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NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 91.100.25 Q 31

GB/T 4100-2015

Replacing GB/T 4100-2006

Ceramic tiles

(ISO 13006:2012, Ceramic tiles - Definitions, classification, characteristics and marking, MOD)

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Issued on: May 15, 2015 Implemented on: December 1, 2015

Issued by: General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China;

Standardization Administration of the People's Republic of China.

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Foreword

This Standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces GB/T 4100-2006 "Ceramic tiles". Compared with GB/T 4100-2006, the main technical changes are as follows:

- ADD the specifications for the thickness of ceramic tiles (see 7.3);
- DELETE extruded ceramic tiles 3 % < E ≤ 6 %, Group Alla Part 2 (see Annex C of 2006 edition);
- DELETE extruded ceramic tiles 6 % < E ≤ 10 %, Group Allb Part 2 (see Annex E of 2006 edition);
- MODIFY the requirements for the coefficient of friction of ceramic tiles (See Annex A, Annex B, Annex C, Annex D, Annex E, Annex G, Annex H, Annex J, Annex K, Annex L of this Standard, Annex A, Annex B, Annex C, Annex D, Annex E, Annex G, Annex H, Annex J, Annex K, Annex L of 2006 edition);
- MODIFY the requirements for the small colour difference of ceramic tiles (See Annex A, Annex B, Annex C, Annex D, Annex E, Annex G, Annex H, Annex J, Annex K, Annex L of this Standard, Annex A, Annex B, Annex C, Annex D, Annex E, Annex G, Annex H, Annex J, Annex K, Annex L of 2006 edition);
- MODIFY the classification method for the technical requirements of dry-pressed ceramic tiles, from the classification according to product surface areas to the classification according to nominal sizes (see Annex G, Annex H, Annex J, Annex K of this Standard, Annex G, Annex H, Annex J, Annex K of 2006 edition);
- MODIFY the classification method for the technical requirements of ceramic tiles, from the classification according to whether there are spacer lugs to the classification according to nominal sizes (see Annex L of this Standard, Annex L of 2006 edition).

This Standard uses the re-drafting method to modify and adopt ISO 13006:2012 "Ceramic tiles - Definitions, classification, characteristics and marking".

Compared with ISO 13006:2012, this Standard has added 3 clauses (7.1, 7.2, 7.3) in the structure, and added the thickness of ceramic tiles (see 7.3), to meet the needs of the thinness tendency of China's ceramic tiles. ADD an annex (Annex M) to unify the determination method for coefficient of friction. DELETE two annexes of ISO 13006:2012 (Annex C and Annex E of ISO 13006:2012), that is, cancel part 2 in Group Alla extruded ceramic tiles (3 % < $E \le 6$ %) of medium water absorption and part 2 in Group Allb extruded ceramic tiles (6 % < $E \le 10$ %) of medium water absorption, which

Ceramic tiles

1 Scope

This Standard specifies terms and definitions, classifications, characteristics, sampling and basis for acceptance, requirements and test methods, marking and specifications for ceramic tiles.

This Standard is applicable to ceramic tiles made by extrusion or dry pressing.

This Standard is not applicable to ceramic accessory tiles.

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.

GB/T 3810.1 Test methods of ceramic tiles - Part 1: Sampling and basis for acceptance (GB/T 3810.1-2006, ISO 10545-1:1995, MOD)

GB/T 3810.2 Test methods of ceramic tiles - Part 2: Determination of dimensions and surface quality (GB/T 3810.2-2006, ISO 10545-2:1995, MOD)

GB/T 3810.3 Test method of ceramic tiles - Part 3: Determination of water absorption, apparent porosity, apparent relative density and bulk density (GB/T 3810.3-2006, ISO 10545-3:1995, IDT)

GB/T 3810.4 Test methods of ceramic tiles - Part 4: Determination of modulus of rupture and breaking strength (GB/T 3810.-2006, ISO 10545-4:2004, IDT)

GB/T 3810.5 Test methods of ceramic tiles - Part 5: Determination of impact resistance by measurement of coefficient of restitution (GB/T 3810.5-2006, ISO 10545-5:1996, IDT)

GB/T 3810.6 Test methods of ceramic tiles - Part 6: Determination of resistance to deep abrasion for unglazed tiles (GB/T 3810.6-2006, ISO 10545-6:1995, IDT)

GB/T 3810.7 Test methods of ceramic tiles - Part 7: Determination of resistance to surface abrasion for glazed tiles (GB/T 3810.7-2006, ISO 10545-7:1996, IDT)

GB/T 3810.8 Test methods of ceramic tiles - Part 8: Determination of linear thermal

expansion (GB/T 3810.8-2006, ISO 10545-8:1994, IDT)

GB/T 3810.9 Test methods of ceramic tiles - Part 9: Determination of resistance to thermal shock (GB/T 3810.9-2006, ISO10545-9:1994, IDT)

GB/T 3810.10 Test methods of ceramic tiles - Part 10: Determination of moisture expansion (GB/T 3810.10-2006, ISO 10545-10:1995, IDT)

GB/T 3810.11 The methods of ceramic tiles - Part 11: Determination of crazing resistance for glazed tiles (GB/T 3810.11-2006, ISO 10545-11:1994, IDT)

GB/T 3810.12 Test methods of ceramic tiles - Part 12: Determination of frost resistance (GB/T 3810.12-2006, ISO 10545-12:1995, IDT)

GB/T 3810.13 Test methods of ceramic tiles - Part 13: Determination of chemical resistance (GB/T 3810.13-2006, ISO 10545-13:1995, IDT)

