INTERNATIONAL STANDARD 695

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Glass — Determination of resistance to attack by a boiling aqueous solution of mixed alkali

Verre — Détermination de la résistance à l'attaque par une solution aqueuse bouillante d'un mélange alcalin

First edition — 1975-09-01

UDC 666.1 : 620.193.42

Ref. No. ISO 695-1975 (E)

Descriptors : glass, tests, water resistance tests, boiling water, alkalis.

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 48 has reviewed ISO Recommendation R 695 and found it technically suitable for transformation. International Standard ISO 695 therefore replaces ISO Recommendation R 695-1968 to which it is technically identical.

ISO Recommendation R 695 was approved by the Member Bodies of the following countries :

Australia	France	New Zealand
Austria	Germany	Poland
Belgium	Greece	South Africa, Rep. of
Brazil	Hungary	Spain
Bulgaria	India	Sweden
Canada	Israel	Switzerland
Chile	Italy	Turkey
Colombia	Japan	United Kingdom
Czechoslovakia	Korea, Rep. of	U.S.S.R.
Egypt, Arab Rep. of	Netherlands	Yugoslavia

The Member Body of the following country expressed disapproval of the Recommendation on technical grounds :

U.S.A.

No Member Body disapproved the transformation of ISO/R 695 into an International Standard.

Printed in Switzerland

Glass — Determination of resistance to attack by a boiling aqueous solution of mixed alkali

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for determining the resistance of glass to attack by a boiling aqueous solution of equal volumes of N sodium carbonate and N sodium hydroxide. The resistance is measured inversely by the loss in mass per unit area of the glass.

2 REAGENTS

Use only reagents of recognized analytical grade, and only distilled or deionized water.

2.1 Acetone, pure.

2.2 Acetic acid, 5 % (*V*/*V*).

2.3 Hydrochloric acid, approximately N solution.

2.4 Sodium carbonate solution, N ± 0,02 N, freshly prepared for each test.

2.5 Sodium hydroxide solution, N ± 0,02 N, freshly prepared for each test.

3 APPARATUS

3.1 Test vessel, of pure silver or alkali-resistant silver alloy. A recommended vessel, as shown in the figure, is cylindrical with a hemispherical base and has a close-fitting lid. The lid has a wide neck and is fitted on the underside with four hooks from which to suspend the samples. Where a gasket is required to ensure an adequate joint between the body and the lid, it shall be of a material which remains inert under the conditions of test.

3.2 Condenser of the Allihn or Liebig type, made of chemically resistant glass, fitted to the neck of the vessel through a bung of suitable inert material which has previously been boiled for 60 min in water.

3.3 Balance, accurate to ± 0,1 mg.

3.4 Desiccator, containing a suitable drying agent.

3.5 Measuring instruments, suitable for measuring lengths and diameters to the required accuracy.

3.6 Drying oven, suitable for operation at a temperature of 150 °C.

3.7 Beaker, 1 l capacity.

3.8 Silver wire.

3.9 Tongs, tipped, if necessary, with a suitable material.

4 PREPARATION OF SAMPLE

Cut a piece or pieces of the glass to be tested such that the sample has a total surface area of 10 to 15 cm². Remove any sharp angles, "hackles" or splinters by a minimum of grinding; do not fire-polish the edges.

