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Packaging container - Tamper-evident plastic closure

包装容器 塑料防盗瓶盖

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Packaging container - Tamper-evident plastic closure

1 Scope

This standard specifies the definition, product classification, requirements, test methods, inspection rules and signs, packaging, transportation, storage of plastic temper-evident bottle enclosures for beverages.

This standard applies to plastic temper-evident bottle enclosures (hereinafter referred to as bottle enclosures), which are formed by injection molding, hot pressing or other processes, using polyolefin as the main raw material.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard; however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 191 Packaging - Pictorial marking for handling of goods (GB/T191-2008, ISO 780:1997, MOD)

GB/T 2828.1 Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection (GB/T 2828.1-2003, ISO 2859-1:1999, IDT)

GB 4806.1 Hygienic standard for foodstuff rubber products

GB/T 5009.60 Method for analysis of hygienic standard of products of polyethylene polystyrene and polypropyrene for food packaging

GB 9685 Hygienic standard for adjuvants and processing aids in food containers and packaging materials

GB 9687 Hygienic standard for polyethylene products used as food containers and table wares

GB 9688 Hygienic standard for polypropyrene products used as food containers and table wares

3 Terms and definitions

The following terms and definitions apply to this standard

3.1

Temper-evident plastic closure

It is made of plastic and cannot be restored to its original packaging form, after being encapsulated and opened.

3.2

Removal torque

The maximum torque, which is required to open the temper-evident closure of the package.

3.3

Bridge break torque

The maximum torque, which is required to break the temper-evident band.

3.4

Temper-evident band

It is composed of a bridge connected and completely or partially disconnected from the closure after opening.

Note: The temper-evident band is divided into two types: drop type and connection type.

4 Classification and specifications

4.1 Classification

4.1.1 Products are classified into closure with cushion and closure without cushions, according to the structure of the closure.

4.1.2 Products are divided into one-time forming bottle closure and multiple forming bottle closure, according to the manufacturing process.

4.1.3 Products are classified into carbonated beverage bottle closure (hereinafter referred to as carbonated closure) and non-carbonated beverage closure (hereinafter referred to as non-carbonated closure), according to their

direction of the pasting. Observe the integrity of the pattern.

6.4 Physical and mechanical properties

6.4.1 Sealing performance test

6.4.1.1 Use a capping machine for non-carbonated closures, to apply the closure, at the rated torque that meets the capping requirements. Use a seal tester to carry out testing. Pressurize to 200 kPa. Hold the pressure underwater for 1 min. Observe whether there is air leakage. Then increase the pressure to 350 kPa. Hold the pressure for 1 min. Observe whether the closure is loose and pops up.

6.4.1.2 Use a capping machine for carbonated closures, to apply the closure, according to the rated torque that meets the capping requirements. Cut off the temper-evident band. Use a seal tester to carry out testing. Pressurize it to 690 kPa. Hold the pressure underwater for 1 min. Observe whether there is air leakage. Then Increase the pressure to 1207 kPa. Hold the pressure for 1 min. Observe whether the closure is loose and pops up.

6.4.2 Thermal stability test

6.4.2.1 After filling the bottle with nominal volume of water, use a capping machine to seal the non-carbonated closure, according to the rated torque that meets the capping requirements. After laying it down for 24 hours in the freezer at 4 °C ± 1 °C, turn it upside down, to observe whether the closure is bursting or deforming, whether the seal has liquid leakage.

6.4.2.2 After filling the bottle with nominal volume of carbonated water, which contains 4.2 ± 0.1 volume of carbon dioxide, use a capping machine to seal the carbonated closure, according to the rated torque that meets the capping requirements. After placing it in a 4 °C ± 1 °C freezer for 24 hours, turn it upside down, to observe whether the closure is cracked or deformed, whether the seal has gas leakage or liquid leakage.

6.4.2.3 After filling the bottle with carbonated water, which contains a nominal capacity of 4.2 ± 0.1 volume of carbon dioxide, use a capping machine to seal the carbonated closure, according to the rated torque that meets the capping requirements, and place it sideways in a 42 °C thermostat for 5 days. Observe the whether the closure is cracked, deformed or leaked.

