BRITISH STANDARD

Sanitary appliances — Shower trays made from impact modified coextruded ABS/acrylic sheets — Requirements and test methods

ICS 91.140.70

BSi

British Standards

National foreword

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

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Sanitary appliances - Shower trays made from impact modified coextruded ABS/acrylic sheets - Requirements and test methods

Appareils sanitaires - Receveurs de douche en feuilles d'ABS/acrylique coextrudées modifiées choc - Exigences et méthodes d'essai

Sanitärausstattungsgegenstände - Duschwannen, hergestellt aus schlagzäh-modifizierten coextrudierten ABS/Acrylplatten - Anforderungen und Prüfverfahren

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Foreword

This document (EN 15720:2009) has been prepared by Technical Committee CEN/TC 163 "Sanitary appliances", the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2010, and conflicting national standards shall be withdrawn at the latest by June 2010.

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

Attention is drawn to EN 14527 [1], which has been prepared under the Mandate M/110 "Sanitary Appliances" which was given to CEN by the European Commission and the European Free Trade Association and supports the Essential Requirements to allow CE marking under Construction Products Directive (89/106/EEC).

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1 Scope

This European Standard specifies the requirements for shower trays for domestic purposes made from crosslinked cast acrylic sheets conforming to EN 13559 with the aim of ensuring that the product, when installed in accordance with the manufacturer's instructions, will provide satisfactory performance in use.

This European Standard is applicable to all sizes and shapes of shower trays.

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 13559, *Specifications for impact modified coextruded ABS/Acrylic sheets for baths and shower trays for domestic purposes*

3 Terms and definitions

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

3.1
domestic purposes
use in homes, hotels, accommodation for students, hospitals and similar buildings, except when special medical provisions are required

4 Requirements

4.1 General

The manufacturer shall provide instructions for installation and care with each shower tray.

The shower tray shall be free from sharp edges that would be exposed after the installation of the shower tray in accordance with the manufacturer's instructions.

4.2 Material

The shower tray shall be manufactured from impact modified coextruded ABS/acrylic sheets complying with EN 13559.

4.3 Surface appearance

When the shower tray is visually inspected under strong and oblique illumination there shall be no evidence of cracks, chips, or other surface defects, such as unexpected changes in colours, etc. that will impair the appearance or performance of the shower tray.

4.4 Waste outlet hole

The shower tray shall have at least one outlet hole. The dimensions of the waste outlet hole and the clearance around the waste outlet hole shall either be in accordance with the requirements of EN 251 or the manufacturer shall supply or recommend a suitable waste outlet fitting.

4.5   Overflow hole

When the shower tray is provided with an overflow hole the dimensions of the overflow hole and the clearance around the overflow hole shall either be in accordance with the requirements of EN 251 or the manufacturer shall supply or recommend a suitable overflow fitting.

4.6   Hole edges

The edges of any holes in the shower tray shall not show evidence of chips, cracks, or any other defects that may impair the appearance or performance of the shower tray.

4.7   Dimensional deviations

The dimensions of shower trays shall not deviate from the size quoted by the manufacturer by greater than ± 5 mm.

If the manufacturer states two sizes (e.g. both a work size and a nominal size) he shall state to which size the permitted deviations apply.

For round shower trays, length and width correspond to the diameter.

4.8   Geometric deviations

4.8.1   General

The straight sides or edges of the shower tray that might abut independent surroundings or supporting structures shall comply with the requirements of 4.8.2 to 4.8.4 and all shower trays shall comply with 4.8.5. These requirements are not applicable to sides or edges that are purposely designed as curves or slopes.

4.8.2   Squaring

When tested in accordance with A.2.2 the deviation from square, Δq, shall be less than or equal to 5 mm.

4.8.3   Straightness of the rim sides

When tested in accordance with A.2.3 the deviation from straightness of the rim sides, Δs, shall be less than or equal to 5 mm.

4.8.4   Straightness of the bottom edge of the rim

When tested in accordance with A.2.4 the deviation from straightness of the bottom edge of the rim, Δr, shall be less than or equal to 5 mm.

4.8.5   Flatness of the top surface of rim

When tested in accordance with A.2.5 the deviation from flatness of the top surface of the rim, c, shall be less than or equal to 5 mm.

4.9   Bottom of the shower tray

When the shower tray is installed in accordance with the manufacturer's instructions and the waste outlet hole is open, all water shall empty from the shower tray unless prevented by surface tension.