GB/T 3810.14 Test methods of ceramic tiles - Part 14: Determination of resistance to stains (GB/T 3810.14-2006, ISO 10545-14:1995, IDT)

GB/T 3810.15 Test methods of ceramic tiles - Part 15: Determination of lead and cadmium given off by glazed tiles (GB/T 3810.15-2006, ISO 10545-15:1995, IDT)

GB/T 3810.16 Test methods of ceramic tiles - Part 16: Determination of small colour differences (GB/T 3810.16-2006, ISO 10545-16:1999, IDT)

GB/T 9195-2011 Classification and terms of building and sanitary ceramics

GB/T 13891 Test methods of specular gloss for decorative building materials

3 Terms and definitions

For the purposes of this document, the terms and definitions given in GB/T 9195-2011 and the following apply. For ease of use, some of the terms and definitions in GB/T 9195-2011 are repeated below.

3.1

ceramic tile

Plate or block building ceramic products made from clays, feldspars and quartz, generally used as covering for floors and walls.

[GB/T 9195-2011, definition 3.1.1]

3.2

3.8

porcelain tile

Ceramic tiles with a water absorption (*E*) of not more than 0.5 %.

3.9

stoneware porcelain tile

Ceramic tiles with a water absorption (E) of more than 0.5 % and not more than 3 %.

3.10

fine stoneware tile

Ceramic tiles with a water absorption (*E*) of more than 3 % and not more than 6 %.

3.11

stoneware tile

Ceramic tiles with a water absorption (*E*) of more than 6 % and not more than 10 %.

3.12

earthenware tile

Ceramic tiles with a water absorption (*E*) of more than 10 %.

3.13

water absorption

Ε

Mass of the water absorbed when dried unit mass of products is saturated, expressed as a percentage by mass.

[GB/T 9195-2011, definition 7.10]

3.14

description of sizes

NOTE: The sizes here are only defined for rectangular tiles. If the sizes of non-rectangular tiles are required, they are defined by the smallest rectangle into which they fit. See Figures 1 and 2.

Size used to describe the product specification.

3.14.2

work size

W

Size specified for manufacturing to which the actual size shall conform within specified permissible deviations.

NOTE: Work size includes length, width and thickness.

3.14.3

actual size

Size measured in accordance with the method in GB/T 3810.2.

3.14.4

coordinating size

C

Work size plus the joint width.

3.14.5

modular size

Tile and size based on module M, 2 M, 3 M and 5 M and also their multiples or subdivisions, except for tiles with a surface area of less than 9 000 mm².

NOTE: In ISO 1006, 1 M = 100 mm.

3.14.6

non-modular size

Size not based on module M

3.14.7

tolerance

Difference between the permissible limits of size.

3.15

	0	1	1	1	1	OD/T 0040 0
	Surface quality	√	√	V	√ /	GB/T 3810.2
	Back feet ^a	,	,	,	√	Figure 3
	Water absorption	√	√	√	√	GB/T 3810.3
	Breaking strength	√	V		$\sqrt{}$	GB/T 3810.4
	Modulus of rupture	√	√	$\sqrt{}$	√	GB/T 3810.4
	Resistance to deep abrasion	asion $\sqrt{}$			GB/T 3810.6	
	of unglazed tiles	•	٧			GB/1 3010.0
	Resistance to surface	$\sqrt{}$				GB/T 3810.7
Dhyaiaal	abrasion of glazed tiles	, ,	V			GB/1 3610.7
Physical	Linear thermal expansion ^b	\checkmark	$\sqrt{}$		\checkmark	GB/T 3810.8
property	Resistance to thermal shock ^b	\checkmark	√	√	√	GB/T 3810.9
	Resistance to crazing of	V	V			GB/T 3810.11
	glazed tiles	V	V	V	V	GB/1 3010.11
	Frost resistance ^c		√		√	GB/T 3810.12
	Moisture expansion ^b	√	√	√	√	GB/T 3810.10
	Small colour differences ^b		V	V	√	GB/T 3810.16
	Impact resistance ^b	√	√			GB/T 3810.5
	Resistance to staining of	√	V	1	√	OD/T 0040 44
	glazed tiles			V		GB/T 3810.14
	Resistance to staining of	1	1	,	√	OD/T 0040 44
	unglazed tiles ^b	V		$\sqrt{}$		GB/T 3810.14
	Resistance to low					
	concentrations of acids and	\checkmark	\checkmark	$\sqrt{}$	\checkmark	GB/T 3810.13
	alkalis					
01	Resistance to high					
Chemical	concentrations of acids and	\checkmark		$\sqrt{}$	$\sqrt{}$	GB/T 3810.13
property	alkalis ^b					
	Resistance to household					
	cleaners and swimming pool	\checkmark				GB/T 3810.13
	salts					
	Lead and cadmium release of	1	1	,	1	OD/T 0040 45
	glazed tiles ^b	$\sqrt{}$	√	V	$\sqrt{}$	GB/T 3810.15
	Lead and cadmium release of	.1	.1	.1	.1	OD/T 2040 45
	glazed tiles ^b	$\sqrt{}$	√	V	$\sqrt{}$	GB/T 3810.15
			•		•	•

^a For application to exterior tiles installed by cement mortar, including tiles installed in tunnels.

6 Sampling and basis for acceptance

The sampling and basis for acceptance shall be in accordance with GB/T 3810.1.

^b See Annex Q.

For tiles intended to be used in situations where frost conditions apply.

g) total weight of the tiles and their packaging.

