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INTERNATIONAL STANDARD

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**Optics and photonics — Optical materials and components
— The powder test method for the water resistance of
optical glass**

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***Optique et photonique — Matériaux et composants optiques — Méthode d'essai sur poudre pour
déterminer la résistance à l'eau des verres optiques***

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This document was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 3, *Optical materials and components*.

Introduction

There are two commonly used methods for measurement of the chemical resistance of optical glass: The powder method and the surface method. The powder method has simpler procedures for the sample preparation since it does not require a homogeneously polished surface.

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Optics and photonics — Optical materials and components — The powder test method for the water resistance of optical glass

1 Scope

This document specifies the general procedures of the powder test method for the water resistance of optical glass.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3310-1, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 4797, *Laboratory glassware — Boiling flasks with conical ground joints*

ISO 4799, *Laboratory glassware — Condensers*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Principles

The glass is ground into particles of diameter within the range of 425 μm to 600 μm . A powder sample equivalent to the specific gravity in grams is placed in a platinum basket. The basket is placed in a flask of silica glass and boiled for 60 min. The degree of water resistance is determined by measuring the weight loss (in percent), and is denoted by a class number ranging from 1 to 6, as given in Table 1.

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5 Reagents

5.1 Water

The purity of the water used shall comply with the grade 2 requirements of ISO 3696.

5.2 Alcohol

Ethanol, methanol and 2-propanol can be used, but water-containing alcohol cannot be used.

6 Apparatus

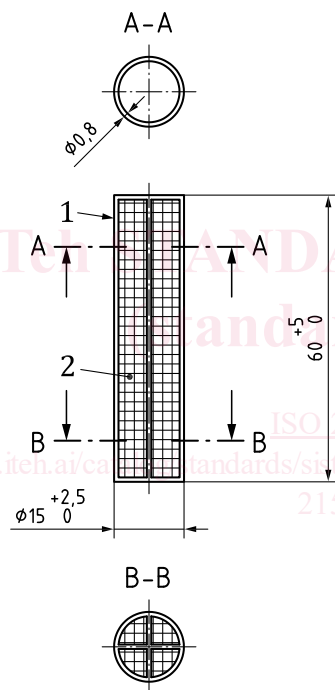
6.1 Sieve

The sieve shall refer to the test sieve specified in ISO 3310-1.

6.2 Basket for corrosion test

The mesh basket for the corrosion test shall be fabricated with a specific opening size between 230 µm and 260 µm using platinum wire ~~with a diameter of~~ about 76 µm. A drawing of the apparatus ~~including~~ dimensions is shown in Figure 1.

Dimensions in millimetres



Key

- 1 platinum frame
- 2 platinum test sieve
- A-A cross-section view
- B-B cross-section view

Figure 1 — Basket

6.3 Apparatus for corrosion test

The configuration and dimensions of the apparatus are shown in Figure 2. However, the dimensions of Figure 2 are merely an example, the shape shall conform to ISO 4797 and ISO 4799. The dimension and

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shape may be different, as long as the nominal capacity of a spherical-shaped flask is 100 ml. The apparatus shall employ a flask fitted to a condenser made of either fused silica glass or fused borosilicate glass as specified in ISO 4797 and ISO 4799.

Dimensions in millimetres

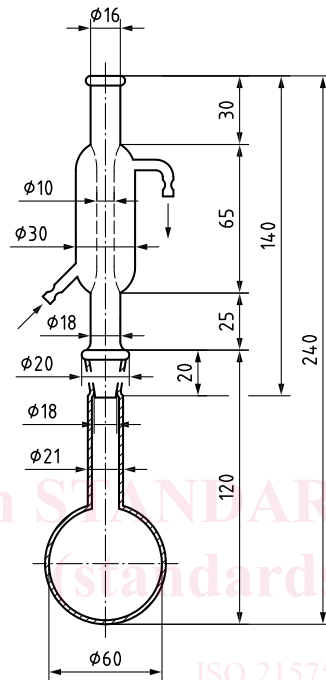


Figure 2 — Apparatus for corrosion

6.4 Heating bath

The apparatus shall employ a water bath in which the spherical part of the flask is completely immersed in hot water and shall be held at temperatures over 98 °C measured at 20 mm ± 10 mm location from the bottom of the flask.

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7 Preparation of the specimen of the glass to be tested

Prepare the specimen as follows:

- Crush the glass and pass through a screen with a 710 µm sieve and sieve the selected particles again with a 600 µm sieve. Then reselect the glass particles with a 425 µm test sieve to collect particles of sizes between 425 µm and 600 µm.
- Place the powdered glass weighing about three times its specific gravity in grams into a 50 ml beaker. To remove dust powder from the particles, pour 15 ml of alcohol for decantation.
- After repeating operation b) five times, dry the specimen at the temperature between 120 °C and 130 °C in an oven for one hour and then store it in a desiccator with silica gel.

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