6.4.2.4 After filling the bottle with carbonated water, which contains a nominal capacity of 4.2 ± 0.1 volume of carbon dioxide, use a capping machine to seal the carbonated closure, at the rated torque that meets the capping requirements. Place it in a 60 °C incubator for 6 h. Then place it in a 32 °C incubator for another 18 h. Repeat three times. Observe whether the closure bursts or flies off.

the bottle closure, at a height of 762 mm from the bottle closure: vertically on the center of the top; vertically on the edge of the top; at an angle of 45° to the edge of the bottle closure; vertically on the side wall of the bottle closure. Observe whether the closure is cracked or damaged, whether the closure falls off.

6.4.5 Removal torque test

Use a capping machine to seal the closure, according to the rated torque that meets the capping requirements. Leave it at room temperature for 24 hours. Use a torque meter, which has an accuracy greater than 0.1 N·m to test the torque.

6.4.6 Physical test of temper-evident band

Use a capping machine to seal the closure, according to the rated torque that meets the capping requirements. Observe whether the connecting bridge of the bottle closure's temper-evident band is broken. Leave it at room temperature for 24 hours. Use a torque meter, which has an accuracy greater than 0.1 N·m, to test the removal torque and the bridge break torque. Apply the closure again. Observe whether the temper-evident band's connecting bridge is obviously damaged.

6.5 Lipid spill performance test

6.5.1 Fill the clean bottle with pure water of nominal capacity. Use a non-carbonated enclosure to seal it. Place it at room temperature for 24 h. Shake it for 5 h. Place it sideways in a 42 °C thermostat for 48 h. Observe the liquid level in the bottle, every 24 h, from the time of placement, to see whether there is lipid. Terminate the test if there is lipid.

6.5.2 Fill the clean bottle with carbonated water, which has a nominal volume of 4.2 ± 0.1 volume of carbon dioxide. Use a carbonated enclosure to seal it. Place it at room temperature for 24 h. Shake it for 5 h. Place it sideways in a 42 °C thermostat for 48 h. Observe whether there is lipid on the liquid level in the bottle, every 24 hours from the time of placement. Terminate the test if there is lipid.

6.6 Safe removal performance test

Use a bottle, which has a capacity of not less than 2 L. Inject carbonated water, which has a nominal capacity of 4.2 ± 0.1 volume of carbon dioxide. Use a capping machine to seal the carbonated closure, according to the rated torque that meets the capping requirements.

Leave it at room temperature for 24 hours. Slowly turn the bottle closure counterclockwise, until there is a leaking sound. Then immediately unscrew the

bottle closure by hand, at the fastest speed until it is completely leaked. Observe whether the closure is loose and pops up.

Slowly pour out half of the liquid in the sample, which is tested above. Then use a capping machine, to seal the carbonated closure, according to the rated torque that meets the capping requirements. Leave it for 24 hours. Repeat the opening process above, to observe whether the closure is loose and pops up.

6.7 Hygienic performance test

The hygienic performance index of the bottle closure shall be carried out in accordance with the requirements of GB/T 5009.60.

7 Inspection rules

7.1 Group-batch

The products are checked and accepted in batches. The products which are produced continuously by the raw materials, of the same specification, on the same production line, form a batch. Each batch does not exceed 1.2 million.

7.2 Classification of inspections

Product inspection is divided into exit-factory inspection and type inspection.

7.2.1 Exit-factory inspection

The exit-factory inspection items are 5.1, 5.2, 5.3.

7.2.2 Type inspection

Type inspection items are all items in Chapter 5. Type inspection shall be carried out in one of the following situations:

a) Inspection and type finalization of new products or old products after transplant production;

b) After the formal production, there are major changes of material and process, that affect the performance of the product;

c) When production resumes after suspension for more than 6 months;

d) Where there are major quality problems;

e) When the user requests for type inspection;

f) When the national quality supervision agency puts forward a requirement for type inspection.

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