8.2 Product literature

Product literature for tiles intended for use on floors shall state the abrasion class or the place of use of glazed tiles.

NOTE: See Annex N.

8.3 Product specifications

Product specifications shall include the following:

- a) the method of shaping;
- b) type of ceramic tile and reference to the appropriate annex of this Standard;
- c) nominal and work sizes, modular (M) and non-modular;
- d) the nature of the surface, i.e. glazed (GL) or unglazed (UGL);
- e) back feet (if required).

EXAMPLE 1: Precision extruded tile, GB/T 4100-2015, Annex A, Ala M 25 cm \times 12.5 cm (W 240 mm \times 115 mm \times 10 mm) GL.

EXAMPLE 2: Natural extruded tile, GB/T 4100-2015, Annex B, Alb 15 cm \times 15 cm (W 150 mm \times 15 mm \times 12.5 mm) UGL.

EXAMPLE 3: Dry-pressed tile, GB/T 4100-2015, Annex G, Bla M 25 cm \times 12.5 cm (W 240 mm \times 115 mm \times 10 mm) GL.

EXAMPLE 4: Dry-pressed tile, GB/T 4100-2015, Annex L, BIII 15 cm \times 15 cm (W 150 mm \times 150 mm \times 12.5 mm) UGL.

	Height (<i>h</i>)/mm		<i>h</i> ≥ 0.7	Figure 3
			Back feet as specified by	
			the manufacturer and as	
Back feet			shown in one of the	
(if required)	Shape		examples in Figure 3.	Figure 3
			Example 1: $L_0 - L_1 > 0$	
			Example 2: $L_0 - L_2 > 0$	
			Example 3: $L_0 - L_3 > 0$	
			A minimum of 95 % of the	
			tiles are to be free from	
S	urface quality ^d		visible defects which can	GB/T 3810.2
			impair the appearance of a	
			major area of tiles	
Wa	ater absorption ^e		Average value ≤ 0.5 %,	OD/T 0040 0
(Per d	cent mass fraction)		individual value ≤ 0.6 %	GB/T 3810.3
Breaking	Thickness (work size) ≥	≥ 7.5 mm	≥ 1 300	GB/T 3810.4
strength/N	Thickness (work size) <	< 7.5 mm	≥ 600	GB/T 3810.4
Modulus of	f rupture/[N/mm² (MPa)]]	Average value ≥ 28,	
Not applicable t	o tiles with breaking stre	ength	individual value ≥ 21	GB/T 3810.4
	≥ 3 000 N		ilidividuai value 2 2 i	
	Resistance to deep abrasion of unglazed tiles: removed volume/mm² Resistance to surface abrasion of glazed tiles intended for use			
			≤ 275	GB/T 3810.6
Abrasion				
resistance			Report abrasion class and	
			cycles passed	GB/T 3810.7
	on floors ^f		cycles passed	
Coefficient of	From ambient temper	ature to		
linear thermal	100 °C	ature to	See Annex Q	GB/T 3810.8
expansion ^g	100 0			
Therma	al shock resistance ^g		See Annex Q	GB/T 3810.9
Crazing re	sistance of glazed tiles ^h	1	No crazing after test	GB/T 3810.11
F	rost resistance		See Annex Q	GB/T 3810.12
Coeffic	ient of friction of tiles		Individual value ≥ 0.50	Annex M
Moisture	e expansion ^g /(mm/m)		See Annex Q	GB/T 3810.10
			Plain coloured tiles	
Small colour differences ⁹			GL: Δ <i>E</i> < 0.75	GB/T 3810.16
			UGL: Δ <i>E</i> < 1.0	
Im	Impact resistance ^g		See Annex Q	GB/T 3810.5
Resistance to	Glazed tiles		Minimum class 3	GB/T 3810.14
staining	Unglazed tiles	е	See Annex Q	GB/T 3810.14
Resistance to	Resistance to low	glazed	Manufacturer is to state	OD/T 0040 15
chemicals	concentrations of	tiles	classification	GB/T 3810.13
L	<u> </u>			<u> </u>

Annex B

(normative) Extruded ceramic tiles (0.5 < $E \le 3$ %, Group Alb)

Technical requirements for extruded ceramic tiles (0.5 < $E \le 3$ %, Group Alb) shall be in accordance with Table B.1.

Table B.1 -- Technical requirements for extruded ceramic tiles (0.5 < $E \le 3$ %, Group Alb)

