

INTERNATIONAL STANDARD

ISO 10545-6

First edition
1995-11-01

Ceramic tiles —

Part 6:

Determination of resistance to deep abrasion for
unglazed tiles

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(Carreaux et dalles céramiques) —

Partie 6: Détermination de la résistance à l'abrasion profonde pour les
carreaux non émaillés

<https://standards.iteh.ai/catalog/standards/sist/a4fdd898-05d7-4850-80e7-09263ee5c3d7/iso-10545-6-1995>



Reference number
ISO 10545-6:1995(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10545-6 was prepared by Technical Committee ISO/TC 189, *Ceramic tile*.

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ISO 10545 consists of the following parts, under the general title *Ceramic tiles*:

[ISO 10545-6:1995](https://standards.iteh.ai/catalog/standards/sist/a4fdd898-05d7-4850-80e7-09263ee5c3d7/iso-10545-6-1995)

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- *Part 1: Sampling and basis for acceptance* [09263ee5c3d7/iso-10545-6-1995](https://standards.iteh.ai/catalog/standards/sist/a4fdd898-05d7-4850-80e7-09263ee5c3d7/iso-10545-6-1995)
- *Part 2: Determination of dimensions and surface quality*
- *Part 3: Determination of water absorption, apparent porosity, apparent relative density and bulk density*
- *Part 4: Determination of modulus of rupture and breaking strength*
- *Part 5: Determination of impact resistance by measurement of coefficient of restitution*
- *Part 6: Determination of resistance to deep abrasion for unglazed tiles*

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- *Part 7: Determination of resistance to surface abrasion for glazed tiles*
- *Part 8: Determination of linear thermal expansion*
- *Part 9: Determination of resistance to thermal shock*
- *Part 10: Determination of moisture expansion*
- *Part 11: Determination of crazing resistance for glazed tiles*
- *Part 12: Determination of frost resistance*
- *Part 13: Determination of chemical resistance*
- *Part 14: Determination of resistance to stains*
- *Part 15: Determination of lead and cadmium given off by glazed tiles*
- *Part 16: Determination of small colour differences*
- *Part 17: Determination of coefficient of friction*

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Ceramic tiles —

Part 6:

Determination of resistance to deep abrasion for unglazed tiles

1 Scope

This part of ISO 10545 specifies a test method for determining the resistance to deep abrasion of all unglazed ceramic tiles used for floor coverings.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 10545. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 10545 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 630-1:—¹⁾, *Structural steels — Part 1: Plates, wide flats, bars, sections and profiles.*

ISO 8486-1:—²⁾, *Bonded abrasives — Grain size analysis — Designation and determination of grain size distribution — Part 1: Macrogrits F 4 to F 220.*

3 Principle

Determination of the abrasion resistance of unglazed tiles by measuring the length of the groove produced in the proper surface by means of a rotating disc, under given conditions and with the use of abrasive material.

4 Apparatus

4.1 Abrasion apparatus, (see figure 1), consisting essentially of a rotating disc, a storage hopper with a dispensing device for the abrasive material, a test specimen support and a counterweight.

The disc is made of E 235 A (Fe 360 A) (ISO 630-1) with a diameter of $(200 \pm 0,2)$ mm and thickness at the edge of $(10 \pm 0,1)$ mm, and with a revolution rate of 75 r/min.

The pressure with which the test specimens are held against the steel disc is determined by calibrating the apparatus against transparent fused silica. The pressure is adjusted such that, after 150 r using F 80 (ISO 8486-1) abrasive, a chord of $(24 \pm 0,5)$ mm is produced. Transparent fused silica shall be used as a primary standard. A secondary standard of float glass or other products may be used.

When the diameter has worn by 0,5 % of the initial diameter, the steel disc shall be replaced.

4.2 Measuring gauge, accurate to 0,1 mm.

4.3 Abrasive material: white fused aluminium oxide of grain size F 80, according to ISO 8486-1.

5 Test specimens

5.1 Types of test specimens

Tests shall be carried out using whole tiles or test specimens of suitable dimensions. Before testing, small specimens shall be fixed with an adhesive onto a larger background, avoiding joints.

1) To be published. (Revision of ISO 630:1980)

2) To be published. (Revision of ISO 8486:1986)

5.2 Preparation of test specimens

Clean, dry test specimens shall be used.

5.3 Number of test specimens

A minimum of five test specimens shall be tested.

6 Procedure

Place a test specimen in the apparatus (4.1) so that it is tangential against the rotating disc. Ensure that abrasive material (4.3) is fed uniformly into the grinding zone at a rate of (100 ± 10) g/100 r.