4.10 Resistance to temperature changes

When tested in accordance with A.3 the shower tray shall show no evidence of distortion or other defects which will impair the appearance or functioning of the shower tray and any deflection shall be less than or equal to 4 mm.

4.11 Resistance to impact

When tested in accordance with A.4 the bottom and the rim of the shower tray shall show no evidence of distortion or other defects that impair the appearance or functioning of the shower tray.

4.12 Permitted deflections

When tested in accordance with A.5 the deflections shall be less than or equal to the values given in Table 1.

Table 1 — Permitted deflections

Test method	Deflection under load [a] mm	Residual deflection [a] mm
A.5.4	2	0,3
A.5.5	4	0,3
[a] Values in addition to any deflection of the test rig (see A.5.2).		

4.13 Shower tray rim

When a shower tray is installed in accordance with the manufacturer's instructions, the rim shall not encourage water to drain away from the inside of the shower tray. Roll top rims and rims incorporating special features are not subject to this requirement.

5 Marking

Every shower tray shall be legibly marked on the underside with the following information:

a)   reference to this European Standard (EN 15720);

b)   name or trademark of the manufacturer or supplier.

Annex A
(normative)

Shower tray test methods

A.1 Sequence of tests

The tests shall be carried out on one shower tray of each type in sequence A.2, A.3, A.5, A.4.

A.2 Geometric deviations

A.2.1 Test apparatus

a)   length measuring device with an accuracy of 0,5 mm;

b)   reference plane surface with flatness tolerance of 0,5 mm;

c)   fixed square, fixed to the reference plane surface, at least 25 mm deeper than the depth of the rim side to be measured, one arm at least 300 mm longer than the length to be measured and the other arm at least as long as the width to be measured;

d)   movable square, at least 25 mm deeper than the depth of the rim side to be measured, one side at least 300 mm long and the other side at least as long as the width to be measured;

e)   thickness comparator or gauge with an accuracy of $\pm\,0{,}1$ mm;

f)   spacing rollers made of metallic material, at least 25 mm deeper than the depth of the rim side to be measured and with a diameter D_{sr} with a tolerance of $\pm\,0{,}25$ mm;

g)   thickness wedge with a thickness of $5^{\,0}_{-0{,}1}$ mm.

A.2.2 Squaring

Place the shower tray upside down on the reference plane surface as shown in Figure A.4.

Position sides AB and AD adjacent to the fixed square and place three spacing rollers with diameter D_{sr} each at a distance of r + 15 mm from the corners A and B, as shown in Figure A.1, where r is the radius of the corners. Measure the distance x between the corner D and the fixed square and calculate Δq as the difference $D_{sr} - x$.

Position the movable square along the side BC and place a fourth spacing roller at a distance of r + 15 mm from the corner B. Measure the distance y between the corner C and the moveable square and calculate Δq as the difference $D_{sr} - y$.

Turn the shower tray through 180° and check the distances x and y at corners A and B respectively.

Record the deviation.

Dimensions in millimetres
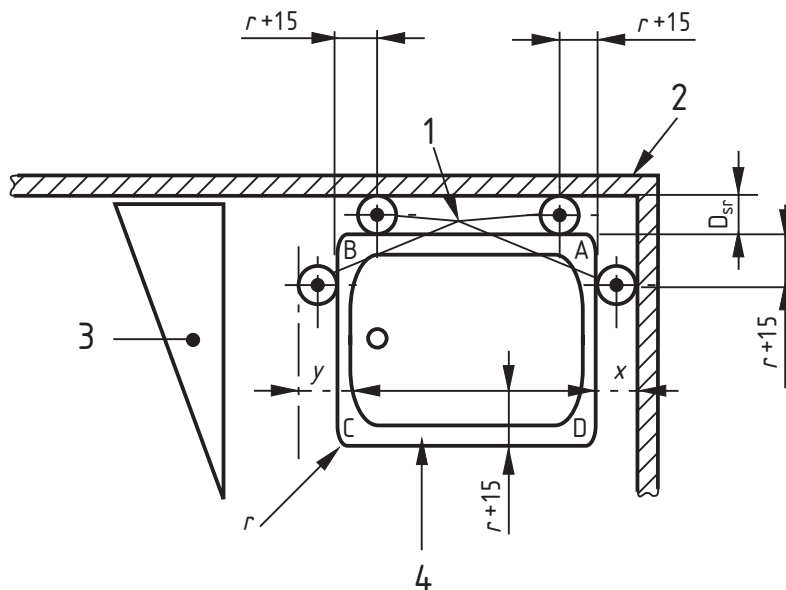
Key

1 spacing rollers
2 fixed square
3 movable square
4 shower tray
r radius of the corner
D_{sr} diameter of spacing roller
x distance between the rim and the fixed square
y distance between the rim and the moveable square

Figure A.1 — Squaring

A.2.3 Straightness of the rim side

Place the shower tray upside down on the reference plane surface as shown in Figure A.4.