Length and width The deviation, in %, of the average size for each tile (2 or 4 sides) from the average size of 10 tiles (20 or 40 sides) The manufacturer shall choose the work size as follows: for modular tiles in order to allow a nominal joint width of between 3 mm and 11 mm²; for non-modular tiles so that the difference between the work size and the nominal size is not more than ± 3 mm. Thicknessb The thickness shall be specified by the manufacturer; ±10 ±10 GB/T 3810. The deviation, in %, of the average thickness of each tile from the work size thickness Straightness of sidesc (facial sides) The maximum deviation from straightness, in %, ±0.5 ±0.6 GB/T 3810. related to the corresponding work sizes Rectangularityc The maximum deviation from rectangularity, in %, ±1.0 ±1.0 GB/T 3810. GB/T 3810. Surface flatness The maximum Centre curvature, related to diagonal calculated from the work sizes Edge curvature related to the corresponding work sizes	Group Alb)							
The deviation, in %, of the average size		Test method						
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The deviation, in %, of the average thickness of each tile from the work size thickness Straightness of sides ^c (facial sides) The maximum deviation from straightness, in %, related to the corresponding work sizes Rectangularity ^c The maximum deviation from rectangularity, in %, related to the corresponding work sizes Centre curvature, related to diagonal calculated from the work sizes The maximum Edge curvature related to the	The t	thicknes	s shall be specified by the					
each tile from the work size thickness Straightness of sides ^c (facial sides) The maximum deviation from straightness, in %, related to the corresponding work sizes Rectangularity ^c The maximum deviation from rectangularity, in %, related to the corresponding work sizes Centre curvature, related to diagonal calculated from the work sizes The maximum Centre curvature related to the fedge curvature related to the sizes Fige curvature related to the		I	manufacturer;	± 10	± 10	GB/T 3810.2		
Straightness of sides ^c (facial sides) The maximum deviation from straightness, in %, related to the corresponding work sizes Rectangularity ^c The maximum deviation from rectangularity, in %, related to the corresponding work sizes Centre curvature, related to diagonal calculated from the work sizes The maximum Surface flatness The maximum Fige curvature related to the	The devia	ation, in	%, of the average thickness of					
The maximum deviation from straightness, in %, related to the corresponding work sizes Rectangularityc The maximum deviation from rectangularity, in %, related to the corresponding work sizes Centre curvature, related to diagonal calculated from the work sizes The maximum Centre curvature related to the formular to the sizes Fige curvature related to the	each tile from the work size thickness							
related to the corresponding work sizes Rectangularityc The maximum deviation from rectangularity, in %, related to the corresponding work sizes Centre curvature, related to diagonal calculated from the work sizes The maximum Fige curvature related to the	Str	aightnes	ss of sides ^c (facial sides)					
Rectangularity ^c The maximum deviation from rectangularity, in %, related to the corresponding work sizes Centre curvature, related to diagonal calculated from the work sizes The maximum Rectangularity ^c ± 1.0 ± 1.0 GB/T 3810. GB/T 3810.	The maxir	mum de	viation from straightness, in %,	± 0.5	± 0.6	GB/T 3810.2		
The maximum deviation from rectangularity, in %, related to the corresponding work sizes Centre curvature, related to diagonal calculated from the work sizes The maximum Centre curvature related to the formula formula for the formula formula for the f	relate	ed to the	corresponding work sizes					
related to the corresponding work sizes Centre curvature, related to diagonal calculated from the work sizes The maximum Centre curvature, related to the ± 0.5 ± 1.5 GB/T 3810.		F	Rectangularity ^c					
Centre curvature, related to diagonal calculated from the work sizes The maximum Centre curvature, related to diagonal calculated from the work sizes Edge curvature, related to the	The maxin	num dev	riation from rectangularity, in %,	± 1.0	± 1.0	GB/T 3810.2		
Surface flatness The maximum diagonal calculated from the ± 0.5 ± 1.5 GB/T 3810. work sizes Fige curvature, related to the	relate							
Surface flatness The maximum Edge curvature related to the			Centre curvature, related to					
The maximum Fdge curvature, related to the	Surface fla	atness	diagonal calculated from the	± 0.5	± 1.5	GB/T 3810.2		
Figure 1 February 1 Fe			work sizes					
deviation from = 239 sal vatars, related to the = ± 0.5 = ± 1.5 = GB/T 3810.			Edge curvature, related to the	+ 0.5	+ 1.5	GB/T 3810.2		
flatness/%			corresponding work sizes	2 0.0	± 1.0	JD/1 JU10.2		
Warpage, related to diagonal + 0.8 + 1.5 GB/T 3810	nati ioo	S, 70		+ 0.8	+ 1.5	GB/T 3810.2		
calculated from the work sizes			calculated from the work sizes		11.0	35/1 3010.2		
Back feet Height (h)/mm $h \ge 0.7$ Figure 3	Back f	eet	Height (h)/mm	h≥	0.7	Figure 3		

Annex C

(normative) Extruded ceramic tiles (3 % < E \le 6 %, Group Alla)

Technical requirements for extruded ceramic tiles (3 % < $E \le$ 6 %, Group Alla) shall be in accordance with Table C.1.

Table C.1 -- Technical requirements for extruded ceramic tiles (3 % < $E \le$ 6 %, Group Alla)

Group Alia)							
	Test method						
	Item	Precision	Natural	restilletillod			
The de	eviation, in %, of the average size	± 1.25 to a	± 2.0 to a				
for eac	ch tile (2 or 4 sides) from the work	maximum of	maximum of	GB/T 3810.2			
	size (W)	± 2 mm	± 4 mm				
The de	eviation, in %, of the average size						
Length for	each tile (2 or 4 sides) from the	± 1.0	± 1.5	GB/T 3810.2			
and width	ge size of 10 tiles (20 or 40 sides)						
and width	he manufacturer shall choose the	work size as	follows:				
for me	odular tiles in order to allow a nom	ninal joint widt	h of between				
	3 mm and 11 m	m ^a ;		GB/T 3810.2			
for no	n-modular tiles so that the differe	nce between t	he work size				
	and the nominal size is not m	ore than ± 3 n	nm.				
	Thickness ^b						
The thickne	ess shall be specified by the						
	manufacturer;	± 10	± 10	GB/T 3810.2			
The deviation, in	n %, of the average thickness of						
each tile fro	each tile from the work size thickness						
Straightne	ess of sides ^c (facial sides)						
The maximum d	eviation from straightness, in %,	± 0.5	± 0.6	GB/T 3810.2			
related to th	e corresponding work sizes						
	Rectangularity ^c						
The maximum de	eviation from rectangularity, in %,	± 1.0	± 1.0	GB/T 3810.2			
related to th							
	Centre curvature, related to						
Surface flatness	diagonal calculated from the	± 0.5	± 1.5	GB/T 3810.2			
The maximum	work sizes						
deviation from	Edge curvature, related to the	± 0.5	± 1.5	GB/T 3810.2			
flatness/%	corresponding work sizes	_ 0.0	2 1.0	35/1 0010.2			
110011000,70	Warpage, related to diagonal	± 0.8	± 1.5	GB/T 3810.2			
	calculated from the work sizes			05/1 0010.2			
Back feet	Height (h)/mm	h≥	0.7	Figure 3			

