, as assessed by visual inspection by an observer with usual, or corrected-to-usual, vision without magnification, under a uniform illumination of 300 lx to 750 lx.

9 Sterility and special microbiological states

If a manufacturer claims that an unopened and unused dish is sterile, or has a special microbiological state, the dish shall have been subjected to a validated process designed to achieve that claim. Validation of the sterilisation process is the responsibility of the manufacturer.

NOTE 1 For the validation and routine control of sterilisation procedures, see ISO 11137-1 and ISO 17665-1.

NOTE 2 For cleanrooms and associated controlled environments, see ISO 14644 (parts 1 to 8).

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10 Packaging

Petri dishes shall be supplied, assembled, in sealed bags, the permeability of which shall be such as to prevent microbiological contamination of the dishes under usual conditions of storage and handling. All Petri dishes shall be arranged with the same orientation with a maximum of 30 dishes in each bag. The bagged Petri dishes shall be assembled in quantities convenient for sale, storage and handling, in outer cartons (primary packaging) to protect the bags and minimize the risk of compromising the microbiological integrity of the Petri dishes.

If the bags are made of polyethylene film, the thickness should be not less than 70 µm.

11 Marking

As appropriate, the primary packaging (outer cartons, see Clause 10) shall bear the following particulars, which may, where applicable, take the form of a symbol in accordance with regional or national standards:

a) the name and address of the manufacturer;

b) a description of the product detailing shape, and nominal dimension, whether vented and number of compartments, if subdivided e.g. “Petri dishes, circular, 90 mm, un-vented”, or “Petri dishes, square, 100 mm, 4-compartment, vented”;

c) where appropriate, the word “STERILE”, or a statement indicating any special microbiological state or state of cleanliness;

d) the batch code, preceded by the word “LOT”;

e) if necessary, an indication of the date by which the Petri dish should be used, in safety, without degradation of performance, expressed as the year, the month and, where relevant, the day, in that order; in the format YYYY MM or YYYY MM DD;

f) where appropriate, a statement indicating the “*in vitro*” use of the dish;

g) any particular storage and/or handling conditions required.

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Annex A
(normative)

Type test for rigidity

A.1 Purpose of test

The purpose of this type test is to determine whether the component is fabricated so that it is sufficiently rigid to resist excessive deformation when handled.

A.2 Apparatus

A.2.1 **Test rig**, (see Figure A.1) to hold the component, comprising:

a) a baseboard with two blocks of wood 25 mm square and 15 mm high secured 25 mm apart;

b) a rigid wooden back stop 100 mm wide and 40 mm high secured 5 mm from the rear of the test rig;

c) a guide for the test finger consisting of a stout metal plate, with a 4 mm hole, adjustable in distance (from 15 mm to 25 mm) from the front block and adjustable in height (from 15 mm to 40 mm).

A.2.2 **Test finger**, capable of applying a point load of 4,90 N (500 g on the scale of the test finger).

A.2.3 **Internal calipers**, scale range 0 mm to 150 mm.

A.3 Test conditions

The component shall be maintained at a temperature of (20 ± 2) °C for 1 h before the test, which shall be carried out at a temperature within these limits.

When the test is performed in a country which has adopted a standard reference temperature of (27 ± 2) °C, this figure shall be substituted for (20 ± 2) °C.

A.4 Procedure

A.4.1 Place the baseboard on a level surface. Place the component to be tested, sides uppermost, on the raised blocks such that it is touching the back stop of the apparatus and that the hole for the test finger, the centre of the component and the point of contact with the back stop form a straight line (i.e. the direction of the applied force) which bisects the dish.

A.4.2 Adjust the guide so that it is 10 mm from the component, and so that the test finger, when inserted through the hole, will touch the external wall of the component at a height equal to one-half of the total height of the wall.

A.4.3 Using the calipers, measure the inside diameter or inner width of the component, as appropriate, in the direction of the force to be applied.

A.4.4 Insert the test finger through the guide and apply a steady load of 4,90 N (500 g as shown by the indicator on the device), horizontally and along the straight line referred to in A.4.1.