Position two spacing rollers with diameter D_{sr} between the rim side of the shower tray and one side of the fixed square, each at a distance of $r + 15$ mm from the corners, as shown in Figure A.2, where r is the radius of the corners of the shower tray.

Measure the maximum and minimum distances a_{max} and a_{min} between the rim side and the fixed square using the thickness comparator or gauge.
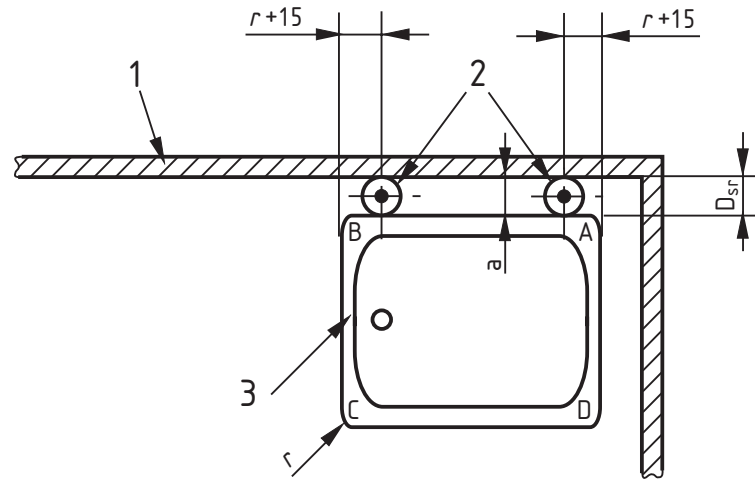
Calculate the deviation Δs as the difference $a_{max} - a_{min}$.

Record the deviation.

Repeat the procedure for each rim of the shower tray.

Dimensions in millimetres

Key

1   fixed square

2   spacing rollers

3   shower tray

a   distance between rim side and fixed square

r   radius of the corner

D_{sr} diameter of spacing roller

Figure A.2 — Straightness of the rim side

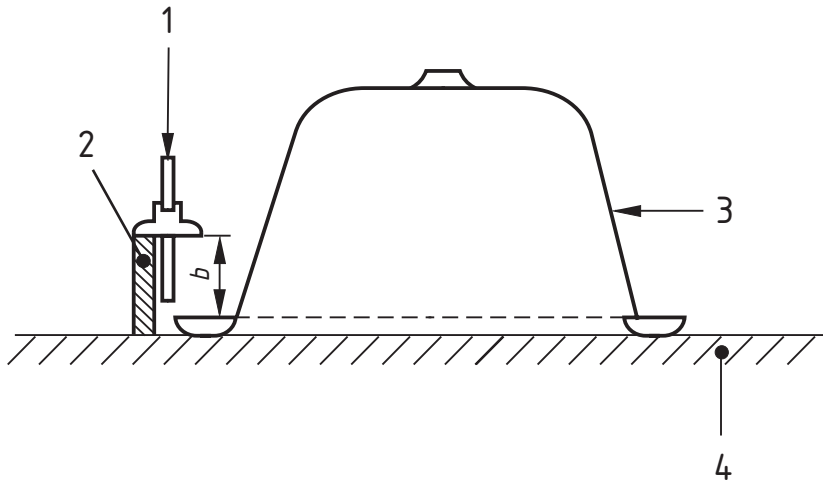## A.2.4 Straightness of the bottom edge of the rim

Place the shower tray upside down on the reference plane surface as shown in Figure A.4.

Position the shower tray against the fixed square as shown in Figure A.3.

Measure the maximum and minimum distances b_{max} and b_{min} between the bottom edge of the rims and the top surface of the fixed square using the thickness comparator or gauge.

Calculate the deviation Δr as the difference $b_{max} - b_{min}$.

Record the total deviation.