Annex D

(normative) Extruded ceramic tiles (6 % $< E \le 10$ %, Group Allb)

Technical requirements for extruded ceramic tiles (6 % < E \le 10 %, Group AIIb) shall be in accordance with Table D.1.

Table D.1 -- Technical requirements for extruded ceramic tiles (6 % < $E \le 10$ %, Group Allb)

	Technical requirements						
		Item	Precision	Natural	Test method		
	The dev	viation, in %, of the average size	± 2.0 to a	± 2.0 to a			
	for each	tile (2 or 4 sides) from the work	maximum of	maximum of	GB/T 3810.2		
		size (W)	± 2 mm	± 4 mm			
	The dev	viation, in %, of the average size					
Length	for ea	ach tile (2 or 4 sides) from the	± 1.5	± 1.5	GB/T 3810.2		
and width	average	e size of 10 tiles (20 or 40 sides)					
and width	Th	ne manufacturer shall choose the	work size as	follows:			
	for mod	dular tiles in order to allow a nom	ninal joint widt	h of between			
		3 mm and 11 m	m ^a ;		GB/T 3810.2		
	for non	-modular tiles so that the differer	nce between t	he work size			
		and the nominal size is not me	ore than ± 3 n	nm.			
		Thickness ^b					
The	thicknes	s shall be specified by the					
	I	manufacturer;	± 10	± 10	GB/T 3810.2		
The devia	ation, in	%, of the average thickness of					
each	each tile from the work size thickness						
Str	aightnes	ss of sides ^c (facial sides)					
The maxi	mum de	viation from straightness, in %,	± 1.0	± 1.0	GB/T 3810.2		
relate	ed to the	corresponding work sizes					
	F	Rectangularity ^c					
The maxin	num dev	viation from rectangularity, in %,	± 1.0	± 1.0	GB/T 3810.2		
relate	ed to the	corresponding work sizes					
		Centre curvature, related to					
Surface fl	otnoso	diagonal calculated from the	± 1.0	± 1.5	GB/T 3810.2		
The max		work sizes					
deviation		Edge curvature, related to the	± 1.0	± 1.5	GB/T 3810.2		
deviation		corresponding work sizes	± 1.0	11.0	GB/1 3010.2		
nautes	JI /U	Warpage, related to diagonal	± 1.5	± 1.5	GB/T 3810.2		
		calculated from the work sizes	± 1.0	I 1.5	JD/1 J010.Z		
Back f	eet	Height (h)/mm	h≥	0.7	Figure 3		

Annex E

(normative) Extruded ceramic tiles (*E* > 10 %, Group AIII)

Technical requirements for extruded ceramic tiles (E > 10 %, Group AIII) shall be in accordance with Table E.1.

Table E.1 -- Technical requirements for extruded ceramic tiles (E > 10 %, Group AIII)

Alli)							
	Test method						
		Item	Precision	Natural	restinethod		
	The dev	viation, in %, of the average size	± 2.0 to a	± 2.0 to a			
	for each	n tile (2 or 4 sides) from the work	maximum of	maximum of	GB/T 3810.2		
		size (W)	± 2 mm	± 4 mm			
	The dev	viation, in %, of the average size					
Longith	for ea	ach tile (2 or 4 sides) from the	± 1.5	± 1.5	GB/T 3810.2		
Length and width	average	e size of 10 tiles (20 or 40 sides)					
and width	Th	ne manufacturer shall choose the	work size as	follows:			
	for mod	dular tiles in order to allow a nom	ninal joint widt	h of between			
		3 mm and 11 m	m ^a ;		GB/T 3810.2		
	for non	-modular tiles so that the differe	nce between t	he work size			
		and the nominal size is not me	ore than ± 3 n	nm.			
		Thickness ^b					
The	thicknes	s shall be specified by the					
	ı	manufacturer;	± 10	± 10	GB/T 3810.2		
The devia	ation, in	%, of the average thickness of					
each tile from the work size thickness							
Str	aightnes	ss of sides ^c (facial sides)					
The maxi	mum de	viation from straightness, in %,	± 1.0	± 1.0	GB/T 3810.2		
relate	ed to the	corresponding work sizes					
	F	Rectangularity ^c					
The maxin	num dev	viation from rectangularity, in %,	± 1.0	± 1.0	GB/T 3810.2		
relate	ed to the	corresponding work sizes					
		Centre curvature, related to					
Surface fl	otnooo	diagonal calculated from the	± 1.0	± 1.5	GB/T 3810.2		
The max		work sizes					
deviation		Edge curvature, related to the	± 1.0	± 1.5	GB/T 3810.2		
flatnes		corresponding work sizes	± 1.0	± 1.0	3D/1 3010.2		
nautes	J/ /U	Warpage, related to diagonal	± 1.5	± 1.5	GB/T 3810.2		
		calculated from the work sizes	± 1.0	± 1.J	OD/1 3010.2		
Back f	eet	Height (<i>h</i>)/mm	h≥	0.7	Figure 3		
	Back feet Height (h)/mm $h \ge 0.7$						

Annex G

(normative) Dry-pressed ceramic tiles (*E* ≤ 0.5 %, Group Bla)

Technical requirements for dry-pressed ceramic tiles ($E \le 0.5$ %, Group Bla) shall be in accordance with Table G.1.

