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PORCELAIN LABORATORY APPARATUS

QUALITY AND METHODS OF TEST

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BRIEF HISTORY

The ISO Recommendation R 1775, *Porcelain laboratory apparatus – Quality and methods of test,* was drawn up by Technical Committee ISO/TC 48, *Laboratory glassware and related apparatus,* the Secretariat of which is held by the British Standards Institution (BSI).

Work on this question led to the adoption of Draft ISO Recommendation No. 1775, which was circulated to all the ISO Member Bodies for enquiry in December 1968. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Austria	Iran	Thailand
Belgium	Israel	Turkey
Canada	Italy	U.A.R.
Colombia	Netherlands	United Kingdom
Czechoslovakia	New Zealand	U.S.A.
France	Peru	U.S.S.R.
Germany	Poland	Yugoslavia
Greece	South Africa, Rep. of	
India	Spain	

No Member Body opposed the approval of the Draft.

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided to accept it as an ISO RECOMMENDATION.

ISO Recommendation | R 1775 | October 1970

PORCELAIN LABORATORY APPARATUS

QUALITY AND METHODS OF TEST

1. SCOPE

This ISO Recommendation specifies requirements for a quality of porcelain suitable for all types of porcelain laboratory apparatus (including microchemical apparatus) and describes appropriate methods of test.

NOTE. – Some of the tests specified should, for convenience, be carried out only on the articles mentioned, the results being accepted as generally applicable to all articles manufactured under similar conditions from the same batch of material.

2. SAMPLING

The whole articles or pieces of porcelain apparatus selected for the tests should be representative of the batch or consignment as a whole. The selection should preferably be made by application of a standard sampling procedure, agreed between the parties to the tests.

3. POROSITY

When tested by the method described in Annex A, the porcelain should not show staining as defined in clause A.4.

4. GLAZE

When tested by the method described in Annex A, the glaze of the porcelain should not show crazing or other defects as defined in clause A.5.

5. RESISTANCE TO HEAT AND SUDDEN CHANGE OF TEMPERATURE

When quenched from a temperature of 230 degrees Celsius above ambient temperature, in the manner described in Annex B, the porcelain should not break, crack or show crazing as defined in clause B.4.

6. RESISTANCE OF GLAZE TO HIGH TEMPERATURE

When tested by the method described in Annex C, the glaze of the porcelain should not show softening as defined in clause C.3.

7. CONSTANCY OF MASS ON IGNITION

When tested by the method described in Annex D, the porcelain should not vary in mass by more than 0.1 mg per 10 g of total mass.

8. RESISTANCE OF GLAZE TO ACID OR ALKALI

When tested by the methods described in Annex E, the porcelain should not show losses in mass greater than the following amounts :

(*a*) Hydrochloric acid test

0.01 mg per square centimetre of the total inner surface of the vessel.

(*b*) Sodium carbonate test

0.1 mg per square centimetre of the surface covered by the liquid.

(*c*) Sodium hydroxide test

0.6 mg per square centimetre of the surface covered by the liquid.

ANNEX A

METHOD OF TEST FOR POROSITY OF BODY AND IMPERFECTIONS OF GLAZE

A.1 MATERIAL FOR TEST

Cleanly broken pieces.

A.2 REAGENT

Solution of eosin in water (5 g/l).

A.3 PROCEDURE

Completely immerse the broken pieces of porcelain in the eosin solution (A.2) and allow them to soak for 18 hours. Rinse the pieces thoroughly with water, dry them with a cloth, and examine them with a hand lens.

A.4 INTERPRETATION OF RESULTS – POROSITY

Porcelain showing general staining of unglazed portions, indicating penetration of the eosin solution through the body, is reported as failing the test.

Porcelain showing a creeping effect of the eosin solution between the glaze and the body, indicating a lack of adhesion between them, is reported as failing the test.

A.5 INTERPRETATION OF RESULTS – IMPERFECTIONS OF GLAZE

Porcelain showing spots of staining with a shading or fringe around them is reported as failing the test.

ANNEX B

METHOD OF TEST FOR RESISTANCE TO HEAT AND TO SUDDEN CHANGE IN TEMPERATURE

B.1 MATERIAL FOR TEST

Complete crucibles not exceeding 46 mm in diameter.

B.2 APPARATUS

A suitable type of apparatus is shown in the Figure, page 8, and comprises

B.2.1 *Furnace,* consisting of a vertical tube, of 100 mm internal diameter and 500 mm long, and provided with a short side tube half way down to take a thermometer. It is uniformly wound with resistance wire to consume about 1 kW, and is efficiently lagged and fitted with a suitable means of controlling the temperature.

B.2.2 *Light wire cage,* for carrying the crucible and suspended from the lid of the furnace in such a manner that it can be released to fall freely.

B.2.3 *Thermometer,* which may conveniently be graduated at each 2 degrees Celsius from 0 to 300 °C, and adjusted for use at 100 mm immersion. Any suitable thermometer of similar accuracy may be used.

B.3 PROCEDURE

Place the crucible bottom downwards in the cage and heat for 15 minutes at a temperature of 230 degrees Celsius above room temperature. Remove the thermometer and allow the cage and crucible to fall into a bucket of water at room temperature, the surface of which is approximately 150 mm below the bottom of the furnace.

Examine the crucible and if it is not broken or cracked dip it into a 5 g/l solution of eosin in water.

B.4 INTERPRETATION OF RESULTS

A crucible which is fractured or which shows staining, indicating damage to the glaze, is reported as failing the test.

ANNEX C

METHOD OF TEST FOR RESISTANCE OF GLAZE TO HIGH TEMPERATURE

C.1 MATERIAL FOR TEST

Complete articles or broken pieces.

C.2 PROCEDURE

Place some small clean broken pieces of the porcelain in a crucible or dish of the same make in such a way that the glazed surfaces are in contact as far as possible . Heat the porcelain for 2 hours in a muffle furnace at a temperature of 900 °C, allow it to cool and examine for adhesion of the pieces to each other or to the containing vessel.

C.3 INTERPRETATION OF RESULTS

Porcelain showing adhesion is reported as failing the test.

ANNEX D

METHOD OF TEST FOR CONSTANCY OF MASS ON IGNITION

D.1 MATERIAL FOR TEST

Complete articles or broken pieces.

D.2 PROCEDURE

Wash the articles or pieces in cold N hydrochloric acid followed by distilled water, then dry and ignite them at a dull red heat. Allow the articles or pieces to cool, weigh them, and repeat the ignition until a constant mass is obtained. Then heat them for 2 hours in a muffle furnace at a temperature of 950 to 1000 °C, allow them to cool and weigh them again.

D.3 REPORTING OF RESULTS

Report any change in mass of the article or pieces in milligrammes per 10 g of total mass.