Key

1 thickness comparator or gauge
2 fixed square
3 shower tray
4 reference plane
b distance between the bottom edge of the rim and top surface of the fixed square
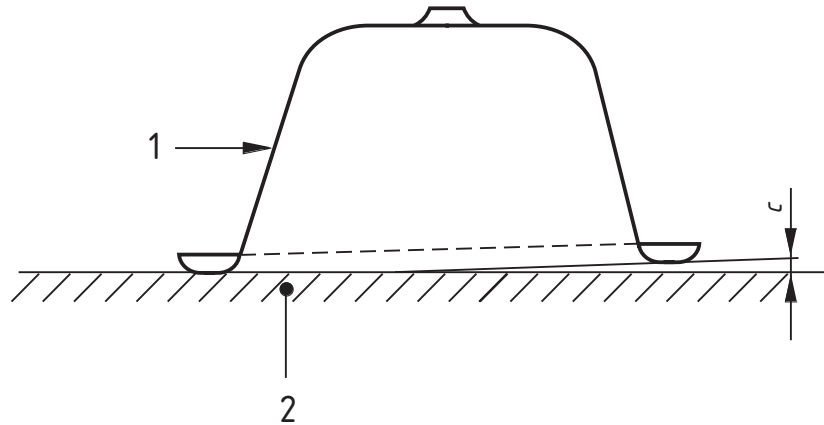
Figure A.3 — Straightness of the bottom edge of the rim

A.2.5 Flatness of the top surface of the rim

Place the shower tray upside down on the reference plane surface as shown in Figure A.4.

Check, using the thickness wedge, the deviation *c* by inserting the thickness wedge between the reference plane and the top surface of the rim.

Record the deviation.

Key

1   shower tray
2   reference plane
c   deviation

Figure A.4 — Flatness of the top surface of the rim

A.3 Resistance to temperature change

A.3.1 Test apparatus

a)   water supply capable of discharging cold and hot water with temperatures, flow rates and volumes as defined in A.3.2;

b)   shower handset;

c)   thermometer with an accuracy of ± 1 °C at the measured values;

d)   flow meter for measuring a flow rate of water at $(0,15 \pm 0,015)$ l/s;

e)   dial gauge with an accuracy of 0,1 mm.

A.3.2 Procedure

The shower tray is submitted successively to tests A and B.

a)   Test A

Position the shower handset 1 m above the bottom of the shower tray in such a way that the water spray impinges on the edge and at least half of the shower tray bottom. With the waste outlet hole open discharge (50 ± 1) l of water at (90 ± 2) °C and a flow rate of $(0,15 \pm 0,015)$ l/s into the shower tray.

Immediately afterwards, with the shower handset in the same position, with the waste outlet hole open discharge (50 ± 1) l of water at (12 ± 3) °C at the same flow rate as before.

b)   Test B

Position the dial gauge on the underside of the shower tray 60 mm from the axis of the waste outlet hole on one or other side of the waste outlet hole on a line at 90° to the axis of the internal showering area of the shower tray (see Figure A.6).

By means of the shower handset positioned as in test A discharge (90 ± 1) l of water with a temperature of (75 ± 2) °C and a flow rate of (0,15 ± 0,015) l/s with the waste outlet hole open.

With the waste outlet hole open discharge immediately afterwards the same quantity of cold water with a temperature of (12 ± 3) °C and the same flow rate as before.

Repeat this procedure 100 times without interruption.

Check any deflection shown by the dial gauge until constant values are reached and at least over the first ten cycles. Record the maximum value.

After the last cycle apply to the surface of the shower tray, using a sponge or paint brush, a solution of eosine in water of concentration 100 g/l to which has been added 1 cm^3/l of liquid detergent. Leave for 5_0^{+1} min, then remove the solution from the surface of the shower tray by cleaning with a damp cloth.

Visually examine the shower tray and record any adverse changes in appearance or presence of traces of the eosine solution.

A.4 Resistance to impact

A.4.1 Test apparatus

a) tube with length (1 000 ± 10) mm and an inner diameter of (55 ± 5) mm;

b) ball made of stainless steel with a mass of (200 ± 5) g and a diameter of approximately 37 mm.

A.4.2 Procedure

Perform the test twice on the flat surface of the bottom of the shower tray at points as far apart as possible and, if the shower tray has a rim, twice on the rim.

Clamp the tube of 1 000 mm length vertically so that it is maintained at 1 mm above the flat surface of the bottom (or rim) of the shower tray.

Drop the ball through the tube onto the surface of the shower tray once at each test point.

Visually examine the surface of the bottom and the underside of the shower tray and the surface and the underside of any rim tested.

Record any distortion or other defects that impair the appearance or functioning of the shower tray.