Table G.1 -- Technical requirements for dry-pressed ceramic tiles ($E \le 0.5$ %, Group Bla)

Group Bla)							
		Technical requirements					
			Nomin	al size	Test method		
		Item	70 mm ≤ <i>N</i> <	<i>N</i> ≥ 150 mm	rest method		
			150 mm	N ≥ 150 IIIII			
				± 0.6 to a			
	The dev	viation, in %, of the average size	± 0.9 mm	maximum of	GB/T 3810.2		
	for each	tile (2 or 4 sides) from the work		± 2.0 mm			
		size (W)	Polished tiles	s: a maximum	GB/T 3810.2		
Length			of ± 1	.0 mm	OB/1 3010.2		
and width	Th	e manufacturer shall choose the	e work size as	follows:			
and width	for mod	dular tiles in order to allow a non	ninal joint widt	h of between			
		2 mm and 5 mr	n ^a ;		GB/T 3810.2		
	for non	OB/1 0010.2					
	and th						
		mm.	T	T			
		Thickness ^b					
The	thicknes	s shall be specified by the		± 5 to a			
		manufacturer;	± 0.5 mm	maximum of	GB/T 3810.2		
		%, of the average thickness of		± 0.5 mm			
each	n tile fror	n the work size thickness					
				± 0.5 to a			
	•	ss of sides ^c (facial sides)	± 0.75 mm	maximum of			
		viation from straightness, in %,		± 1.5 mm	GB/T 3810.2		
relate	ed to the	corresponding work sizes	Polished tiles: ± 0.2 to a				
			maximum	≤ 1.5 mm			
				± 0.5 to a			
	F	maximum of					
The maximum deviation from rectangularity, in %,				± 2.0 mm	GB/T 3810.2		
relate	ed to the	corresponding work sizes	Polished tile				
			maximum	≤ 1.5 mm			
Surface fl		Centre curvature, related to	± 0.75 mm	± 0.5 to a	GB/T 3810.2		
The max	imum	diagonal calculated from the		maximum of			

Annex H

(normative) Dry-pressed ceramic tiles (0.5 % < $E \le 3$ %, Group Blb)

Technical requirements for dry-pressed ceramic tiles (0.5 % $< E \le 3$ %, Group Blb) shall be in accordance with Table H.1.

Table H.1 -- Technical requirements for dry-pressed ceramic tiles (0.5 % $< E \le$ 3 %, Group Blb)

3 %, Group Blb) Technical requirements					
			Nomin	al size	Test method
		Item	70 mm ≤ <i>N</i> <	<i>N</i> ≥ 150 mm	restiniculou
			150 mm	7V = 130 111111	
	The dev	viation, in %, of the average size		± 0.6 to a	
	for each	n tile (2 or 4 sides) from the work	± 0.9 mm	maximum of	GB/T 3810.2
		size (W)		± 2.0 mm	
Length	Th	ne manufacturer shall choose the	work size as	follows:	
and width	for mod	dular tiles in order to allow a nom	ninal joint widt	h of between	
and width		2 mm and 5 mr	n ^a ;		GB/T 3810.2
	for non	-modular tiles so that the differe	nce between t	he work size	OB/1 0010.2
	and th	ne nominal size is not more than	± 2 % to a ma	aximum of 5	
		mm.			
		Thickness ^b			
The		s shall be specified by the		± 5 to a	
		manufacturer;	± 0.5 mm	maximum of	GB/T 3810.2
		%, of the average thickness of		± 0.5 mm	
each	n tile fror	m the work size thickness			
	Ū	ss of sides ^c (facial sides)		± 0.5 to a	
		viation from straightness, in %,	± 0.75 mm	maximum of	GB/T 3810.2
relate	ed to the	corresponding work sizes		± 1.5 mm	
		Rectangularity ^c		± 0.5 to a	
		viation from rectangularity, in %,	± 0.75 mm	maximum of	GB/T 3810.2
relate	related to the corresponding work sizes ± 2.0 mm				
		Centre curvature, related to		± 0.5 to a	
		diagonal calculated from the	± 0.75 mm	maximum of	GB/T 3810.2
Surface fla	atness	work sizes		± 2.0 mm	
The max		Edge curvature, related to the		± 0.5 to a	
deviation		corresponding work sizes	± 0.75 mm	maximum of	GB/T 3810.2
flatnes	s/%			± 2.0 mm	
		Warpage, related to diagonal	± 0.75 mm	± 0.5 to a	GB/T 3810.2
		calculated from the work sizes		maximum of	

Annex J

(normative) Dry-pressed ceramic tiles (3 % < $E \le$ 6 %, Group Blla)

Technical requirements for dry-pressed ceramic tiles (3 % < E \le 6 %, Group BIIa) shall be in accordance with Table J.1.

