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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Pencils
(English Translation)

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1 Scope

This Standard specifies the classification, requirements, test method, inspection rule and signs, packaging, transportation, and storage of pencils.

This Standard applies to graphite pencils and colored pencils.

This Standard does not apply to water-soluble colored pencils and special- purpose pencils.

2 Normative references

The terms in the following documents become the terms of this Standard by reference to this Standard. For dated references, all subsequent amendments (not including errata content) or revisions do not apply to this standard. However, parties to agreements that are based on this Standard are encouraged to study whether the latest versions of these documents can be used. For undated references, the latest edition applies to this Standard.

GB/T 191, Packaging - Pictorial marking for handling of goods (GB/T 191-2008, ISO 780.1997, MOD)

GB/T 2828.1-2003, Sampling procedures for inspection by attributes - Part

1.Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection (ISO 2859-1.1999, IDT)

GB/T 6388, Transport package shipping mark

GB 21027-2007, Request in common use of security for student articles

3 Classification

3.1

Pencils are divided into graphite pencils and colored pencils according to their lead materials, and are divided into ordinary products and advanced products.

3.2

Graphite pencils are divided into 17 types, 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H, according to their hardness.

3.3

Colored pencils are classified by color combination.

- a) lead tip force tester;
- b) oven;
- c) desiccator;
- d) lead tip gauge board.

5.1.3 Methods and steps

5.1.3.1

The colored pencil shall be placed in an oven at 35°C ~ 40°C for 24 hours; then, place it in a desiccator to cool for more than 12 hours.

5.1.3.2

Roll the tip of the to-be-tested pencil in a pencil sharpener at $20^\circ \pm 1^\circ$;

then, insert the lead tip into the lead tip gauge board; use metallographic sandpaper to smooth the exposed part. For colored pencils and 3B ~ 6B graphite pencils, use a 1.2 mm-bore lead tip gauge board; for 2B ~ 9H graphite pencils, use a 0.8 mm-bore lead tip gauge board.

5.1.3.3

Install the pencil that is gauged on a pencil holder that is tilted at 45°;

align the lead tip with the midpoint of the force carrier and tighten.

5.1.3.4

Start the motor. When the force carrier rises to the lead tip and has damages (including crushing, cracking, breaking, etc.), immediately turn off the motor; the index value of the pointer is the lead tip force value.

5.2.1 Test conditions

- a) ambient temperature. $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$;
- b) relative humidity. 50% ~ 65%.

5.2.2 Instruments and materials

- a) micro hardness tester;
- b) lead tip gauge board.

5.2.3 Methods and steps

5.2.3.1

Take both the lead tips with the highest and lowest force on the lead tip as samples. Use metallographic sandpaper to smooth the end surface of the sample; observe it under the microscope of a micro hardness tester. The fineness of the end surface of the sample shall prevail.

5.2.3.2

Select the load according to Table 5 and select a hold time of 10 s.

7.028 -- correction factor;

l -- the length of the longer diagonal line of the indentation, in micrometers (μm).

Express the calculation result to the single digit.

5.3.1 Test conditions

- a) ambient temperature. $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$;
- b) relative humidity. 50% ~ 65%.

5.3.2 Instruments and materials

- a) abrasion meter;
- b) 80 g/m² writing paper (GB/T 12654);
- c) oven;
- d) desiccator;
- e) lead tip gauge board.

5.3.3 Methods and steps

5.3.3.1

Put the writing paper in an oven at $30^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for 2 h; then, cool it in a drying box for 2 h and take it out; then, place it in a plastic bag or a desiccant-free desiccator; use it within one week. When in use, face the front side of the paper up; attach the ring to the revolving drum of the abrasion meter.

5.3.3.2

Take the pencil whose lead tip force is the lowest as the test pencil.

5.3.3.3

Roll the tip of the pencil in a pencil sharpener at $20^{\circ} \pm 1^{\circ}$; then, insert the lead tip into the lead tip gauge board; use metallographic sandpaper to smooth the exposed part. For colored pencils and B ~ 6B graphite pencils, use a 0.8 mm-bore lead tip gauge board. For HB ~ 9H graphite pencils, use a 0.7 mm-bore lead tip gauge board.

5.3.3.4

Connect the clutch of the abrasion meter; then, insert the test pencil into the pencil holder; adjust the weight on the pencil holder lever to balance it; add a 300 g weight to the pencil holder; place the counter and dial indicator to zero separately.

5.3.3.5 Turn on the power; rotate the abrasion meter revolving drum; turn off

the power when it revolves 100 circles. At this time, the value on the dial indicator is the abrasion value of the lead.

c) 210 g/m² slab printed coating base paper;

d) lead tip gauge board.

5.5.3 Methods and steps

5.5.3.1

Take the pencil whose lead tip force is the highest as the test pencil.

5.5.3.2

Roll the tip of the pencil in a pencil sharpener at $20^{\circ} \pm 1^{\circ}$; then, insert the lead tip into the lead tip gauge board; use metallographic sandpaper to smooth the exposed part. For 6B ~ B graphite pencils, use a 0.7 mm-bore lead tip gauge board. For HB ~ 9H graphite pencils, use a 0.6 mm-bore lead tip gauge board.