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

GB/T 21840-2025

Replacing GB/T 21840-2008

**Vulcanizing accelerator -
N-tert-butyl-1,3-benzothiazole-2-sulfenamide (TBBS)**

硫化促进剂 N-叔丁基-1, 3-苯并噻唑-2-次磺酰胺 (TBBS)

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1 Scope

This document specifies the technical requirements for the physical and chemical properties of the vulcanizing accelerator N-tert-butyl-1, 3-benzothiazole-2-sulfenamide (hereinafter referred to as vulcanizing accelerator TBBS), describes the corresponding batching rules, sampling, test methods, and stipulates the contents of marking, packaging, transportation and storage.

This document applies to the detection of the vulcanizing accelerator TBBS made by oxidation of tert-butylamine and the vulcanizing accelerator MBT.

Chemical name. N-tert-butyl-1, 3-benzothiazole-2-sulfenamide Molecular formula. C₁₁H₁₄N₂S₂ Structural formula.

Relative molecular mass. 238.37 (according to the international relative atomic mass in 2022) CAS No.. 95-31-8

2 Normative references

GB/T 191

GB/T 601

GB/T 603

GB/T 617-2006

GB/T 6679

GB/T 6682

GB/T 8170-2008

GB/T 11409-2008

GB/T 21184-2007

3 Terms and definitions

No terms and definitions need to be defined in this document.

4 Technical requirements

The vulcanizing accelerator TBBS shall meet the technical requirements shown in Table 1.

5.1 General provisions

Unless otherwise specified, the standard solutions, preparations and products used in the analysis shall be prepared in accordance with GB/T 601 and GB/T 603. In the analysis, only use reagents confirmed to be analytical reagent and grade-3 water that complies with GB/T 6682.

The test data expression method and rounding rule in this document shall comply with the relevant provisions of the rounded value comparison method in 4.3.3 of GB/T 8170- 2008.

5.2 Determination of appearance

Judge by visual inspection.

5.3.1 Visual method (arbitration method)

Proceed in accordance with the provisions of 3.1 of GB/T 11409-2008.

5.3.2 Instrumental method

Carry out the test in accordance with the provisions of 4.2 of GB/T 617-2006. The length of the capillary is 70 mm ~ 100 mm; the inner diameter is 1.2 mm ~ 1.4 mm; the wall thickness is 0.2 mm ~ 0.3 mm; the capillary is filled with samples of 3 mm ~ 6 mm.

5.4 Determination of heating loss

Carry out the test in accordance with the provisions of 3.4 of GB/T 11409-2008. Weigh approximately 2 g of sample to an accuracy of 0.000 1 g; control the temperature of the electric constant temperature drying oven at $70\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ in the blowing state, for a heating time of 3 h.

The absolute difference between the two parallel determination values is no more than

0.05%, and the arithmetic mean is taken as the determination result.

5.5 Determination of ash

Carry out the test in accordance with the provisions of 3.7 of GB/T 11409-2008. Weigh about 3 g of sample, accurate to 0.000 1 g; control the temperature in the high- temperature furnace at $750\text{ }^{\circ}\text{C} \pm 25\text{ }^{\circ}\text{C}$, and ignite for 2 h.

The absolute difference between the two parallel determination values is no more than 0.04%, and the arithmetic mean is taken as the determination result.

5.6 Determination of sieve residue

Carry out the determination in accordance with the provisions of the dry method in 3.5.2 of GB/T 11409-2008. The test sieve aperture is 150 μm .

The absolute difference between the two parallel determination values is no more than 0.02%, and the arithmetic mean is taken as the determination result.

5.7.1 Reagent

Methanol [67-56-1].

5.7.2 Instruments and apparatuses

5.7.2.1 Conical flask with stopper. 250 mL.

5.7.2.2 Sand core crucible. G4. 5.7.2.3 Magnetic stirrer.

5.7.2.4 Electric constant temperature drying oven. 5.7.2.5 Vacuum pump.

5.7.3 Test procedure

Weigh about 2.5 g of the ground sample, accurate to 0.000 1 g; place it in a conical flask with stopper; add 125 mL of methanol; cover the flask with the stopper; stir on a magnetic stirrer for 30 min. After dissolution, use a sand core crucible pre-set at $70\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ to vacuum-filter; use about 25 mL of methanol to wash the conical flask; pour the washing liquid into the sand core crucible and keep it for 2 minutes; then use a vacuum pump to pump it. Repeat the above washing steps twice. The above dissolution and filtration operations shall be carried out in a fume hood. Place the sand core crucible after filtration in an electric constant temperature drying oven at $70\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and dry it for 1 hour; take it out; cool it to room temperature in a desiccator; weigh it to an accuracy of 0.000 1 g.

5.7.4 Result calculation

The calculation of methanol insoluble matter of the vulcanizing accelerator TBBS is shown in Formula (1). Where.

XS - purity of the vulcanizing accelerator TBBS standard;

Ai - peak area of the vulcanizing accelerator TBBS in the sample;

Mi - mass value of the vulcanizing accelerator TBBS sample, in grams (g);

AS - peak area of the vulcanizing accelerator TBBS standard.

5.9.1.7 Tolerances

The absolute difference between the two parallel determination values is no more than 1.0%, and the arithmetic mean is taken as the determination result.

5.9.2 Titration

Proceed as per the provisions of 5.6.3 of GB/T 21184-2007.

The absolute difference between the two parallel determination values is no more than 1.0%, and the arithmetic mean is taken as the determination result.

6.1 Ex-factory inspection

Items (1) ~ (4) and (6) in Table 1 are ex-factory inspection items for granular products, (1) ~ (6) are ex-factory inspection items for powder products, and (7) ~ (8) are inspection items based on customer requirements.

This product shall be inspected and approved by the quality supervision and inspection department of the manufacturer in accordance with this document before it can be shipped out of the factory, and shall be accompanied by a quality certificate in a certain format, the contents of which include: product name, standard number, manufacturer name, registered trademark, batch number, etc.

6.2 Batch rules

This product is grouped into one batch with uniform products of equal quality.

6.3 Sampling

Sampling shall be carried out in batches according to GB/T 6679, with a sampling volume of no less than 500 g. The samples shall be divided into two clean, dry ground-mouth bottles (plastic bags), sealed and labeled with the manufacturer name, product name, batch number, sampling date and name of the sampler. One bottle (bag) shall be inspected by the inspection department, and the other bottle (bag) shall be kept for future reference.

6.4 Judgment of conformity

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