

Chemical resistance of glass used in the production of laboratory glassware —

**Part 4: Methods for determination of
hydrolytic resistance of the interior
surfaces of glass containers —**

**Section 4.1 Determination by titration
method and classification**

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Laboratory Apparatus Standards Committee (LBC/-) to Technical Committee LBC/8, upon which the following bodies were represented:

British Glass Manufacturers' Confederation
Society of Glass Technology

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National foreword

This Section of BS 3473 has been prepared under the direction of the Laboratory Apparatus Standards Policy Committee. This Section of BS 3473-4 together with Section 4.2 supersedes BS 3473-4:1983, which is withdrawn. It is identical with ISO 4802-1:1988 “*Glassware — Hydrolytic resistance of the interior surfaces of glass containers — Part 1: Determination by titration method and classification*”, published by the International Organization for Standardization (ISO). It has been prepared by subcommittee 5 of Technical Committee TC48, Laboratory glassware and related apparatus, with the active participation and approval of the UK.

BS 3473 was first published in 1962 as a single publication which described procedures for determining the resistance of glass used in the production of laboratory glassware to attack by a boiling aqueous solution of mixed alkali, and to water at 100 °C and 121 °C. To facilitate alignment with corresponding International Standards, the revision of BS 3473 was begun in 1982 with the publication of the first three Parts of what was then intended to be a six Part standard, Part 6, which was to deal with classification, will not now be issued as it has been agreed internationally to include classification in the individual test methods.

BS 3473 currently consists of the following Parts:

- *Part 1: Method for determination of resistance of glass to attack by a boiling aqueous solution of mixed alkali* (Identical with ISO 695:1984);
- *Part 2: Method for determination of hydrolytic resistance of glass grains at 98 °C* (Identical with ISO 719:1985);
- *Part 3: Method for determination of hydrolytic resistance of glass grains at 121 °C* (Identical with ISO 720:1985);
- *Part 4: Methods for determination of hydrolytic resistance of the interior surfaces of glass containers*;
- *Section 4.1: Determination by titration method and classification* (Identical with ISO 4802-1:1988);
- *Section 4.2: Determination by flame photometry and classification* (Identical with ISO 4802-2:1988);
- *Part 5: Method for determination of the resistance of glass to attack by 6 mol/L hydrochloric acid at 100 °C* (Identical with ISO 1776:1985).

The procedures described in BS 3473 are recommended as being capable of yielding consistent results in the hands of independent workers in different laboratories and offer a means of assessing the chemical resistance of glass used in the production of laboratory ware when tested by the specified procedure.

Because the term “laboratory glassware” covers a wide variety of articles to serve many different purposes and the glass types used include both borosilicate and soda-lime-silica glass, methods of test are required which are widely applicable. Tests of fractured surfaces, such as the grain test described in Parts 2 and 3, give an assessment of the chemical behaviour of the body of the glass and can be applied to articles of laboratory glassware because they are usually used many times. Such tests have a more limited value for assessing the chemical resistance of glass articles which are to be used once only because the resistance depends more on the condition of the surface than on the body of the glass; BS 3473-4 relates to such applications.

It should be realized that whilst these procedures can be used to assess the behaviour of glass under the stated conditions, and thus to select glasses for general laboratory purposes, they can reveal or measure limited aspects of chemical behaviour. Where articles are designed for a specific purpose, it is essential that the performance of the glass should be evaluated in terms of precise service requirements by using simulative or functional tests.

The principle differences between BS 3473-4:1983 and this Section of BS 3473 is that this Section includes:

- a) a system for classification of glass;
- b) a clause giving definitions;
- c) a clause giving the principle of the method;
- d) improvements to the test procedure.

In addition, the annex describing a dithizone limit test for heavy metals has been omitted.

Cross-references

International Standard	Corresponding British Standard
	BS 3473 <i>Chemical resistance of glass used in the production of laboratory glassware</i>
ISO 719:1985	Part 2:1987 <i>Method for determination of hydrolytic resistance of glass grains at 98 °C</i> (Identical)
ISO 720:1985	Part 3:1987 <i>Method for determination of hydrolytic resistance of glass grains at 121 °C</i> (Identical)
ISO 1773:1976	BS 2734:1984 <i>Specification for boiling flasks (narrow-necked), conical, flat bottom and round bottom</i> (Identical)
ISO 3696:1987	BS 3978:1987 <i>Specification for water for laboratory use</i> (Identical)
ISO 3819:1985	BS 6523:1984 <i>Specification for glass beakers for laboratory use</i> (Technically equivalent)

The Technical Committee has reviewed the provisions of ISO 385-1, ISO 385-2 and ISO 648, to which reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard.

A related British Standard to ISO 385-1 and ISO 385-2 is BS 846:1985, “*Specification for burettes*”.

A related British Standard to ISO 648 is BS 1583:1986, “*Specification for one-mark pipettes*”.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

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This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.