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Ceramic block for pavement using ceramic industrial by-product “KIRA”

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Foreword

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Ceramic block for pavement using ceramic industrial by-product "KIRA"

Introduction

This Japanese Industrial Standard provides quality requirements and test methods for highly water absorbent, highly water retentive ceramic pavement blocks designed to improve heat environment of pavements in urban areas. This Standard aims to promote widespread use of such ceramic blocks, as well as to facilitate effective utilization of the unused natural resource called "KIRA" which is expected to increase water retentivity and water absorbability of ceramic blocks.

No corresponding International Standard has been established at this point.

1 Scope

This Standard specifies requirements for highly water absorbent, highly water retentive ceramic pavement blocks (hereafter referred to as blocks) which are manufactured by forming, baking and hardening a mixture of materials mainly composed of KIRA and which are used for paving open spaces, parking lots, sidewalks, etc. not having a steady traffic of large sized vehicles.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. For standards with the year indication, only the editions of the indicated year shall be applied and the revisions (including amendments) made thereafter shall not be applied. For those without the indication of the year, the most recent editions (including amendments) shall be applied.

JIS A 0203 *Concrete terminology*

JIS A 1148 *Method of test for resistance of concrete to freezing and thawing*

JIS A 5215 *Brick for pavement*

JIS A 5371 *Precast unreinforced concrete products*

JIS B 7516 *Metal rules*

JIS R 1250 *Common bricks and facing bricks*

JIS R 5201 *Physical testing methods for cement*

ASTM E 303 : 2013 *Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS A 0203**, and

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the following apply.

3.1

KIRA

fine granular material composed of silica sand, felspar, etc. and a small amount of clay, 1 μm to 200 μm in grain size and 10 μm to 40 μm in median diameter, which is produced in the refining process of ceramic materials and normally disposed of as industrial waste

3.2

evaporation rate

amount of evaporation per unit time and unit area [kg/(m²·s)]

3.3

evaporation efficiency

ratio of speed of water evaporation from a specimen to the speed of water evaporation from the surface of water at an equal temperature to the specimen

4 Classification

Blocks are classified according to bending fracture load as shown in Table 1.

Table 1 Classification

Classification	Application
Class A	Mainly sidewalks
Class B	Mainly sidewalks and parking lots

5 Quality

5.1 Appearance

When inspected according to **8.2**, the blocks shall be free from flaws, cracks, chips, burrs, and other defects detrimental to use.

5.2 Performance

When tested according to Clause **8**, the blocks shall satisfy the requirements in Table 2.

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Table 2 Performance

Performance	Criterion	
	Class A [a]	Class B [b]
Bending fracture load N/mm	30 min.	50 min.
Compressive strength N/mm²	30 min.	
Freeze-thaw resistance	No cracks, and no change in mass greater than ±5 %	
Slip resistance BPN	40 min.	
Water retention (volume of water retained) g/cm³	0.25 min.	
Water absorption (absorption height) mm	15 min. (thickness of block 60 mm) 20 min. (thickness of block 80 mm)	
Evaporation (sustainability of evaporation efficiency)	Sustained period of 12 h or longer for evaporation efficiency 0.5 or more	
Flexural strength N/mm² [c]	3 min.	5 min.
Water absorption (absorption height) on paving sand mm [c]	15 min. (thickness of block 60 mm) 20 min. (thickness of block 80 mm)	
Evaporation (sustainability of evaporation efficiency) on paving sand [c]	Sustained period of 24 h or longer for evaporation efficiency 0.5 or more	

Notes [a] The criteria for Class A are prescribed assuming sidewalks with no traffic of vehicles.

[b] The criteria for Class B are prescribed based on wheel load of normal sized cars.

[c] These requirements are applied by agreement between the interested parties according to the application of the block or other relevant matters. The requirements applied shall be recorded in the delivery document.

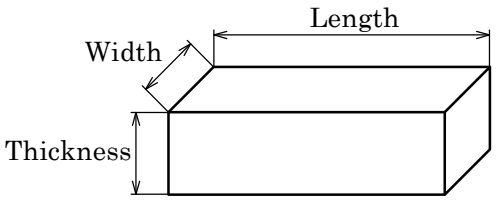
6 Dimensions and dimensional tolerances

When measured according to **8.3**, the block dimensions shall satisfy the requirements in Table 3.

Other thickness value than given in the table may be applied upon agreement between the interested parties, provided the agreed value is subject to the tolerance in Table 3.

Table 3 Dimensions and dimensional tolerances of blocks

Unit: mm



Division	Width (vertical dimension)	Length (horizontal dimension)	Thickness
Nominal	50 or over	100 or over	60 or 80
Tolerance	±3.0	±5.0	±3.0

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