Rotate the steel disc for 150 r. Remove the test specimen from the apparatus and measure the chord length L of the groove to the nearest 0,5 mm. Test each test specimen on its proper surface, in at least two places at right angles to each other.

In the case of relief surfaces interfering with the determination of the abrasion resistance, the projections may be ground off, but the results of the test will not be the same as for similar tiles having plane surfaces.

Do not re-use the abrasive material.

7 Expression of results

The resistance to deep abrasion is expressed as the volume, V , in cubic millimetres, of material removed, and is calculated from the chord length L of the groove using the equation

$$V = \left(\frac{\pi\alpha}{180} - \sin\alpha \right) \frac{h \cdot d^2}{8}$$

with

$$\sin(0,5\alpha) = \frac{L}{d}$$

where

α is the angle, in degrees, subtended at the centre of the rotating disc by the chord (see figure 2);

h is the thickness, in millimetres, of the rotating disc;

d is the diameter, in millimetres, of the rotating disc;

L is the length, in millimetres, of the chord.

Some equivalent values of L and V are given in table 1.

8 Test report

The test report shall include the following information:

- reference to this part of ISO 10545;
- a description of the tiles;
- the chord length L of each groove, to the nearest 0,5 mm;
- the volume V , in cubic millimetres, for each individual groove;
- the average volume V_m , in cubic millimetres.

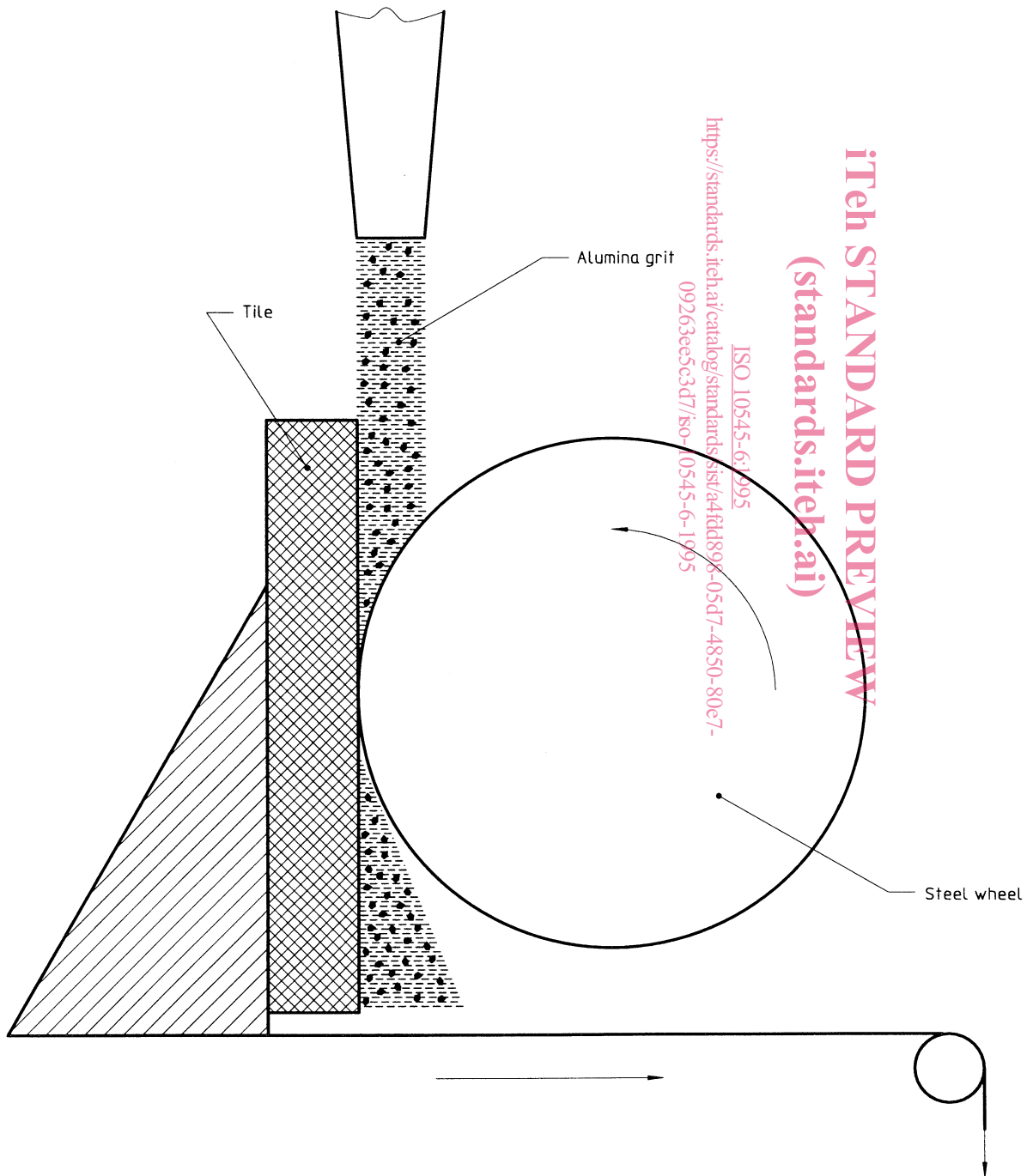
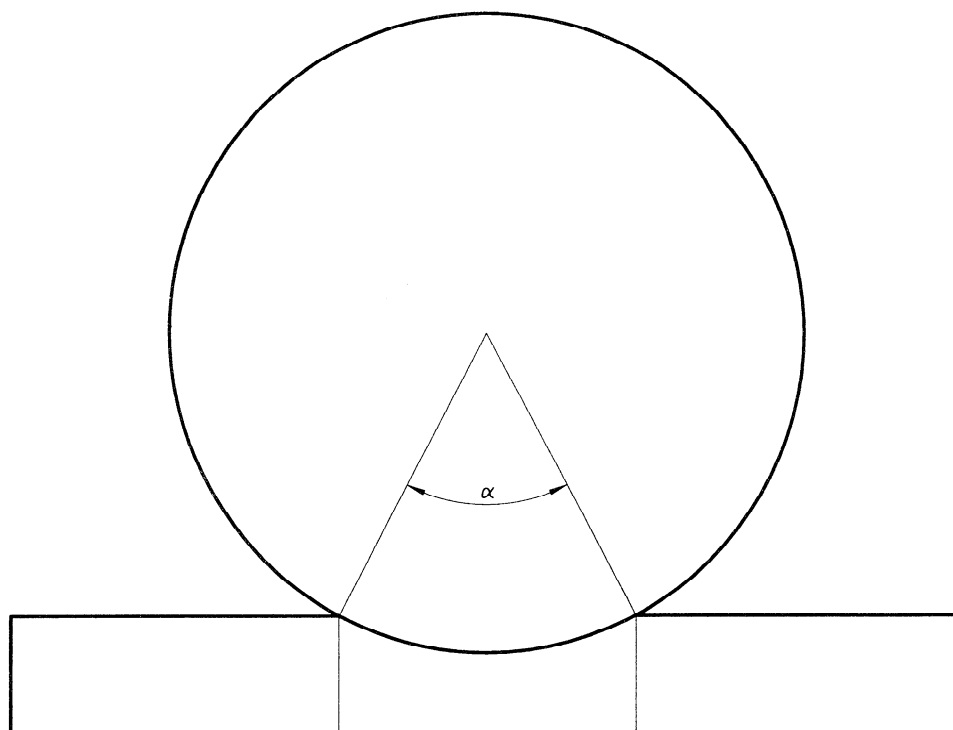


