

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 4459.2—1999

Methods of sampling and testing ceramic tiles

Method 2: Determination of dimensions and surface quality

RECONFIRMATION NOTICE

Technical Committee BD-044 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 21 January 2016.

The following are represented on Technical Committee BD-044:

Australian Industry Group
Australian Stone Advisory Association
Australian Tile Council
Ceramic Tile Manufacturers Association of Australia
Institute of Building Consultants
Master Builders Australia
Master Glazed Wall & Floor Tile Layers Association of SA
Plastics and Chemicals Industries Association
Property Council of Australia
Surface Coatings Association Australia

NOTES

Australian Standard™

Methods of sampling and testing ceramic tiles

Method 2: Determination of dimensions and surface quality

[ISO title: Ceramic tiles, Part 2: Determination of dimensions and surface quality]

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee BD/44, Fixing of Ceramic Tiles.

This Standard is identical with and is reproduced from ISO 10545-2:1995, *Ceramic tiles Part 2: Determination of dimensions and surface quality*, and Technical Corrigendum No.1:1997.

This Standard is the result of consensus among the representatives on the Joint Committee that it be produced as an Australian Standard.

Technical Corrigendum changes to ISO 10545-2:1995 are shown by a marginal bar set adjacent to the clause, table, figure or part thereof.

For the purpose of this Australian Standard, the ISO/IEC text should be modified as follows:

- (a) *Terminology* The words 'Australian Standard' should replace the words 'International Standard' wherever they appear.
- (b) *Decimal marker* A full point should be substituted for a comma where it appears as a decimal marker.

METHOD

1 Scope

This part of ISO 10545 specifies methods for determining the dimensional characteristics (length, width, thickness, straightness of sides, rectangularity, surface flatness) and the surface quality of ceramic tiles.

Tiles with areas less than 4 cm² are excluded from measurements of length, width, straightness of sides, rectangularity and surface flatness.

Spacer lugs and glaze blobs and other irregularities of the sides shall be ignored when measuring length, width, straightness of sides, rectangularity, if these are subsequently hidden in the joints after fixing (installation).

2 Measurement of length and width

2.1 Apparatus

2.1.1 Vernier callipers, or other suitable apparatus for linear measurement.

2.2 Test specimens

Ten whole tiles shall be submitted to measurements.

2.3 Procedure

Measure, to the nearest 0,1 mm, each side of the tile under test, at positions 5 mm from the corners.

2.4 Expression of results

The average dimension of square tiles is the average of four measurements. The average dimension of the sample is the average of 40 measurements.

For oblong tiles, each similar pair of sides of a tile provides the appropriate average dimension of the tile, i.e. an average of two measurements. The average dimensions for length and width of the sample are the average of 20 measurements each.

2.5 Test report

The test report shall include the following information:

- a) reference to this part of ISO 10545;
- b) a description of the tiles;
- c) all individual measurements of length and width;
- d) the average size of each test specimen for square tiles, and the average length and width for each oblong tile;
- e) the average size of the 10 test specimens for square tiles, and the average length and width for oblong tiles;
- f) the deviation, as a percentage, of the average size of each tile (two or four sides) from the work size;
- (g) the deviation, as a percentage, of the average size of each tile (two or four sides) from the average size of the 10 test specimens (20 or 40 sides).

3 Measurement of thickness

3.1 Apparatus

3.1.1 Micrometer screw gauge with anvils, of 5 mm to 10 mm diameter, or other suitable apparatus.

3.2 Test specimens

Ten whole tiles shall be submitted to measurements.

3.3 Procedure

For all tiles, except those with uneven surfaces, draw diagonals between the corners and measure the thickness at the thickest point within each of the four segments. Measure, to the nearest 0,1 mm, the thickness of each tile under test in four positions.

For tiles with uneven surfaces, draw four lines at right angles across the face at distances of 0,125; 0,375; 0,625 and 0,875 times the length measured from the end. Measure the thickness at the thickest point on each line.

3.4 Expression of results

For all the tiles, the average dimension of each individual tile is the average of four measurements. The average thickness of the sample is the average of 40 measurements.

3.5 Test report

The test report shall include the following information:

- reference to this part of ISO 10545;
- a description of the tiles;
- all individual measurements of thickness;
- the average thickness of each tile;
- the deviation, as a percentage or in millimetres (as required by the product standard), of the average thickness of each tile from the work size thickness.

4 Measurement of straightness of sides

4.1 Definition

For the purposes of this part of ISO 10545, the following definition applies.

4.1.1 straightness of sides: The deviation from straightness of the centre of the side in the plane of the tile.

