**4017 Determination of Internal Pressure Resistance for Glass Containers**

Internal pressure resistance is a measure of the ability of the glass container to bear hydraulic pressure, expressed as pressure value. Glass internal structure, unevenness of the wall thickness, and surface appearance defects will affect the internal pressure resistance of glass.

This method applies to the determination of internal pressure resistance of glass containers. The determination methods are divided into constant-pressure method and constant-rate method.

**Method I. Constant-pressure method**

**Instruments:** The pressure machine shall meet the technical requirements: can ensure that the sample is tested under suspension condition, and the bottle mouth is easily clamped on the test instrument; In order to ensure no leakage of the pressurized medium during the test, elastic material must be in place between the indenter and the sealing surface of the bottle mouth, and the contact surface shall have sufficient pressure to prevent leakage of medium during the pressurization process; The test equipment shall be equipped with a device capable of making the liquid pressure reach a predetermined value at a rate of 0.58 MPa/s±0.10 MPa/s, maintaining constant pressure during the test and maintaining a predetermined pressurization time; The instrument shall be able to show the pressure at which the test is terminated in any case.

**Determination:** The sample shall be untested for other properties (such as mechanical, thermal, etc.) and shall be left at room temperature for 30 min. Unless otherwise specified, water with a temperature difference of no more than 5℃ from room temperature shall be used as the test medium to avoid introducing additional pressure before the test. Choose one of the following test procedures depending on the type of test:

Pass test: After the internal pressure of the test sample reaches the predetermined value according to the specified requirements, the constant pressure is maintained for 60 s±2 s, and observe whether the test sample is broken; or maintained for a different duration, but the instrument should be able to correct the pressure value and obtain a test result equivalent to a constant pressure of 60 s.

Progressive test: After the pass test, increase the pressure in increments of 0.1 MPa or 0.2 MPa, until the broken rate of the test sample reaches 50% or 100%, respectively.

**Method II. Constant-rate method**

**Instruments:** The pressure machine shall meet the technical requirements: can ensure that the test sample is tested under suspension condition, and the bottle mouth is easily clamped on the test instrument; In order to ensure no leakage of the pressurized medium during the test, elastic material must be in place between the indenter and the sealing surface of the bottle mouth, and the contact surface shall have sufficient pressure to prevent leakage of medium during the pressurization process; The test equipment shall be equipped with a device that can increase the hydraulic pressure at a rate of 0.58 MPa/s±0.10 MPa/s, until the predetermined value is reached or the container is broken, and the repeatability of the pressurization rate shall be ±2%; The test equipment shall also be equipped with a device to show the pressure value at which the test is terminated in any case and to show that the test has reached the required specified value; The instrument shall be equipped with a device to show the relationship between constant-rate pressurization and fixed-time pressure holding.

Note: The relationship between constant-rate pressurization and fixed-time pressure holding (for 60s) is as follows:

*P*Ｒ*＝*1.38*P*60*+*K

*P*Ｒ is the actual pressure value, in MPa;

*P*60 is the pressure value after constant pressure is held for 60 seconds, in MPa.

K=0.1783 (Note: when pressure measured is in bar or psi, the K value corresponds to 1.783 or 25.9, respectively)

**Determination:** With the same requirements as Method I. Choose any of the following test procedures depending on the type of test:

Pass test: Increase the internal test pressure at a rate of 0.58 MPa/s±0.10 MPa/s to the predetermined pressure value and hold for 60s to observe whether the sample is broken.

Destructive test: Increase the internal test pressure at a rate of 0.58 MPa/s±0.10 MPa/s until the container is broken.

**Result Representation**

Pass test: The pressure used in the test and the number of broken containers.

Progressive test: The pressure under which the first break occurs and the number of broken samples under this pressure. The pressure required to reach a predetermined percentage, which is rounded to the nearest 0.01 MPa; Mean breakdown pressure and standard deviation.

Destructive test: The pressure under which the first break occurs and the number of broken samples under this pressure. The pressure required to reach a predetermined percentage, which is rounded to the nearest 0.01 MPa; Mean breakdown pressure and standard deviation.

**Result Evaluation**

After the internal pressure resistance test is carried out in accordance with the corresponding pressure value specified, if the number of broken samples is less than the specified number, it is adjudicated to be qualified.

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