A.5 Determination of deflections

A.5.1 General

These tests are intended to simulate the effect of loads on different parts of the shower tray whilst the shower tray is in use.

The tests are based on rectangular styled shower trays. Shower trays of other shapes shall be tested with the loads and dial gauges positioned at the nearest equivalent points.

A.5.2 Test apparatus

a)   test rig. An example of a suitable rig is shown in Figure A.5. The rig shall be designed to minimize inherent deflection. The rig and the shower tray to be tested shall be mounted on a firm, flat horizontal surface. If preferred, solid vertical walls may be used;

b)   either four reinforced cloth bags with approximate dimensions 500 mm $\times$ 200 mm, filled with lead shot, iron shot or sand, of mass $25\,^{+0,5}_{0}$ kg each or eight bags of the same dimensions of $12,5\,^{+0,25}_{0}$ kg each;

c)   five dial gauges, capable of reading to an accuracy of 0,1 mm.

Key
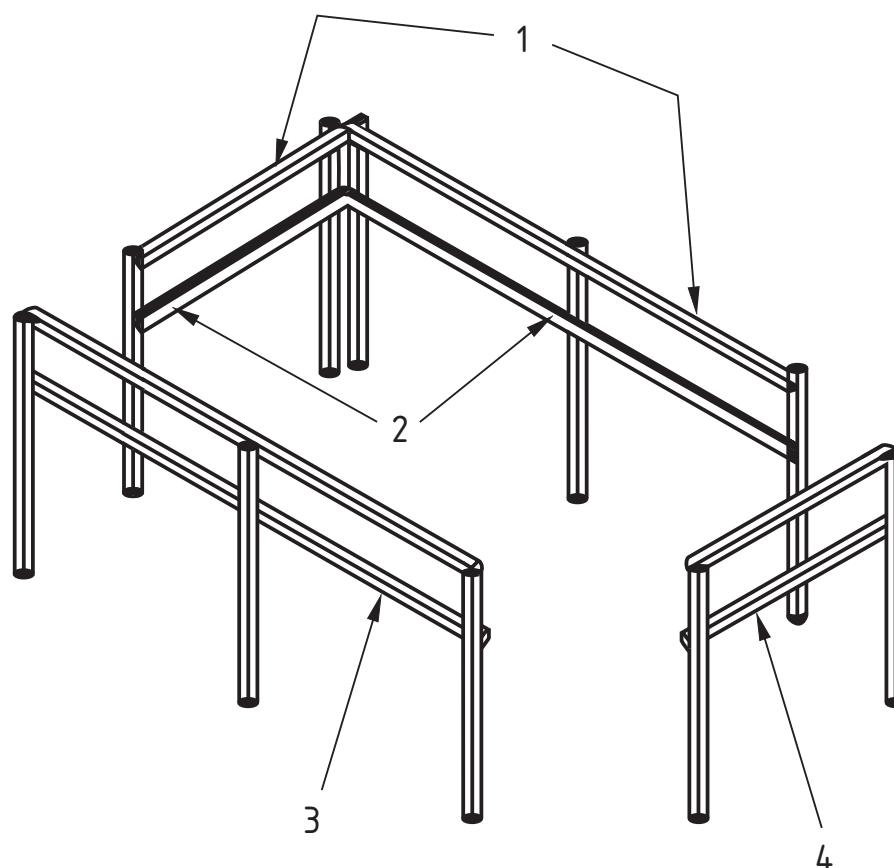
1   fixed rigid frame
2   groove in bar for fixing clips
3   mobile rigid frame
4   mobile rigid frame

Figure A.5 — Example of test rig for deflection tests

A.5.3 Preloading

Before carrying out the deflection tests, load the shower tray according to A.5.4 with bags as described in A.5.2. Leave for $30\,^{+1}_{0}$ min, remove the bags, wait $15\,^{+1}_{0}$ min, then carry out the tests specified in A.5.4 and A.5.5, allowing not less than 10 min between each test.

A.5.4 Deflection test 1 - Deflection of the rim and the bottom due to a load on the bottom

Install the shower tray in accordance with the manufacturer's instructions and set up five dial gauges at the necessary measuring points marked in Figure A.6. If the waste outlet hole is in the middle of the shower tray, the dial gauges shall be positioned on the underside of the shower tray.

Record the initial readings of the dial gauges.

Place the bags carefully on the bottom of the shower tray as shown in Figure A.6. If eight bags are used they shall occupy the same surface area as the four bags.

