International Standard 8106

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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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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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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

1 Scope and field of application

This International Standard specifies a gravimetric method for determining the brimful and filling level capacities of glass containers and for determining their compliance with specification limits.

2 References

ISO 1770, *Solid-stem general purpose thermometers.*

ISO 7348, *Glass containers — Manufacture — Vocabulary.* [1]

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 7348 shall 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 temperature and density of the water.

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 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 Flow control device.

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

6.5 Depth gauge, for filling level determination.

Table 1 — Accuracy limits required for the gravimetric determination of container capacities

Capacity ml	Measurement accuracy g
Up to 10	± 0,2
Over 10 up to 250	± 0,5
Over 250 up to 1 000	± 1
Over 1 000 up to 5 000	± 2,5
Over 5 000	± 10

7 Procedure

7.1 The test temperature shall be chosen from the ambient temperature range of 22 ± 5 °C.

7.2 Using the general purpose thermometer (6.1), measure the temperature of the water which shall be at ambient temperature 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.

1) At present at the stage of draft.

7.4 Place the container on a flat, horizontal surface and fill it to just less than, but as near as possible to, the brimful level. The outer surface of the container shall be kept dry throughout the test procedure.

7.5 For the determination of brimful capacity, the container shall be topped up with water by means of the flow control device (6.3), until the top of the meniscus is level with the top of the rim. For wide-mouth containers, the strike plate (6.4) is recommended. No air bubble shall be trapped underneath the strike plate.

7.6 For the determination of the filling level capacity, the depth gauge (6.5), adjusted to the specified level, shall be inserted centrally and vertically into the neck of the container. The container shall be filled with water by means of the flow control device, 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

$$\text{Actual capacity} = m \times \text{VCF}$$

where

m is the measured mass of water, in grams;

VCF is the volume correction factor for water at the test temperature.

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

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

Test temperature °C	Volume correction factor VCF
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 × 1,001 41
= 500,71 ml

NOTE — If non-distilled water is used, it is necessary to apply the appropriate correction factor.

9 Test report

The test report shall include the following information:

a) the reference to this International Standard;

b) a description of the containers;

c) the sample size;

d) a report of the sampling procedure used;

e) the brimful or filling level capacity of each container;

f) identification of those containers which did not satisfy the specification limit;

g) the bulk capacity, if required by the container specification, calculated as an average of the individual capacities of the predetermined number of test containers;

h) a calculation to ascertain whether the sample complies with acceptance criteria.