Figure 1 — Schematic diagram of deep abrasion equipment



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 Figure 2 — Definition of the chord

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 Table 1 — Equivalent values
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L mm	V mm ³	L mm	V mm ³	L mm	V mm ³	L mm	V mm ³	L mm	V mm ³
20	67	30	227	40	540	50	1 062	60	1 851
20,5	72	30,5	238	40,5	561	50,5	1 094	60,5	1 899
21	77	31	250	41	582	51	1 128	61	1 947
21,5	83	31,5	262	41,5	603	51,5	1 162	61,5	1 996
22	89	32	275	42	626	52	1 196	62	2 046
22,5	95	32,5	288	42,5	649	52,5	1 232	62,5	2 097
23	102	33	302	43	672	53	1 268	63	2 149
23,5	109	33,5	316	43,5	696	53,5	1 305	63,5	2 202
24	116	34	330	44	720	54	1 342	64	2 256
24,5	123	34,5	345	44,5	746	54,5	1 380	64,5	2 310
25	131	35	361	45	771	55	1 419	65	2 365
25,5	139	35,5	376	45,5	798	55,5	1 459	65,5	2 422
26	147	36	393	46	824	56	1 499	66	2 479
26,5	156	36,5	409	46,5	852	56,5	1 541	66,5	2 537
27	165	37	427	47	880	57	1 583	67	2 596
27,5	174	37,5	444	47,5	909	57,5	1 625	67,5	2 656
28	184	38	462	48	938	58	1 689	68	2 717
28,5	194	38,5	481	48,5	968	58,5	1 713	68,5	2 779
29	205	39	500	49	999	59	1 758	69	2 842
29,5	215	39,5	520	49,5	1 030	59,5	1 804	69,5	2 906

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