After $5_{\ 0}^{+0,5}$ min note the intermediate readings of the dial gauges.

Calculate the deflections of the rims and the bottom of the shower tray as the differences between the intermediate and initial readings of the dial gauges.

Remove the bags and after $10_{\ 0}^{+1}$ min note the final readings of the dial gauges. Calculate the residual deflections of the rims and the bottom of the shower tray as the differences between the final and initial readings of the dial gauges.

Record the deflections.

NOTE   The dial gauges on the bottom of shower tray can be on one or other side of the waste outlet hole on a line at 90° to the axis of the shower tray (see Figure A.6).

Dimensions in millimetres
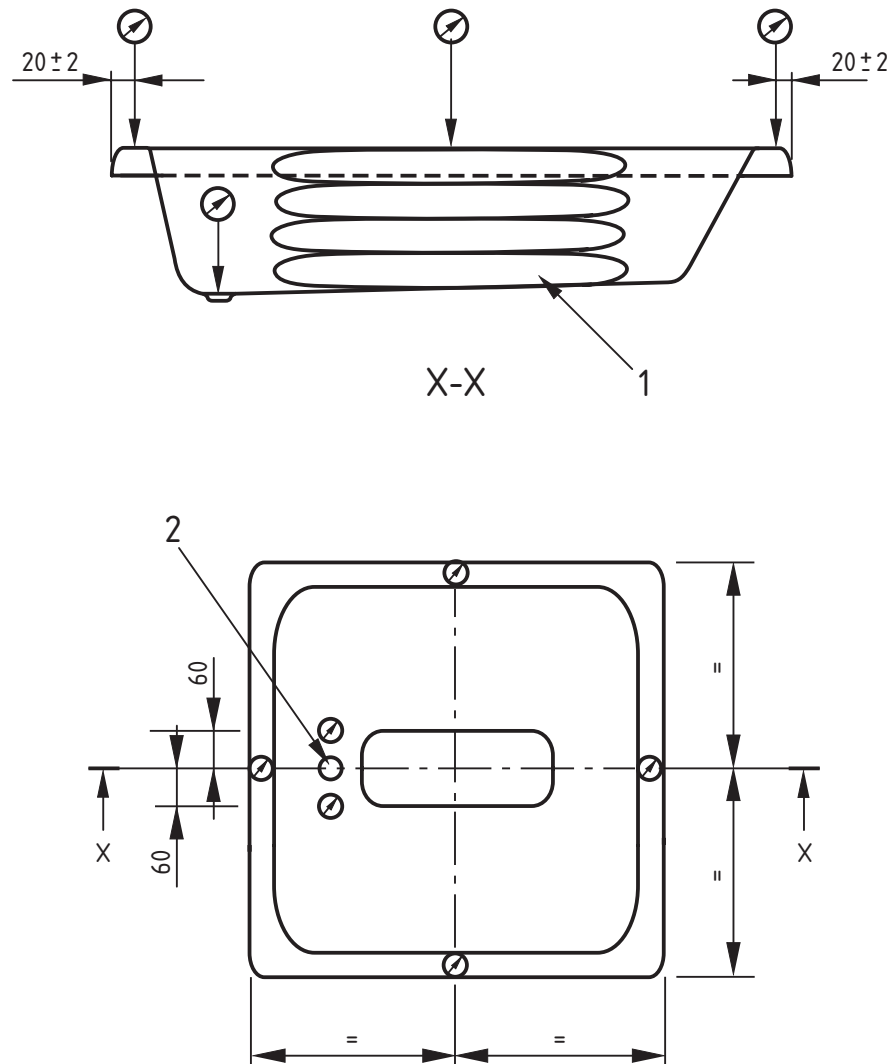
Key

1   bags

2   waste outlet hole

Figure A.6 — Deflection test 1

A.5.5 Deflection test 2 - Deflection of the rim due to a load on the rim on the side of entry

Set up the four dial gauges on the rim as shown in Figure A.7 or A.8 and note the initial readings.

If it is possible to set up the dial gauge on the underside of the rim to be loaded place the bags carefully in the configuration shown in Figure A.7, so that the major axis of each bags coincides with the longitudinal axis of the rim itself. If eight bags are used they shall occupy the same surface area as the four bags.

If it is not possible to set up the dial gauge on the underside of the rim to be loaded then place the dial gauge on the upper side of the rim to be loaded and place the bags carefully in the configuration shown in Figure A.8, so that the minor axis of each bag coincides with the longitudinal axis of the rim itself. If eight bags are used they shall occupy the same surface area as the four bags.

