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Glass containers — Determination of capacity by gravimetric method — Test method

Récipients en verre — Détermination de la capacité par la méthode gravimétrique — Méthode d'essai

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Foreword

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ISO 8106 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 63, *Glass containers*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read "...this European Standard..." to mean "...this International Standard...".

This second edition cancels and replaces the first edition (ISO 8106:1985), which has been technically revised.

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Foreword

This document (EN ISO 8106:2004) has been prepared by Technical Committee CEN /TC 261, "Packaging", the secretariat of which is held by AFNOR, in collaboration with Technical Committee ISO/TC 63 "Glass containers".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2005, and conflicting national standards shall be withdrawn at the latest by May 2005.

This document includes a Bibliography.

Efficient packaging is of great importance for the distribution and the protection of goods and the environment. Insufficient or inappropriate packaging can lead to damage or wastage of the contents of the pack.

This standard is part of a series of standards for "Glass containers - Test methods":

— EN ISO 7458, *Glass containers — Internal pressure resistance — Test methods (ISO 7458:2004)*

— EN ISO 7459, *Glass containers — Thermal shock resistance and thermal shock endurance — Test methods (ISO 7459:2004)*

— EN ISO 8106, *Glass containers — Determination of capacity by gravimetric method — Test method (ISO 8106:2004)*

— EN ISO 8113, *Glass containers — Resistance to vertical load — Test method (ISO 8113:2003)*

— EN 29008, *Glass bottles — Verticality — Test method (ISO 9008:1991)*

— EN 29009, *Glass containers — Height and non-parallelism of finish with reference to container base — Test methods (ISO 9009:1991)*

— EN 29885, *Wide-mouth glass containers — Deviation from flatness of top sealing surface — Test methods (ISO 9885:1991)*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This document specifies a gravimetric method for determining the capacity of glass containers and their compliance with specification limits.

2 Normative references

The following referenced documents are indispensable for the application 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 7348:1992, *Glass containers — Manufacture — Vocabulary.*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7348:1992 apply.

4 Principle

Calculation of the capacity of a glass container from the mass of the water filling the container, adjusted by a factor for density of the water at a given temperature.

5 Sampling

The test shall be performed on a predetermined number of containers which shall be representative of the consignment.

6 Apparatus

6.1 General purpose calibrated thermometer, with a scale range graduated in increments of at least 1 °C.

6.2 Balance, with an accuracy as specified in Table 1.

6.3 Strike plate, for brimful determination of wide-mouth containers.

6.4 Depth gauge, for filling level determination.

Table 1 — Accuracy limits for balance

Capacity (ml)				Accuracy limits for the measurement equipment for the gravimetric determination of container capacities (g)
		Up to	10	± 0,1
Over	10	**Up to**	250	± 0,25
Over	250	**Up to**	1000	± 0,5
Over	1000	**Up to**	5000	± 1,25
Over	5000			± 5

7 Procedure

7.1 The reference test temperature is 20 °C. A volume correction factor is applied depending on the temperature at which the test is carried out.

7.2 Using the general purpose calibrated thermometer (6.1), measure the temperature of the water and ensure that it remains within ± 1 °C of the measured value throughout the test.

7.3 Using the balance (6.2), weigh the dry, empty container which shall be at ambient temperature and ensure that it remains within ± 1 °C of the measured value throughout the test.

7.4 The container shall be filled on a flat, horizontal surface. The outer surface of the container shall be kept dry throughout the test procedure.

7.5 For the determination of brimful capacity fill to just less than, but as near as possible to, the brimful level. The container shall then be topped up with water until the top of the meniscus is level with the top of the rim. For wide mouth containers, place the strike plate across the mouth of the container and top up with water until the meniscus just touches the strike plate. No air bubble shall be trapped underneath the strike plate.

7.6 For the determination of the filling level capacity fill to just less than the fill level. The depth gauge (6.4), adjusted to the specified level, shall be inserted centrally and vertically into the neck of the container. The container shall then be filled with water until the centre of the meniscus just touches the tip of the gauge.

7.7 The filled container shall be weighed to the accuracy specified in Table 1.

8 Expression of results

8.1 Calculation of capacity

The capacity of the container shall be calculated from the difference between the value of the mass of the filled container and that of the empty container, and shall be expressed as a volume in millilitres.

8.2 Calculation of actual capacity

The actual capacity of the container, expressed in millilitres, shall be calculated from the equation

Actual capacity = m x VCF

where

m is the measured mass of water, in grams;

VCF is the volume correction factor for water at the test temperature in ml/g.

Table 2 gives the volume correction factors for the temperature within the permitted range for distilled water.

However in practice non-distilled tap water is mainly used for capacity measurements. It is therefore necessary to apply additional correction factors, such as for the density of the tap water, appropriate to the location where the measurement is carried out.

NOTE See Directive 75/107/EEC for the requirement to correct all tests to 20°C.

Table 2 — Volume correction factor for distilled water temperatures at 0,1 MPa (1 bar)

Test temperature (°C)	Volume correction factor VCF (ml/g)
16	1,001 02
17	1,001 23
18	1,001 41
19	1,001 60
20	1,001 80
21	1,002 01
22	1,002 23
23	1,002 47
24	1,002 71
25	1,002 96
26	1,003 23
27	1,003 50
28	1,003 78

EXAMPLE For distilled water:

Test temperature = 18 °C

Mass of water = 500 g

Actual capacity = 500 x 1,001 41

= 500,71 ml