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Reclaimed Rubber - General Specification

再生橡胶 通用规范

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Reclaimed Rubber - General Specification

1 Scope

This document specifies the classification, technical requirements, inspection rules, packaging, marking, storage and transportation of reclaimed rubber, and describes the corresponding test methods.

This document applies to the production and inspection of reclaimed rubber made from various waste rubber products.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 528 Rubber, Vulcanized or Thermoplastic - Determination of Tensile Stress-strain Properties

GB/T 533-2008 Rubber, Vulcanized or Thermoplastic - Determination of Density

GB/T 1232.1 Rubber, Unvulcanized - Determinations Using a Shearing-disc Viscometer - Part 1: Determination of Mooney Viscosity

GB/T 2449.1 Sulphur for Industrial Use - Part 1: Solid Product

GB/T 2941-2006 Rubber, General Procedures for Preparing and Conditioning Test Pieces for Physical Test Methods

GB/T 3185 Zinc Oxide (indirect method)

GB/T 3516 Rubber - Determination of Solvent Extract

GB/T 4498.1 Rubber - Determination of Ash - Part 1: Muffle Furnace Method

GB/T 6038 Rubber Test Mixes - Preparation, Mixing and Vulcanization - Equipment and Procedures

GB/T 9103 Industrial Stearic Acids

GB/T 9881 Rubber - Vocabulary

GB/T 11407 Vulcanizing Accelerator - 2-Mercaptobenzothiazole (MBT)

GB/T 14837.1 Rubber and Rubber Products - Determination of the Composition of Vulcanizates and Uncured Compounds by Thermogravimetry - Part 1: Butadiene, Ethylene-propylene Copolymer and Terpolymer, Isobutene-isoprene, Isoprene and Styrene-butadiene Rubbers

GB/T 14837.2 Rubber and Rubber Products - Determination of the Composition of Vulcanizates and Uncured Compounds by Thermogravimetry - Part 2: Acrylonitrile-butadiene and Halobutyl Rubbers

GB/T 21840 Vulcanizing Accelerator TBBS

GB/T 26125 Electrical and Electronic Products - Determination of Six Regulated Substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers)

GB/T 29614 Vulcanized Rubber - Determination the Content of Polycyclic Aromatic Hydrocarbons

HG/T 2334 Vulcanizing Accelerator TMTD

3 Terms and Definitions

The terms and definitions defined in GB/T 9881 and the following are applicable to this document.

3.1 reclaimed rubber

Vulcanized rubber that has been plasticized by thermal, mechanical and (or) chemical action and is mainly used as a rubber diluent, extender or processing aid.

[source: GB/T 9881-2008, 2.330, modified]

3.2 reclaimed butyl rubber

Reclaimed rubber made from waste rubber products with butyl rubber as the main component.

3.3 reclaimed butadiene-acrylonitrile rubber

Reclaimed rubber made from waste rubber products with butadiene-acrylonitrile rubber as the main component.

3.4 reclaimed natural rubber

Reclaimed rubber made from waste rubber products with natural rubber as the main component.

3.5 reclaimed halogenated butyl rubber

Reclaimed rubber made from waste rubber products with halogenated butyl rubber as the main

5.3 Limits of Polycyclic Aromatic Hydrocarbons and Hazardous Substances

The limits of polycyclic aromatic hydrocarbons and hazardous substances shall be agreed upon by both the supply-side and the demand-side or specified in specific product standards.

6 Test Methods

6.1 Appearance

Visual inspection under natural light.

6.2 Heating Loss

Carry out the determination in accordance with Appendix A.

6.3 Acetone Extract

Carry out the determination in accordance with Method A in GB/T 3516, with acetone as the solvent and Soxhlet extractor as the instrument.

6.4 Ash Content

Carry out the determination in accordance with Method A in GB/T 4498.1.

6.5 Carbon Black Content

Carry out the determination in accordance with GB/T 14837.1 and GB/T 14837.2.

6.6 Rubber Hydrocarbon Content

Carry out the determination in accordance with GB/T 14837.1 and GB/T 14837.2.