After $5_{0}^{+0,5}$ min note the intermediate readings of the dial gauges.

Calculate the deflections of the rims of the shower tray as the differences between the intermediate and initial readings of the dial gauges.

Remove the bags and after 10_{0}^{+1} min note the final readings of the dial gauges. Calculate the residual deflections of the rims of the shower tray as the differences between the final and initial readings of the dial gauges.
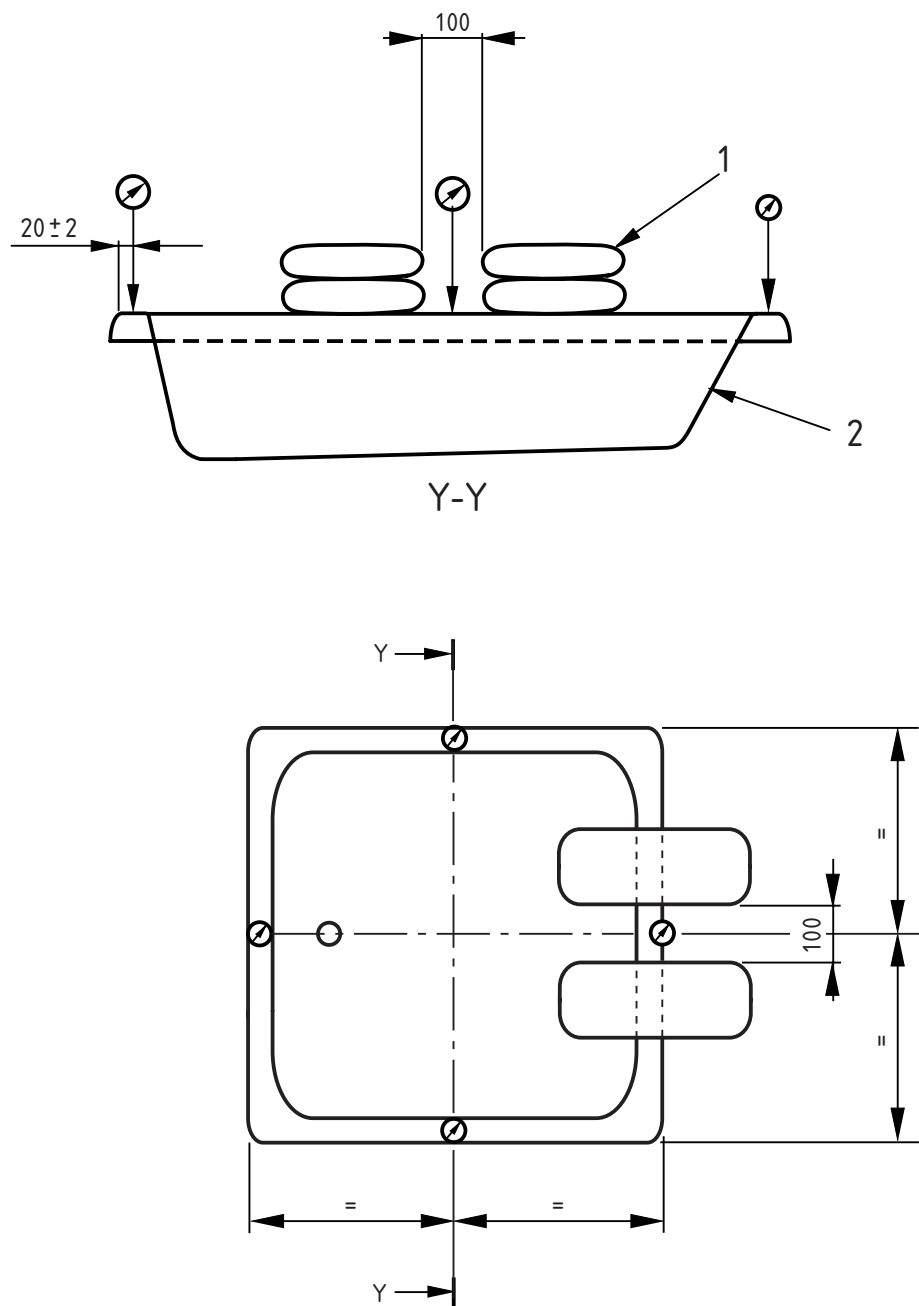
Record the deflections.

For shower trays where the design of the sides and/or support arrangements are not symmetrical and the shower tray can be installed allowing entry from other sides, repeat the procedure with loadings on any other sides of entry.

