
International Standard



7458

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Glass containers — Internal pressure resistance — Test methods

Réipients en verre — Résistance à la pression interne — Méthodes d'essai

First edition — 1984-12-15

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UDC 621.798.147 : 666.17

Ref. No. ISO 7458-1984 (E)

Descriptors : containers, glass packaging, tests, determination, pressure resistance.

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.

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.

International Standard ISO 7458 was prepared by Technical Committee ISO/TC 63, *Glass containers*.

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Glass containers — Internal pressure resistance — Test methods

1 Scope and field of application

This International Standard specifies two test methods for the determination of the internal pressure resistance of glass containers, Method A by application of uniform internal pressure for a predetermined period and Method B by application of internal pressure increasing at a predetermined constant rate.

2 Sampling

The test shall be performed on a predetermined number of containers.

The containers used for the test shall not have been subjected to any other mechanical or thermal test which could affect their internal pressure resistance.

3 Test methods

3.1 Method A — Application of uniform internal pressure for a predetermined period

3.1.1 Apparatus

The apparatus shall comply with the following principles:

- the container to be tested shall be held in such a manner that it is suspended by the finish;
- there shall be a resilient seal between the sealing surface and the pressure head in order to retain the pressurizing medium during the test;
- there shall be a means of applying fluid pressure to a predetermined level, at a rate of $10 \pm 2 \text{ bar}\cdot\text{s}^{-1}$ ($1 \pm 0,2 \text{ MPa}\cdot\text{s}^{-1}$) and of maintaining that pressure constant during the test.

3.1.2 Procedure

3.1.2.1 Allow the containers to reach ambient temperature, then fill them with water at a temperature $\pm 5 \text{ }^\circ\text{C}$ from ambient.

3.1.2.2 Use one of the following test procedures, depending on the purpose of the test:

a) Pass test

Apply the internal test pressure to the predetermined level and hold it constant for $60 \pm 2 \text{ s}$, or for a different period, provided that the apparatus has the means for correcting the pressure values to those which would be obtained for a 60 s test.

b) Progressive test

Continue the test described in a), by increasing the pressure in increments of 1 or 2 bar (0,1 or 0,2 MPa), until 50 % or/and 100 % of containers are broken.

NOTE — In some commercially available machines, increments are 1 bar for use up to 18 bar and 2 bar above 18 bar.

3.1.3 Test report

The test report shall include the following:

- the reference of this International Standard;
- the sample size and sampling method;
- the number of containers from each mould included in the sample;
- the type of test, i.e. "pass test" [3.1.2.2 a)] or "progressive test" [3.1.2.2 b)];
- the test results:
 - for the "pass test", in accordance with 3.1.2.2 a):
 - the pressure used and the number of containers that failed in the test, with the respective pressures at which they failed;
 - for the "progressive test", in accordance with 3.1.2.2 b):
 - the pressure at which first failure occurred and the number of containers that failed at that pressure,

- the pressure required to break the predetermined percentage of the sample, expressed to the nearest 0,1 bar (0,01 MPa),
- the mean breaking pressure and the standard deviation.

3.2 Method B — Application of internal pressure increasing at a predetermined constant rate

3.2.1 Apparatus

The apparatus shall comply with the following principles:

- a) the container to be tested shall be held in such a manner that it is suspended by the finish;
- b) there shall be a resilient seal between the sealing surface and the pressure head in order to retain the pressurizing medium during the test;
- c) there shall be a means of applying fluid pressure, increasing at a rate of $10 \pm 2 \text{ bar}\cdot\text{s}^{-1}$ ($1 \pm 0,2 \text{ MPa}\cdot\text{s}^{-1}$), until the container fails or a predetermined level is reached. The rate of increase of pressure shall be reproducible to 2 %;
- d) the apparatus shall include a means of indicating the pressure level at which the container failed, or the maximum pressure reached during the test;
- e) the apparatus shall include a means of indicating the relationship between the constant rate and fixed-duration test.

NOTE — For example, in the case of the "Ramp Pressure Tester" apparatus, the relationship between the actual pressure and the 60 s pressure is given by

$$p_R = 1,38 p_{60} + 0,178 \text{ 3}$$

where

- p_R is the actual pressure;
- p_{60} is the 60 s pressure.

3.2.2 Procedure

3.2.2.1 Allow the containers to reach ambient temperature, then fill them with water at a temperature $\pm 5 \text{ }^\circ\text{C}$ from ambient.

3.2.2.2 Use one of the following test procedures, depending on the purpose of the test:

a) Pass test

Increase the internal test pressure at a rate of $10 \pm 2 \text{ bar}\cdot\text{s}^{-1}$ ($1 \pm 0,2 \text{ MPa}\cdot\text{s}^{-1}$), until a predetermined level of pressure has been reached.

b) Test to destruction

Increase the internal test pressure at a rate of $10 \pm 2 \text{ bar}\cdot\text{s}^{-1}$ ($1 \pm 0,2 \text{ MPa}\cdot\text{s}^{-1}$), until each container breaks.

3.2.3 Test report

The test report shall include the following:

- a) the reference of this International Standard;
- b) the sample size and sampling method;
- c) the number of containers from each mould included in the sample;
- d) the type of test, i.e. "pass test" (3.2.2.2 a)) or "test to destruction" (3.2.2.2 b));
- e) the test results:
 - 1) for the "pass test", in accordance with 3.2.2.2 a):
 - the pressure used and the number of containers that failed in the test, with the respective pressures at which they failed;

2) for the "test to destruction", in accordance with 3.2.2.2 b):

- the pressure at which first failure occurred and the number of containers that failed at that pressure,
- the pressure required to break the predetermined percentage of the sample, expressed to the nearest 0,1 bar (0,01 MPa),
- the mean breaking pressure and the standard deviation.

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