6.7 Mooney Viscosity

6.7.1 Specimen preparation

Use an open rubber mixing mill that complies with the provisions of GB/T 6038, adjust the mill clearance to $0.8\text{ mm} \pm 0.2\text{ mm}$, the roller temperature to $50\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$; fold 200 g of the rubber, and roll and refine it through the open rubber mixing mill for 3 times. Then, adjust the mill clearance to the appropriate one in accordance with the requirements of the Mooney viscosity determination thickness, and roll the mixes, without folding, through the open rubber mixing mill for 3 times. The prepared specimens are left for 2 h ~ 5 h as required to complete the determination.

6.7.2 Determination

Carry out the determination in accordance with GB/T 1232.1.

6.8 Density

Take the non-vulcanized rubber sheet specimen and determine it in accordance with Method B in GB/T 533-2008.

6.9 Tensile Strength and Elongation at Break

6.9.1 Specimen preparation shall be carried out in accordance with Appendix B.

6.9.2 The test shall be carried out in accordance with GB/T 528, using Type 1 specimens.

6.10 Contents of Polycyclic Aromatic Hydrocarbons and Hazardous Substances

In accordance with GB/T 26125, determine the content of mercury (Hg), lead (Pb), cadmium (Cd), hexavalent chromium (Cr^{6+}), polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE).

In accordance with GB/T 29614, determine the content of polycyclic aromatic hydrocarbons.

7 Inspection Rules

7.1 Inspection

7.1.1 Inspection is divided into type inspection and exit-factory inspection.

7.1.2 Type inspection is for all items specified in Chapter 5. In any of the following cases, type inspection shall be carried out:

- a) Finalization of product design, transfer of production to another factory, or restart of production after suspension for more than half a year;
- b) Changes in raw materials, formulas or process conditions;
- c) Normal production, with a time interval of half a year;
- d) The exit-factory inspection results are significantly different from the previous type inspection results.

7.1.3 Exit-factory inspection includes the following items, and the inspection frequency is batch by batch:

- a) Appearance;
- b) Ash content;
- c) Heating loss;
- d) Acetone extract;

Appendix A

(normative)

Determination of Heating Loss

A.1 Instruments

A.1.1 Weighing bottle: $\phi 40\text{ mm} \times 35\text{ mm}$.

A.1.2 Desiccator: contain anhydrous calcium chloride or color-changing silica gel.

A.1.3 Constant-temperature drying oven: equipped with a uniform and constant temperature automatic control device with an accuracy of $\pm 1\text{ }^{\circ}\text{C}$.

A.1.4 Balance: accurate to 0.0001 g.

A.2 Test Steps

A.2.1 Place the weighing bottle (A.1.1) in a constant-temperature drying oven (A.1.3) at $80\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and dry it to a constant mass, then, weigh its mass m_1 .

A.2.2 Use a balance (A.1.4) to weigh-take $2.0\text{ g} \sim 2.2\text{ g}$ (accurate to 0.0001 g) of the specimen and place it in a constant-mass weighing bottle (A.1.1). Weigh the mass m_2 (accurate to 0.0001 g) of the specimen (including the weighing bottle) before drying.

A.2.3 Place the specimen (including the weighing bottle) in a constant-temperature drying oven (A.1.3) at $80\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for 2 h, take it out and place it in a desiccator (A.1.2) to cool for 25 min. Within 1 h, use a balance (A.1.4) to weigh the mass m_3 (accurate to 0.0001 g) of the dried specimen (including the weighing bottle).

A.3 Result Expression

Heating loss is expressed as mass fraction (w) and calculated in accordance with Formula (A.1):

$$w = \frac{m_2 - m_3}{m_2 - m_1} \times 100\% \quad \dots\dots\dots (A.1)$$

Where,

m_2 ---the mass of the specimen (including the weighing bottle) before drying, expressed in (g);

m_3 ---the mass of the specimen (including the weighing bottle) after drying, expressed in (g);

m_1 ---the mass of empty weighing bottle, expressed in (g).

The calculation result is accurate to two decimal places.

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