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Manual toothbrushes - General requirements and test methods

手动牙刷 一般要求和检测方法

(English Translation)

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1 Scope

This document specifies the technical requirements, inspection rules, marking, packaging, transportation, and storage of manual toothbrushes (hereinafter referred to as "toothbrushes"). The corresponding test methods are described.

This document applies to the production, inspection, and sale of manual toothbrushes for daily oral hygiene.

This document does not apply to toothbrushes intended for use by children aged 14 and under.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 191, Packaging and storage marks

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 2829, Sampling procedures and tables for periodic inspection by attributes (apply to inspection of process stability)

GB 39669, General technical requirements for safety of toothbrushes and oral implements

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB 39669 apply.

3.1

manual toothbrush

A tool for cleaning the surface of teeth that does not use electricity to drive the cleaning function, but uses bristles.

3.2

tufting toothbrush

A toothbrush in which all or part of the bristles are fixed to the brush head by means of metal sheets or heat fusion.

3.3

taper rate of filament

The percentage of monofilaments with a pointed tip cone height of not less than 4 mm in the tapered filament brush bristles.

3.4

molded bristle

The bristles that are molded into the brush head using an injection molding process and are used to clean teeth.

NOTE: Excludes injection-molded components used for massage or other functions.

3.5

tuft deflection force; F

The force that is generated by tufts resisting to bending.

NOTE: The unit is Newton (N).

3.6

conventional bristle

The bristles that have a solid circular cross-section along their length.

4.1 Sensory quality

Sensory quality shall meet the requirements of Table 1.

4.2 Specifications and dimensions

The specifications and dimensions shall conform to the requirements of Table 2. See

4.10.1 Secureness of insertable detachable brush head

The separation strength between the insertable detachable brush head and the brush handle shall not be less than 5 N.

4.10.2 Secureness of rotary detachable brush head

The separation torque between the rotary detachable brush head and the brush handle shall not be less than 0.05 N·m.

5.1 Specimen conditioning and test environment

Condition the samples in an environment with a temperature of $(23\pm 2)^{\circ}\text{C}$ and a relative humidity of $(50\pm 10)\%$ for at least 4 h. Conduct the tests under these conditions (unless otherwise specified).

5.2 Sensory quality

5.2.1

Visually inspect the sample at a distance of 300 mm under natural light or a light source with a color temperature of 6500 K.

5.2.2

Use absorbent cotton fully soaked in 65% ethanol. Apply a force of 1 N~1.5 N and rub back and forth 100 times on each test area. Test areas include the brush head, handle, bristles, and decorative objects. The rubbing frequency is 2~3 times per second.

Visually observe whether there is any color on the absorbent cotton.

5.2.3

Check for air bubbles in the brush handle by comparing them with a dust standard chart.

5.2.4

Use your sense of smell to determine if there is an unusual odor.

5.3 Specifications and dimensions

The length, width, thickness, height, and total length of the toothbrush shall be measured using a measuring tool with a minimum graduation of no more than 0.02 mm (such as a steel ruler, vernier caliper, or outside micrometer). The diameter of a single filament shall be measured at the base using a measuring tool with a minimum graduation of no more than

0.001 mm (such as a measuring microscope). The maximum dimension of the bristles 4 mm below the top shall be measured using a measuring tool with a minimum graduation of no more than 0.001 mm (such as a measuring microscope). If a toothbrush has two or more bristle sizes, take one bristle of each size.

5.4 Tuft strength

Tuft strength is assessed by tuft deflection force. The test is performed according to the method in Annex A.

5.5 Taper rate of filament

Take 30 tapered monofilaments from the base of the bristles of a toothbrush. Measure the diameter of each monofilament at the base using a measuring tool with a minimum graduation of 0.001 mm (such as a tool measuring microscope). Simultaneously measure the diameter at a point 4 mm from the tip of the tapered filament on the corresponding bristle. Compare the diameter at this point with the diameter of the monofilament. If the diameter at this point is smaller than the diameter of the monofilament, the cone height of the monofilament is not less than 4 mm. Record the number of monofilaments with a cone height not less than 4 mm, and calculate the taper rate of filament using formula (1).

Where,

P - Taper rate of filament, %;

n - Number of monofilaments with a cone height of not less than 4 mm, in units of strands.

5.6 Breaking strength of molded bristle

5.6.1

Test apparatus. A tensile testing machine with a minimum scale division of 0.1 N, equipped with a brush head clamp and a bristle clamp.

5.6.2

Test procedure. Connect the brush head to the lower jaw of the tensile testing machine using the brush head clamp (bristles upwards). Connect the bristle clamp to the upper jaw of the tensile testing machine. Select any 5 molded bristles from the same brush head and test them separately. Clamp the molded bristles 2 mm above the root with the bristle clamp. Start the tensile testing machine and allow it to rise at a constant speed of (90 ± 10) mm/min. Read the tensile testing machine reading when the bristles break. Take the arithmetic mean of the results.

NOTE: Avoid damaging the sample with the brush clip during testing to prevent affecting the test results.