Table J.1 -- Technical requirements for dry-pressed ceramic tiles (3 % < E ≤ 6 %. Group Blla)

6 %, Group Blla)					
Technical requirements					
			Nomin	al size	Test method
		Item	70 mm ≤ <i>N</i> < 150 mm	<i>N</i> ≥ 150 mm	rest method
		viation, in %, of the average size		± 0.6 to a	GB/T 3810.2
	ior eacr	n tile (2 or 4 sides) from the work size (<i>W</i>)	± 0.9 mm	maximum of ± 2.0 mm	GB/1 3010.2
Length and width		ne manufacturer shall choose the	ninal joint widt		
	2 mm and 5 mm ^a ; for non-modular tiles so that the difference between the work size and the nominal size is not more than ± 2 % to a maximum of 5				GB/T 3810.2
		mm.			
The	Thickness ^b The thickness shall be specified by the manufacturer; ± 0.5 mm maximum of				
		%, of the average thickness of m the work size thickness		± 0.5 mm	
Straightness of sides ^c (facial sides) The maximum deviation from straightness, in %, related to the corresponding work sizes			± 0.75 mm	± 0.5 to a maximum of ± 1.5 mm	GB/T 3810.2
Rectangularity ^c The maximum deviation from rectangularity, in %, related to the corresponding work sizes			± 0.75 mm	± 0.5 to a maximum of ± 2.0 mm	GB/T 3810.2
Surface fl	atness	Centre curvature, related to diagonal calculated from the work sizes	± 0.75 mm	± 0.5 to a maximum of ± 2.0 mm	GB/T 3810.2
The max deviation	from	Edge curvature, related to the corresponding work sizes	± 0.75 mm	± 0.5 to a maximum of ± 2.0 mm	GB/T 3810.2
		Warpage, related to diagonal calculated from the work sizes	± 0.75 mm	± 0.5 to a maximum of	GB/T 3810.2

Annex K

(normative) Dry-pressed ceramic tiles (6 % < $E \le 10$ %, Group BIIb)

Technical requirements for dry-pressed ceramic tiles (6 % < $E \le$ 10 %, Group BIIb) shall be in accordance with Table K.1.

Table K.1 -- Technical requirements for dry-pressed ceramic tiles (6 % < $E \le$ 10 %. Group BIIb)

Technical requirements					
			Nomin	al size	Test method
		Item	70 mm ≤ <i>N</i> <	<i>N</i> ≥ 150 mm	restiniculou
			150 mm	7V = 130 111111	
	The dev	viation, in %, of the average size		± 0.6 to a	
	for each	tile (2 or 4 sides) from the work	± 0.9 mm	maximum of	GB/T 3810.2
		size (W)		± 2.0 mm	
Length	Th	ne manufacturer shall choose the	work size as	follows:	
and width	for mod	dular tiles in order to allow a nom	ninal joint widt	h of between	
and width		2 mm and 5 mr	n ^a ;		GB/T 3810.2
	for non	-modular tiles so that the differe	nce between t	he work size	OB/1 3010.2
	and th	ne nominal size is not more than	± 2 % to a ma	aximum of 5	
		mm.	1		
		Thickness ^b			
The		s shall be specified by the		± 5 to a	
		manufacturer;	± 0.5 mm	maximum of	GB/T 3810.2
		%, of the average thickness of		± 0.5 mm	
each	n tile fror	m the work size thickness			
	Ū	ss of sides ^c (facial sides)		± 0.5 to a	
		viation from straightness, in %,	± 0.75 mm	maximum of	GB/T 3810.2
relate	ed to the	corresponding work sizes		± 1.5 mm	
		Rectangularity ^c		± 0.5 to a	
		viation from rectangularity, in %,	± 0.75 mm	maximum of	GB/T 3810.2
relate	related to the corresponding work sizes ± 2.0 mm				
		Centre curvature, related to		± 0.5 to a	
		diagonal calculated from the	± 0.75 mm	maximum of	GB/T 3810.2
Surface fla	atness	work sizes		± 2.0 mm	
The max		Edge curvature, related to the		± 0.5 to a	
deviation		corresponding work sizes	± 0.75 mm	maximum of	GB/T 3810.2
flatnes	s/%			± 2.0 mm	
		Warpage, related to diagonal	± 0.75 mm	± 0.5 to a	GB/T 3810.2
		calculated from the work sizes		maximum of	

Annex L

(normative) Dry-pressed ceramic tiles (E > 10 %, Group BIII)

Technical requirements for dry-pressed ceramic tiles (E > 10 %, Group BIII) shall be in accordance with Table L.1.

Table L.1 -- Technical requirements for dry-pressed ceramic tiles (E > 10 %, Group BIII)

Group Bill)							
	Test method						
Nominal size							
Item			70 mm ≤ <i>N</i> <	<i>N</i> ≥ 150 mm	restinethod		
			150 mm				
Length and width	The dev	viation, in %, of the average size		± 0.5 to a			
	for each tile (2 or 4 sides) from the work		± 0.75 mm	maximum of	GB/T 3810.2		
		size (W)	<u> </u>	± 2.0 mm			
	Th						
	for mod	GB/T 3810.2					
	1.5 mm and 5 mm ^a ;						
	for non-modular tiles so that the difference between the work size						
	and th						
	Thickness ^b						
The thickness shall be specified by the				± 10 to a	a= /= a= /= a		
T0 - 4 - 3		manufacturer;	± 0.5 mm	maximum of	GB/T 3810.2		
		%, of the average thickness of		± 0.5 mm			
each tile from the work size thickness							
	•	ss of sides ^c (facial sides)	. 0 5	± 0.3 to a	OD/T 2040 0		
The maximum deviation from straightness, in %,			± 0.5 mm	maximum of	GB/T 3810.2		
related to the corresponding work sizes ± 1.5 mm ± 0.5, - 0.3 to							
	F	Rectangularity ^c	± 0.75 mm	a maximum	GB/T 3810.2		
The maxin	num dev	viation from rectangularity, in %,		of ± 2.0 mm.			
related to the corresponding work sizes			0.0 11111	- 1.5 mm			
		Centre curvature, related to diagonal calculated from the work sizes	± 0.75 mm - 0.5 mm	± 0.5, - 0.3 to	GB/T 3810.2		
	n from			a maximum			
				of ± 2.0 mm,			
The max				- 1.5 mm			
flatnes		Edge curvature, related to the corresponding work sizes	± 0.75 mm	± 0.5 to a	GB/T 3810.2		
nautes				maximum of			
				± 2.0 mm			

