JC

BUILDING MATERIAL INDUSTRY STANDARD

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Natural stone protector for building decoration

建筑装饰用天然石材防护剂

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Natural stone protector for building decoration

1 Scope

This standard specifies the terms and definitions, classification and naming marks, technical requirements, test methods, inspection rules, marking, packaging, storage and transportation, safe coating and protection of natural stone protectors.

This standard applies to the natural stone protector for building decoration.

2 Normative references

The provisions in following documents become the provisions of this standard through reference in this standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this standard; however, parties who reach an agreement based on this standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB 3186 Sampling paint products

GB/T 9966.3-2001 Test methods for natural facing stones - Part 3: Test methods for bulk density, true density, true porosity and water absorption

GB/T 13890 Terms for natural facing stone

GB 18581 Indoor decorating and refurbishing materials - Limit of harmful substances of solvent based coatings for woodenware

GB 18582 Indoor decorating and refurbishing materials - Limit of harmful substances of interior architectural coatings

JC/T 902 Silicone hydrophobic agent for construction surfaces

3 Terms and definitions

The terms and definitions as established by GB/T 13890 as well as the following terms and definitions apply to this standard.

3.1

6 Test methods

6.1 pH

Use a precision pH test paper to make determination.

6.2 Stability

Take two sets of 10 mL of sample. Respectively put it into two test tubes. Place them on opposite sides of the electric centrifuge. Rotate it at 3000 r/min for 5 min. Take out the test tube, to see if there is delamination, floating oil, precipitation.

6.3 Waterproofness

See Appendix A.

6.4 Stain resistance

See Appendix B.

6.5 Reduction rate of cement's bond strength

See Appendix C.

6.6 Acid resistance

See Appendix D.

6.7 Alkali resistance

See Appendix E.

6.8 UV-aging resistance

See Appendix F.

6.9 Impermeability

Flatly place the five 150 mm x 150 mm x 20 mm stones, whose bottom and four sides are protected according to A.3.1 to A.3.3 in Appendix A, in the top of a container (wide-edge box which has a volume of 160 mm x 160 mm x 25 mm, lined with 240 mm x 240 mm plastic film) which contains cement mortar (cement and sand are prepared in the proportion of 1:2.5 by the use of water). Make its bottom face downwards. Allow the cement mortar to reach about 1/2 of the stone's thickness. Use plastic tape to seal the exposed part at the sides of stone and the periphery of the container. Let it be standing for seven days. At the interval of one day, observe the color change and the presence of water mark

7.2 Type inspection

7.2.1 Inspection items

All the items in clause 5 of technical requirements.

7.2.2 Inspection conditions

In one of the following cases, carry out type inspection:

a) When the new product is initially type-finalized;

b) When there is a major change in product's formulation, process, raw materials;

c) When the production is restored after suspension for more than half a year;

d) Once a year during normal production;

e) When the national quality supervision agency proposes to carry out type inspection requirements.

7.2.3 2 Group-batch

Same as exit-factory inspection.

7.2.4 Sampling

Same as exit-factory inspection.

7.2.5 Determination

If one of the test results does not meet the requirements of clause 5, the batch of products is judged to be unqualified.

8 Marking, packaging, storage, transportation

The marking, packaging, storage, transportation of the product shall be in accordance with the provisions of clause 7 of JC/T 902.

9 Safety coating and protection

9.1 When applying coating, try to choose the brushing method and carry it outdoors. If it is indoors, it must be well ventilated.

9.2 When applying coating, the construction personnel shall wear the necessary protective equipment.

Appendix A

(Normative)

Test method of waterproofness

A.1 Equipment and appliances.

A.1.1 Drying oven: The temperature can be controlled within the range of 60 °C ± 2 °C.

A.1.2 Balance: The maximum weighing is 1000 g. The sensitivity is 10 mg.

A.1.3 Dryer.

A.2 Specimen

Take 14 pieces of natural stone sample of 100 mm x 100 mm x 20 mm (it is recommended to use the G3503 natural granite).

A.3 Test procedures

A.3.1 Prepare the protector according to the protector's instruction manual or the requirements of the entrusting organization.

A.3.2 Use 0.25 mm silicon carbide sand to grind the six sides of the specimen smoothly. Use clean water to rinse it. Place it in a drying oven at 60 °C ± 2 °C to dry it for 48 h. Take it out. Place it in a desiccator to cool it to room temperature. Store 5 of them in a desiccator as control samples. Take the other 9 of them as test samples.

A.3.3 Take 9 test samples. Use a brush which is fully coated with protector to apply uniform coating for the six surfaces of the test sample. Flatly place it in a porcelain plate which is paved with glass rod at the bottom. Dry it naturally at room temperature for 1 h. Place the surface of the stone in contact with the glass rod upwards. Continue to dry it at room temperature for 1 h. Follow the procedures above to apply another course of coating. Let it be naturally dried at room temperature which has a humidity of not more than 60% for 48 h.

A.3.4 Make the control sample and test sample be subjected to the water absorption rate test and calculation according to the requirements of 4.1.1, 4.1.2, 5.2 of GB/T 9966.3-2001. The drying temperature is 60 °C ± 2 °C. Respectively calculate the average value of water absorption rate of the control sample and the test sample.

A.4 Calculation of results

Appendix B

(Normative)

Test method of stain resistance

B.1 Vessel

B.1.1 Drying oven: The temperature can be controlled within the range of 60 °C ± 2 °C.