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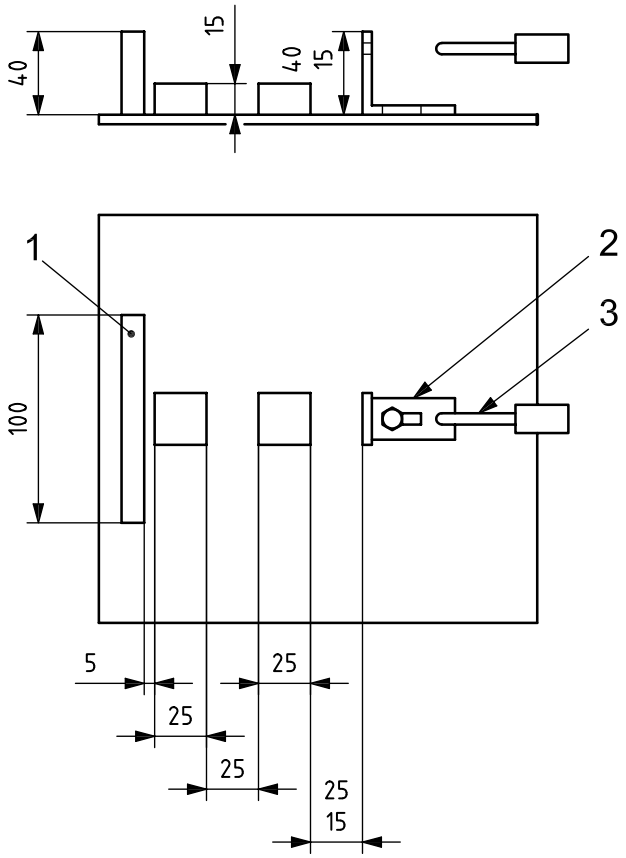
A.4.5 Re-measure the inside diameter or width of the component, as in A.4.3, after 10 s while maintaining the applied load.

A.4.6 Remove the test finger.

Nominal dimensions in millimetres



Key

1 back stop
2 guide
3 test finger

Figure A.1 — Test assembly

A.5 Interpretation of results

Subtract the value of the inside diameter or width, measured as described in A.4.5 from the corresponding original value (measured as described in A.4.3). Compare the difference with that specified in 7.1.1 or 7.1.2, as appropriate.

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Annex B
(normative)

Type test for resistance to thermal distortion

B.1 Reagent

B.1.1 **Medium**, aqueous solution containing (1,5 ± 0,2) % agar.

B.2 Procedure

Place the dish on a flat glass surface at ambient temperature. Heat the medium until melted, and when it has cooled to a temperature of (60 ± 2) °C, pour (20 ± 0,5) ml of the medium into the Petri dish, cover with the lid, and allow to set.

B.3 Interpretation of results

Examine the dish for compliance with 7.2.

Annex C
(normative)

Type test for resistance to fracture

C.1 Purpose of test

The purpose of this type test is to determine whether the component is fabricated so that it is sufficiently robust to withstand usual laboratory handling.

C.2 Apparatus

C.2.1 **Test finger**, capable of applying a load of up to 19,61 N (2 000 g on the scale) (see A.2.2).

C.2.2 **Stopwatch**, reading to at least 0,1 s.

C.3 Test conditions

The test conditions shall be as specified in A.3.

C.4 Procedure

C.4.1 Place the component, with the plane surface supported by its side walls, on a hard level surface. Apply the tip of the test finger to the centre of the plane surface of the component. Align the test finger apparatus in a vertical position.

C.4.2 Maintaining the test finger apparatus in the vertical position, apply a steadily increasing load. The rate of increase shall be such that a time of 10 s to 15 s is required to increase the load from 0 N to 19,61 N (0 g to 2 000 g as shown by the indicator on the device).

C.4.3 Whilst applying the load, observe the component for the development of any crack, fracture or other permanent deformity. Record the load reading on the test finger at which any such deformity occurs.

C.5 Interpretation of results

Check the result for compliance with 7.3.1 or 7.3.2, as appropriate.

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Annex D
(normative)

Type test for stability in stacking

D.1 Reagent

D.1.1 **Medium**, aqueous solution containing (1,5 ± 0,2) % agar.

D.2 Apparatus

D.2.1 **Suitable protractor**, or scale for measuring the angle of inclination from the vertical.

D.3 Procedure

D.3.1 Pour (20 ± 0,5) ml of the medium into each of 10 Petri dishes, cover each with a lid and allow to set.

NOTE Dishes that have been subjected to the test for thermal distortion, and that have complied with 7.2 can be used.

D.3.2 Form a stack of 10 filled Petri dishes with the medium uppermost on a horizontal, rigid, plane surface on which the lowest dish is held firmly.

D.3.3 Incline the plane surface at a steady rate so that the stack is tilted, and record the angle of inclination of the stack from the vertical at which the stack collapses.

D.4 Interpretation of results

Check the result for compliance with 7.4.

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