ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION
R 718

METHODS FOR THERMAL SHOCK TESTS
ON LABORATORY GLASSWARE

1st EDITION
May 1968

BRIEF HISTORY

The ISO Recommendation R 718, *Methods for thermal shock tests on laboratory glass ware,* 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 by the Technical Committee began in 1950 and led, in 1958, to the adoption of a Draft ISO Recommendation.

This first Draft ISO Recommendation (No. 351) was circulated in April 1960 to all the ISO Member Bodies for enquiry. As the results of this consultation were not considered satisfactory, the Technical Committee presented a second Draft ISO Recommendation which was circulated to all the ISO Member Bodies in December 1963 and which was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Argentina	Hungary	Sweden
Australia	India	Switzerland
Austria	Israel	Turkey
Belgium	Italy	U.A.R.
Brazil	Japan	United Kingdom
Canada	Korea, Rep. of	U.S.A.
Chile	Netherlands	U.S.S.R.
Colombia	New Zealand	Yugoslavia
Czechoslovakia	Poland	
Greece	Spain	

Two Member Bodies opposed the approval of the Draft :

France
Germany

The second Draft ISO Recommendation was then submitted by correspondence to the ISO Council which decided, in May 1968, to accept it as an ISO RECOMMEND-ATION.

METHODS FOR THERMAL SHOCK TESTS

ON LABORATORY GLASSWARE

1. SCOPE

This ISO Recommendation describes general methods of test intended to assess the resistance of glassware used in laboratories to a shock arising from a predetermined change in temperature.

Three methods are recommended :

(1) Method A, for testing whole articles at temperature differences of less than 100 degrees Celsius.

(2) Method B, for testing whole articles at temperature differences of 100 degrees Celsius or more.

(3) Method C, for testing the rims of articles.

NOTE. – Method B is recommended also for testing small articles, at temperature differences of less than 100 degrees Celsius, in cases for which Method A is inappropriate.

2. DEFINITION

The thermal shock is measured by the difference between the upper temperature t_1, to which the article is heated, and the lower temperature t_2 of the cold water bath, in which the article is placed.

3. SAMPLING

The number of articles to be taken as a sample from a consignment should be specified in the appropriate national standard for the article under test or, in default, this should be agreed between the parties concerned. The articles comprising the sample should be taken at random from the whole consignment.

4. APPARATUS

4.1   **Method A. For testing whole articles at temperature differences less than 100 degrees Celsius**

Two baths of a capacity of at least 5 litres are required, one of the baths provided with a means of heating. Each bath should be provided with a suitable stirrer or other device to ensure that a constant temperature can be maintained throughout the bath, and with a laboratory thermometer capable of being read to an accuracy of $\pm$ 1 degree Celsius.

4.2   Method B. For testing whole articles at temperature differences of 100 degrees Celsius or more

A bath is required, similar to one of those described for Method A, fitted with a stirrer and thermometer and capable of being maintained at a stated temperature between 0 and 25 °C as required.

An oven with a temperature range of 35 to 250 °C and provided with an air-stirrer or circulator to ensure temperature uniformity. The oven should also have a thermostat capable of maintaining the temperature constant to $\pm$ 1 degree Celsius up to 180 °C and to $\pm$ 2 degrees Celsius between 180 and 250 °C.

4.3   Method C. For testing the rims of articles

As described above for Method B.

5.   PROCEDURE

5.1   Method A. For testing whole articles at temperature differences less than 100 degrees Celsius

Both baths should be filled with water and the temperatures adjusted to $t_1 \pm 1$ °C and to $t_2 \pm 1$ °C respectively; t_2 is conveniently taken as the temperature of the tap water, and t_1 is selected to give the required thermal shock ($t_1 - t_2$) degrees Celsius. The range may be extended to nearly 100 degrees Celsius by using ice-water in the cold bath. The sample articles should be immersed in the bath at temperature t_1 so that they are filled with water, and then allowed to soak for 15 minutes. The temperature should be maintained constant to $\pm$ 1 degree Celsius and noted.

Each of the samples filled with water should then be transferred to the bath at temperature t_2. The process of transference should be completed in 10 $\pm$ 2 seconds for each article. The articles should be almost completely immersed in the bath, without allowing cold water to enter them, for a specified period which should not exceed 2 minutes.

5.2   Method B. For testing whole articles at temperature differences of 100 degrees Celsius or more

The articles should be placed in the oven previously heated to the upper temperature t_1 and should be maintained at that temperature for 30 minutes. The articles should then be removed from the oven one at a time by means of tongs with asbestos-covered tips and immersed to half the height of the body (i.e. total height less neck, if any) in the cold water bath which has been maintained at the lower temperature t_2. The process of transference should be completed in 5 $\pm$ 1 seconds for each article.