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Test Method for Leaks in Sealed Flexible Packages

软包装件密封性能试验方法

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Test Method for Leaks in Sealed Flexible Packages

1 Theme Content and Scope

This Standard specifies the test method for leaks in sealed flexible packages.

This Standard is applicable to the test of sealed flexible packages made of various materials.

2 Test Purpose

This standard may be used as a test for one of the following purposes:

- a. Compare and evaluate the sealing process and sealing performance of flexible packages,
- b. Provide the relevant basis for determining the technical requirements for the sealing performance of flexible packages,
- c. Test the sealing performance of the flexible packages after drop, pressure and other tests.

3 Terms

3.1 Flexible packages

The flexible packages that need to have sealing performance, the used packaging materials shall not have any defects such as pinholes, cracks, unsealed and failing to be sealed at the seal, etc. that affect the sealing performance.

3.2 Sealing performance

The property of a flexible package to prevent the entry of other substances or the escape of the contents.

4 Test Principle

4.1 Method-I

This method is used for packages in which the performance of the outer layer material does not significantly degrade during the test under the action of water, such as a package with a plastic film outer layer.

By vacuumizing the vacuum chamber, the sample immersed in water produces a pressure difference between the inside and outside, and the gas escape or water infiltration in the specimen is observed to determine the sealing performance of the specimen.

4.2 Method-II

This method is used for packages in which the performance of the outer layer material is significantly reduced during the test under the action of water, such as a package with a paper material for the outer layer.

The method is divided into two methods, namely, Method-A and Method-B; and Method-A is used for the arbitration test.

4.2.1 Method-A

Fill the specimen with the test liquid; place the specimen after sealing on the filter paper; and observe the leakage of the test liquid from the inside to the outside of the specimen.

4.2.2 Method-B

By vacuumizing the vacuum chamber, the pressure difference between the inside and outside of the sample is generated; and observe the specimen expansion and shape recovery after release of the vacuum; so as to determine the sealing performance of the specimen.

5 Test Device

The test device shall include the following parts:

5.1 Vacuum chamber: It consists of a vacuum container made of transparent material that can withstand a pressure of 100 kPa and a sealing lid.

The vacuum container is used to hold the test liquid and the test sample; the sealing lid is used to seal the vacuum chamber. When vacuumizing, the sealing lid shall be able to ensure the airtightness of the vacuum chamber.

The maximum vacuum degree that can be achieved in the vacuum chamber during the test shall be no less than 95 kPa; and the vacuum degree can be reached from normal atmospheric pressure within 30~60 s.

5.2 Specimen fixture: It is used to fix the specimen in the test liquid in the vacuum chamber; and its material and shape shall not affect the performance of the specimen and the test observation.

5.3 Pipeline: It include the vacuum pipe connected to the vacuum source and the exhaust pipe connected to the atmosphere. Both shall be equipped with valves.

8.1.4 Open the valve of the intake pipe to make the vacuum chamber communicate with the atmosphere; take off the sealing lid, take out the sample; wipe the water on its surface; and open the seal to check whether there is test water infiltrating inside the specimen.

8.2 Method-II

8.2.1 Method-A

8.2.1.1 Take out the contents of the specimen; and clean the inside of the specimen.

8.2.1.2 Pour the test liquid (colored aqueous solution with obvious color difference from the filter paper) into the specimen, and seal the mouth.

8.2.1.3 Place the specimen on the filter paper for more than 5 min; and observe the leakage of the test liquid from the inside of the specimen to the outside. The specimen is then turned over and tested on the other side.

8.2.2 Method-B

8.2.2.1 Put the specimen into the vacuum chamber; cover the sealing lid of the vacuum chamber; and close the valve of the inlet pipe.

8.2.2.2 Open the valve of the vacuum tube to vacuumize the vacuum chamber; and adjust the vacuum degree to one of the following values within 30~60 s: 20, 30, 50, 90 kPa, etc. When it reaches a certain degree of vacuum, stop vacuumizing, and keep the vacuum degree for one of the following times; 3, 5, 8, 10 min, etc.

The adjusted vacuum degree value and vacuum degree holding time are determined according to the characteristics of the sample (such as the used packaging materials, sealing conditions, etc.) or relevant product standards. However, the sample shall not be ruptured or the seal shall not be cracked, due to the excessive pressure difference between the inside and outside of the specimen.

8.2.2.3 Open the valve of the intake pipe; quickly restore the air pressure in the vacuum chamber to normal pressure; and observe whether the shape of the specimen returns to its original shape.

9 Evaluation of Test Results

9.1 Method-I

If the specimen has no continuous bubble generation during vacuumizing and vacuum holding period, and no water infiltration during unpacking inspection, then the specimen is qualified; otherwise, it is unqualified.

9.2 Method-II

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