INTERNATIONAL STANDARD

ISO 10136-2

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Glass and glassware — Analysis of extract solutions —

Part 2:
Determination of sodium oxide and potassium oxide by flame spectrometric methods

Verre et verrerie — Analyse des solutions d'attaque —

Partie 2: Dosage de l'oxyde de sodium et de l'oxyde de potassium par spectrométrie d'émission de flamme

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10136-2 was prepared by Technical Committee ISO/TC 48, *Laboratory glassware and related apparatus*, Sub-Committee SC 5, *Quality of glassware*.

ISO 10136 consists of the following parts, under the general title *Glass and glassware — Analysis of extract solutions*:

— *Part 1: Determination of silicon dioxide by molecular absorption spectrometry*

— *Part 2: Determination of sodium oxide and potassium oxide by flame spectrometric methods*

— *Part 3: Determination of calcium oxide and magnesium oxide by flame atomic absorption spectrometry*

— *Part 4: Determination of aluminium oxide by molecular absorption spectrometry*

— *Part 5: Determination of iron(III) oxide by molecular absorption spectrometry and flame atomic absorption spectrometry*

— *Part 6: Determination of boron(III) oxide by molecular absorption spectrometry*

Annex A of this part of ISO 10136 is for information only.

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Introduction

Classifications of glass or glassware, in National or International Standards and in the various pharmacopoeia, have relied for many years on a titration of extract solutions with a diluted mineral acid. Such solutions may contain not only the alkali metal oxides (sodium and potassium), but also the alkaline earth oxides (calcium and magnesium), which are also titrated by acid. Thus, the determination is actually of the total alkalinity of the extract solution and this is calculated as the equivalent mass of sodium oxide. In recent years, with the advent of more modern techniques, such as flame spectrometric methods, these techniques have been applied more and more. Therefore, the specific determination of sodium and potassium in extract solutions is possible, and this is of interest for many general investigations on the durability of glasses.

The procedure was established and applied to simulated or actual durability extract solutions of glasses in an international collaborative study conducted by Technical Committee 2, Chemical Durability and Analysis, of the International Commission on Glass (ICG). In these round robins, up to 21 analysts from 15 laboratories collaborated. The final results of the round robin were that for the very low concentrations in extract solutions, e.g. from borosilicate glasses, no spectrochemical buffer needs to be added, and that for other aqueous extract solutions the addition of only caesium chloride is sufficient (see [5] in annex A).

The flame spectrometric methods described in this part of ISO 10136 are claimed to be satisfactory for determining both alkali metal oxides in durability extract solutions.

The results of investigations on turbidities, especially in grain test solutions, showed that acidification to dissolve possible hydroxides and/or carbonates is necessary prior to the analytical determination. This is achieved by using spectroscopic buffer solutions, which are normally strongly acidic, or by addition of acids.