B.1.2 25 mL dropper bottle.

B.1.3 Dryer.

B.2 Contaminant reagent

B.2.1 Edible vegetable oil.

B.2.2 Blue-black ink.

B.3 Specimen

Take 12 pieces of natural stone sample of 100 mm x 100 mm x 20 mm (it is recommended to use G3503 natural granite).

B.4 Test procedure

B.4.1 Prepare the protector according to the protector's instruction manual or the requirements of the entrusting organization.

B.4.2 Use 0.25 mm silicon carbide sand to grind the six sides of the specimen smoothly. Use clean water to rinse it. Place it in a drying oven at 60 °C ± 2 °C to dry it for 48 h. Take it out. Place it in a desiccator to cool it to room temperature. Store 6 of them in a desiccator as control samples. Take the other 6 of them as test samples. Make it protected according to A.3.1 to A.3.3 in Appendix A.

B.4.3 Contamination test

Flatly place the protected test sample and the control sample. Add two drops of each contamination reagent at the center of three samples (prevent splashing). Let it be standing at room temperature for 1 h. Rinse it in flowing water. Use a soft cloth to wipe it gently. After the surface is dried, observe the surface contamination. Take the contamination of the most seriously contaminated sample as the test sample.

B.5 Determination

Appendix C

(Normative)

Test method for reduction rate of cement's bond strength

C.1 Scope

This test specifies the equipment, gauges, specimens, test procedures, calculations used for the comparison test of the protected and unprotected natural facing stone for the cement mortar's bond strength.

C.2 Equipment, gauges, materials

C.2.1 Test machine: The measurement accuracy is ±1%. The sample's failure load is within the range of 20% ~ 90% of the indication value of the equipment.

C.2.2 Vernier caliper: The accuracy is 0.02 mm.

C.2.3 Cement: The 425 cement which complies with GB 175-1999.

C.2.4 Connector: Hanger which connect the test machine to the specimen.

C.2.5 Sand: Engineering sand.

C.3 Specimen

The length is 300 mm. The width is 300 mm. The thickness is the actual using thickness: 10 pieces per sample, including one set of products with coated protector and one set of product without coated protector, each set includes 5 pieces.

C.4 Test procedure

C.4.1 The roughness of the stone's test surface is the same as that used in actual engineering.

C.4.2 Cement mortar is prepared according to 1:2.5 (cement to sand) or the proportion of actual use and stirred evenly.

C.4.3 Flatly place the back side of the specimen upwards on the ground. Apply 15 mm ~ 20 mm thick cement mortar on the back of the specimen. Ensure that the cement mortar and the back of the specimen are in sufficient contact with each other to avoid bulging. Embed the connector at the center of the specimen. Then apply a layer of cement mortar of 25 mm ~ 30 mm thick, to form a 100 mm x 100 mm square block after setting.

Appendix D

(Normative)

Test method of acid resistance

D.1 Appliance

D.1.1 Drying oven: The temperature can be controlled within the range of 60 °C ± 2 °C.

D.1.2 Balance: The maximum weighing is 1000 g. The sensitivity is 10 mg.

D.1.3 Plastic containers.

D.2 Test solution

1% (V/V) sulfuric acid solution.

D.3 Specimen

Take 3 test samples which has been subjected to the waterproofness test.

D.4 Test procedure

D.4.1 Directly put the test sample in the wet state after the waterproofness test in a sulfuric acid solution which has a volume fraction of 1% to soak it for 48 h. The liquid surface is about 50 mm higher than the upper surface of the specimen.

D.4.2 Take out the specimen. Use clean water to rinse it. According to the provisions of 4.1.1, 4.1.2, 5.2 of GB/T 9966.3, carry out water absorption rate test and calculation. The drying temperature is 60 °C ± 2 °C.

D.5 Calculation of results

Acid resistance is calculated according to formula (D.1):

$$E = \frac{E_1 - E_2}{E_1} \qquad \text{(D. 1)}$$

Where:

E - Acid resistance, in percentage (%);

E_1 - The average water absorption rate of control sample, in percentage (%);

Appendix E

(Normative)

Test method of alkali resistance

E.1 Equipment

E.1.1 Drying oven: The temperature can be controlled within the range of 60 °C ± 2 °C.

E.1.2 Balance: The maximum weighing is 1000 g. The sensitivity is 10 mg.

E.1.3 Plastic containers.

E.2 Test solution

Supersaturated calcium hydroxide solution: When the temperature is 23 °C ± 2 °C, dissolve 1 g of calcium hydroxide in 100 g of water.

E.3 Specimen

Take three test samples which has been subjected to waterproofness test.

E.4 Test procedures

E.4.1 Directly put the test sample in the wet state after the waterproofness test in a supersaturated calcium hydroxide solution to soak it for 48 h. The liquid surface is about 50 mm higher than the upper surface of the specimen.

E.4.2 Take out the specimen. Use clean water to rinse it. According to the provisions of 4.1.1, 4.1.2, 5.2 of GB/T 9966.3, carry out water absorption rate test and calculation. The drying temperature is 60 °C ± 2 °C.

E.5 Calculation of results

Alkali resistance is calculated according to formula (E.1):

$$J = \frac{J_1 - J_2}{J_1} \qquad \text{(E. 1)}$$

Where:

J - Alkali resistance, in percentage (%);

J_1 - The average water absorption rate of control sample, in percentage (%);

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