Annex M

(normative) Determination of coefficient of friction

M.1 Scope of application

This annex specifies the determination method for static coefficient of friction of ceramic tiles.

M.2 Instruments and materials

M.2.1 Instruments

A force measuring system, used to test the force required to pull a slider on a tile surface, see figure M.1. Include:

- a horizontal tension meter with a division not less than 0.25 kgf;
- a weight of 4.5 kg;
- 4S rubber, with a IRD hardness of 90 ± 2;
- a slider assembly consisting of a 4S rubber block of 75 mm × 75 mm × 3 mm attaching to a plywood of 200 mm × 200 mm × 20 mm. One side of the plywood is fixed with a ring screw for connection to the tension meter;
- a fixed frame below the tile's working surface to prevent the tile from sliding.

M.2.2 Materials for test

Materials for test include:

- two float glass plates of 6 mm thick: one with size not less than 150 mm × 150 mm and the other with size of 100 mm × 100 mm;
- No. 220 silicon carbide powder;
- No. 400 silicon carbide sandpaper;
- distilled water or deionized water;
- neutral cleaning agent.

M.3 Test procedure

COF - the calibration value of coefficient of friction.

If the 4S rubber surface is polished evenly, the 4 tension readings shall be substantially the same and the calibration value shall be in the range of 0.75 ± 0.05 . The calibration process shall be repeated and recorded before and after testing the 3 samples. If the difference between the calibration values before and after is more than \pm 0.05, the entire test process shall be redone. The operator shall calibrate the test equipment and check the operation before and after testing each of the three samples to ensure a higher test consistency.

M.3.4 Measurement procedure (dry method)

- **M.3.4.1** Wash and dry the test surface of each tile, place the tile to be measured on the work surface and close to the fixed frame restricting its movement, and brush all the debris.
- **M.3.4.2** Place the slider assembly on the test surface of the test brick and place the 4.5 kg weight on the center of the upper part of the slider assembly. The tensile force required to produce a sliding tendency of the assembly in the horizontal direction is measured by a tension meter, and the tension reading is recorded.
- **M.3.4.3** After testing three test surfaces or samples, pull the assembly 4 times on each test surface, each pulling direction is 90 ° differ from that of last time. Obtain a total of 12 readings required to calculate the static coefficient of friction. Record all readings.
- **M.3.4.4** After testing a test surface or sample, check the 4S rubber surface and, if its surface shows gloss or scratches, repeat the grinding process according to M.4.2.

M.3.5 Measurement procedure (wet method)

The surface of the sample is wetted with distilled water and the procedure of M.4.4.2 to M.4.4.4 is repeated. Each test shall ensure that the tile surface is always moist.

M.3.6 Calculation

Use equations (M.2) and (M.3) to calculate the static coefficient of friction of the test surface:

Dry	met	hod:
-----	-----	------

$$F_{\rm d} = R_{\rm d}/nm \qquad \qquad (M.2)$$

Wet method:

where:

Annex P

(informative)

Classification of glazed tiles for floors according to their abrasion resistance

This approximate classification is given for guidance only (see GB/T 3810.7). It is not to be taken to provide accurate product specifications for specific requirements.

Class 0 Glazed tiles in this class are not recommended for use on floors.

Class 1 Floor coverings in areas which are walked on, essentially with soft-soled footwear or bare feet without scratching dirt (for example residential bathrooms and bedrooms without direct access from the outside).

Class 2 Floor coverings in areas which are walked on by soft-soled or normal footwear, with, at the most, occasional small amount of scratching dirt (for example rooms in the living areas of homes, but with the exception of kitchens, entrances and other rooms which can have a lot of traffic). This does not apply to abnormal footwear, for example hobnailed boots.

Class 3 Floor coverings in areas which, with normal footwear, are walked on more often with small amount of scratching dirt (for example residential kitchens, halls, corridors, balconies, loggias and terraces). This does not apply to abnormal footwear, for example hobnailed boots.

Class 4 Floor coverings which are walked on by regular traffic with some scratching dirt so that the conditions are more severe than class 3 (for example entrances, commercial kitchens, hotel, exhibition and sale rooms).

Class 5 Floor coverings which are subjected to severe pedestrian traffic over sustained periods with some scratching dirt, so that the conditions are the most severe for which glazed floor tiles are to be suitable (for example public areas, such as shopping centres, airport concourses, hotel foyers, public walkways and industrial applications).

This classification is valid for the given applications under normal conditions. Consideration should be given to the footwear, type of traffic and cleaning methods expected, and the floors should be adequately protected against scratching dirt at the entrances to buildings by interposing footwear cleaning devices.

In extreme cases of very heavy traffic and quantities of scratching dirt, unglazed floor tiles and quarries from Group I may be considered.

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