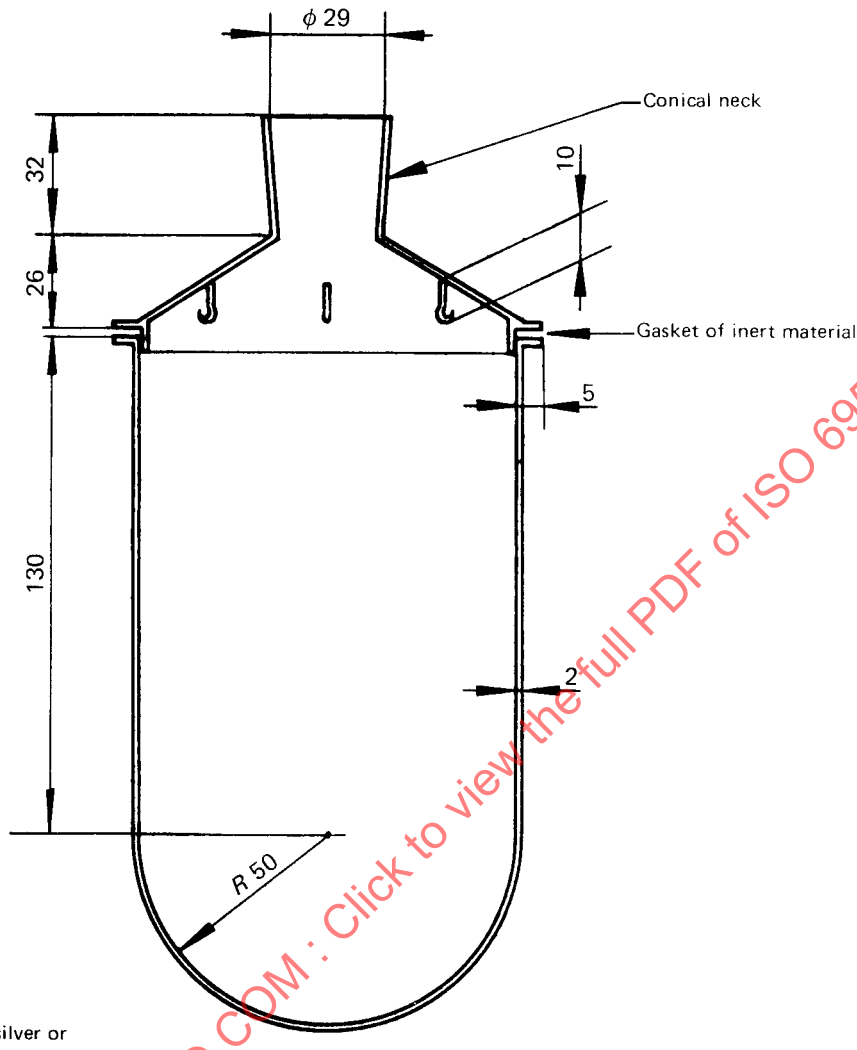
5 PROCEDURE

Calculate the total surface area of the sample piece or pieces to an accuracy of 2 %* and record the value obtained. Thoroughly wash the sample with acetic acid (2.2), then, using the tongs to hold the glass (as in subsequent operations), wash it three times with separate portions of water and finally rinse it with acetone (2.1). Dry the sample in the oven at 150 °C for 30 min, transfer it to the desiccator and allow it to cool to room temperature, then weigh it to an accuracy of ± 0,1 mg. Record the mass.

Transfer 800 ml of a mixture of equal volumes of the sodium carbonate (2.4) and sodium hydroxide (2.5) solutions to the test vessel (3.1) and heat to boiling. Suspend the sample piece or pieces by a silver wire sling from the hooks on the lid of the vessel and immerse in the boiling solution so that all the pieces are completely covered by the solution and no contact is made between the pieces themselves or with the wall of the vessel. Fit the condenser (3.2) to the lid of the vessel, turn on the flow of water through the condenser and continue boiling for 3 h.

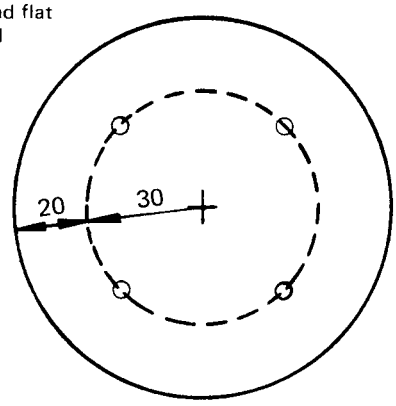
* For this purpose, linear measurements shall be made to an accuracy of ± 1 %.

Dimensions in millimetres



Material
pure silver or
alkali-resistant silver alloy

Execution
4 hooks soldered to cover,
1 flange with ground flat
surface, fixed to lid



View of lid from above, showing position of hooks

FIGURE — **Example of suitable test vessel**

Remove the sample from the boiling solution and submerge it three times in a 500 ml volume of hydrochloric acid (2.3). Wash it three times with separate portions of water and finally rinse it with acetone (2.1). Dry the sample in the oven (3.6) at 150 °C for 30 min, transfer it to the desiccator and allow it to cool to room temperature, then weigh it to an accuracy of ± 0,1 mg. Record the mass.

Repeat the procedure with a new sample of glass and with fresh solutions.

6 EXPRESSION OF RESULTS

From each of the results obtained, calculate and report the loss in mass per unit area of the glass, in milligrams per square decimetre, from the formula

$$\frac{100\,(m_1 - m_2)}{A}$$

where

m_1 is the initial mass, in milligrams, of the sample;

m_2 is the final mass, in milligrams, of the sample;

A is the total surface area, in square centimetres, of the sample.

Calculate and report the mean of the values obtained.