Dimensions in millimetres
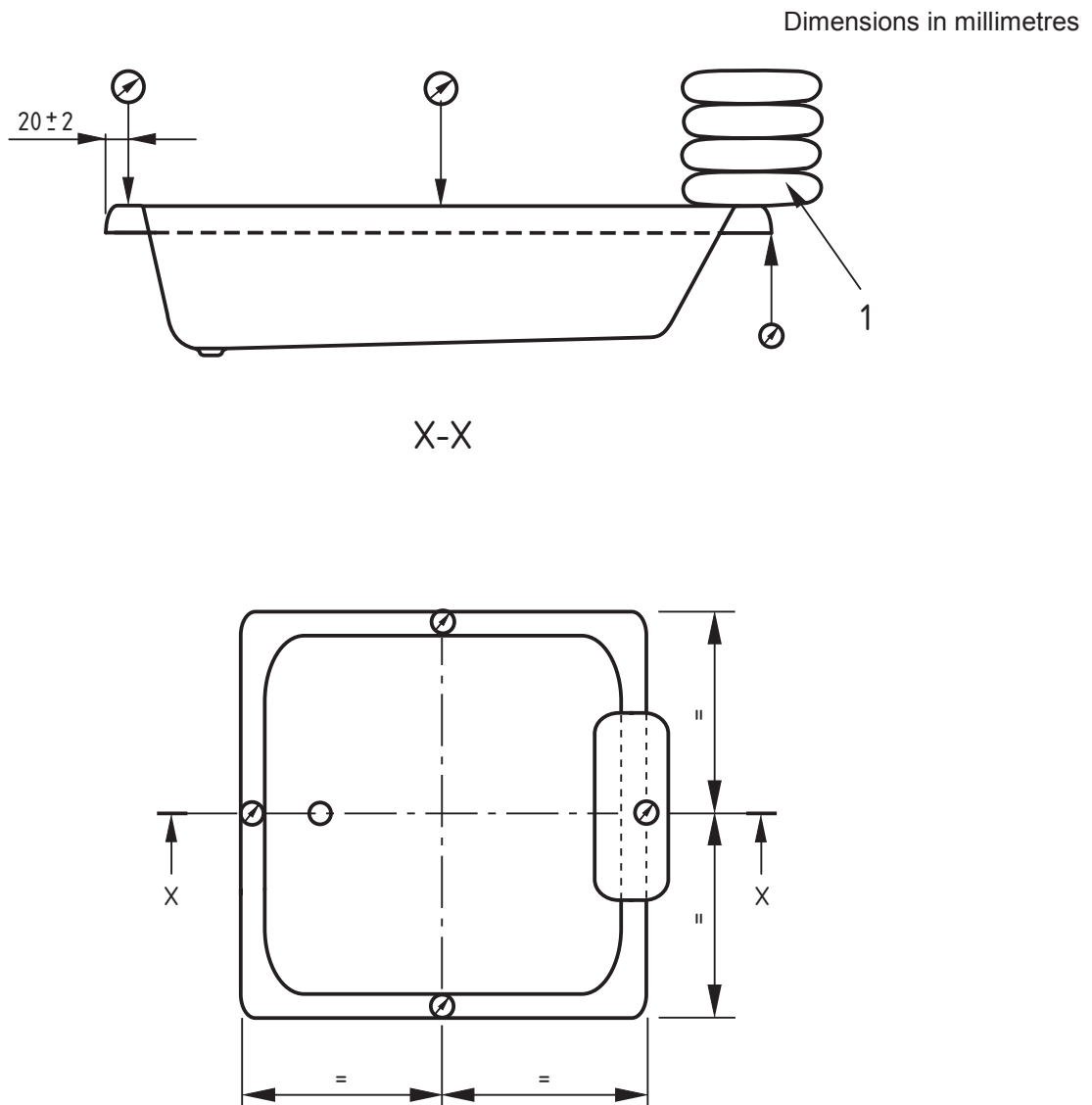
Key
1   bags

Figure A.7 — Deflection test 2

Dimensions in millimetres

Key

1   bags

2   shower tray

Figure A.8 — Deflection test 2 alternative loading

Bibliography

[1]   EN 14527, *Shower trays for domestic purposes*

[2]   ISO 4586-2, *High-pressure decorative laminates — Sheets made from thermosetting resins — Part 2: Determination of properties*

[3]   EN 251, *Shower trays — Connecting dimensions*

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