The measurement is only relevant to the straight sides of tiles (figure 2) and is calculated as a percentage, using the formula

$$\frac{C}{L} \times 100$$

where

C is the deviation from straightness at the centre of the measured side;

L is the length of the measured side.

4.2 Apparatus

4.2.1 Apparatus, as shown in figure 1, or any other suitable instrument.

The dial gauge (D_F) (see 5.4) is used for measuring the straightness of sides.

4.2.2 Calibrating plate, of accurate dimensions and with straight, flat sides.

4.3 Test specimens

Ten whole tiles shall be submitted to measurements.

4.4 Procedure

Select an apparatus of the appropriate dimensions (4.2.1) so that, when a tile is placed in the apparatus, on the supporting studs (S_A , S_B , S_C), the locating studs (I_A , I_B , I_C) are 5 mm from each corner of the side being measured. (See figure 1.)

Fit the appropriate calibrating plate (4.2.2) exactly into position on the instrument, and adjust the dial gauge reading to a suitable known value.

Remove the calibrating plate, place the proper surface of the tile on the locating studs in the apparatus, and record the dial gauge reading in the centre of the side. If the tile is square, rotate it to obtain four measurements. Repeat this procedure for each tile being tested. In the case of oblong tiles, use separate instruments of the appropriate dimensions to measure lengths and widths. Measure to the nearest 0,1 mm.

4.5 Test report

The test report shall include the following information:

- reference to this part of ISO 10545;
- a description of tiles;
- all individual measurements of straightness of sides;
- the maximum deviation from straightness, as a percentage related to the corresponding work sizes.

5 Measurement of rectangularity

5.1 Definition

For the purposes of this part of ISO 10545, the following definition applies.

5.1.1 deviation from rectangularity: If a corner of a tile is placed against the angle of an accurate calibrating plate (see figure 3), deviation from rectangularity is calculate as a percentage, using the formula

$$\frac{\delta}{L} \times 100$$

where

δ is the deviation of the outer corner of the side of the tile (measured 5 mm from the corner) from the inner side of the calibrating plate;

L is the length of the adjacent side of the tile.

5.2 Apparatus

5.2.1 Apparatus, as shown in figure 1, or any other suitable instrument.

The dial gauge (D_A) is used for measuring rectangularity.

5.2.2 Calibrating plate, of accurate dimensions and with straight, flat sides.

5.3 Test specimens

Ten whole tiles shall be submitted to measurements.

5.4 Procedure

Select an apparatus of the appropriate dimensions (5.2.1) so that, when a tile is placed in the apparatus, on the supporting studs (S_A , S_B , S_C), the locating studs (I_A , I_B , I_C) are 5 mm from each corner of the side adjacent to the side being measured. (See figure 1.) The plunger of the dial gauge (D_A) shall also be 5 mm from the corner of the tile on the side being measured. (See figure 1.)

Fit the appropriate calibrating plate (5.2.2) exactly into position on the instrument, and adjust the dial gauge reading to a suitable known value.

Remove the calibrating plate, place the proper surface of the tile on the locating studs in the apparatus, and record the dial gauge reading 5 mm from the corner. If the tile is square, rotate it to obtain four measurements. Repeat this procedure for each edge of a square tile. Repeat this procedure for each tile being tested. In the

case of oblong tiles, use separate instruments of the appropriate dimensions to measure lengths and widths. Measure to the nearest 0,1 mm.

5.5 Test report

The test report shall include the following information:

- a) reference to this part of ISO 10545;
- b) a description of the tiles;
- c) all individual measurements of rectangularity;
- d) the maximum deviation from rectangularity, as a percentage related to the corresponding work sizes.

6 Measurements of surface flatness (curvature and warpage)

6.1 Definitions

For the purposes of this part of ISO 10545, the following definitions apply.

6.1.1 surface flatness: Defined by measurements in three positions on the surface of tiles.

Tiles that have relief on the proper surface preventing measurement on that surface shall, where possible, be measured on the back.

6.1.2 edge curvature: The departure of the centre of a tile from the plane in which three of the four corners lie. (See figure 4.)

6.1.3 centre curvature: The departure of the centre of one edge of a tile from the plane in which three of the four corners lie. (See figure 5.)

6.1.4 warpage: The departure of the fourth corner of the tile from the plane in which the other corners lie. (See figure 6.)

6.2 Apparatus

6.2.1 For tiles larger than 40 mm × 40 mm

6.2.1.1 Apparatus, as shown in figure 1, or any other suitable instrument.

In order to measure smooth-surfaced tiles, the supporting studs (S_A , S_B , S_C) shall be 5 mm in diameter. In order to obtain meaningful results for other tile surfaces, suitable supporting studs shall be used.