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

GB/T 3780.30-2023

**Carbon black - Part 30: Determination of high temperature
volatile matter - Thermogravimetry method**

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1. Structure and Drafting Rules of Standardization Documents"

Drafting.

This document is Part 30 of GB/T 3780 "Carbon Black". GB/T 3780 has released the following parts.

- Part 1. Test method for iodine absorption value;
- Part 2. Determination of oil absorption value;
- Part 4. Determination of oil absorption value of compression specimens;
- Part 5. Determination of specific surface area CTAB method;
- Part 6. Determination of coloring strength;
- Part 7. Determination of pH value;
- Part 8. Determination of heating loss;
- Part 10. Determination of ash content;
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- Part 17. Reflectivity method for indirect determination of particle size;
- Part 18. Identification methods in natural rubber (NR);
- Part 21. Determination of sieve residue by water flushing method;

- Part 22. Calculating process capability index using process control data;
- Part 23. Sampling and identification of fugitive carbon black or other environmental particles;
- Part 24. Determination of void volume;
- Part 25. Determination of carbon content;
- Part 26. Determination of carbon content in carbon black raw oil;
- Part 27. Determination of aggregate size distribution by disc centrifugal optical deposition measurement method;
- Part 28. Determination of polycyclic aromatic hydrocarbons content;
- Part 29. Determination of solvent extractables;
- Part 30. Determination of high temperature volatiles by thermogravimetric method.

This document has been modified to adopt ISO 21870.2005 "Determination of Pyrolysis Loss by Thermogravimetry of Rubber Compounding Agent Carbon Black".

Compared with ISO 21870.2005, this document has made the following structural adjustments.

- Added two chapters "Normative Reference Documents" and "Terms and Definitions" (see Chapter 2 and Chapter 3);
- Chapter 4 corresponds to Chapter 2 in ISO 21870.2005;
- Chapter 5 corresponds to Chapter 4 in ISO 21870.2005;
- Chapter 6 corresponds to Chapter 3 in ISO 21870.2005;
- Added Chapter 7 "Sample";
- Chapter 8 ~ Chapter 10 correspond to Chapter 5 ~ Chapter 7 in ISO 21870.2005.

The technical differences between this document and ISO 21870.2005 and their reasons are as follows.

- The scope of application has been changed (see Chapter 1), and the adaptability is wider;
- Replaced ISO 1126 (see Chapter 1) with the normatively quoted GB/T 3780.8 to adapt to my country's technical conditions;
- Added GB/T 6425 (see Chapter 3) to adapt to my country's technical conditions;
- Added GB/T 3778 and GB/T 7044 (see Chapter 7) to adapt to my country's technical conditions and increase operability;

---The constant flow rate is added to "50cm³/min" (see 8.2), which clarifies and standardizes the uniformity of operation;

---Added "record the mass of the sample m₄₀, accurate to 0.01mg" (see 8.4) corresponding to the calculation formula;

---Added "record the mass of the sample m₁₂₅, accurate to 0.01mg" (see 8.7) corresponding to the calculation formula;

---Deleted the requirement that mass loss less than 0.05% of the starting mass is regarded as constant mass (see 8.9, ISO 21870.2005

5.9), more operable and easy to use;

---Changed the mass unit gram (g) to milligram (mg) (see Chapter 9, Chapter 6 of ISO 21870.2005), which is consistent with the analysis step

Comply with the regulations on weighing sample quantity;

---Added GB/T 8170 (see 9.2) to adapt to my country's technical conditions.

The following editorial changes have been made to this document.

---In order to coordinate with the existing standards, the name of the standard is modified to "Carbon Black Part 30.Determination of High Temperature Volatile Compounds by Thermogravimetric Method".

Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents.

Introduction

Carbon black is a product generated by incomplete combustion or thermal cracking of hydrocarbon compounds. It is mainly composed of carbon elements and is similar to spherical colloidal particles.

They exist in the form of sub- and colloid-sized aggregates. The physical and chemical properties of carbon black are mainly manifested in particle size, structure and surface properties. Its detection methods

It is the GB/T 3780 series of standards and is planned to consist of 30 parts.

---Part 1.Test method for iodine absorption value. The purpose is to indirectly test the specific surface area of carbon black, and the results are mainly used to calculate carbon black production.

The process capability index of the device represents the stability of the process.

---Part 2.Determination of oil absorption value. The purpose is to test the structural properties of carbon black aggregates and agglomerates, and the results are mainly used

for calculations.

The process capability index of carbon black production equipment represents the stability of the process.

---Part 4.Determination of oil absorption value of compression specimens. The purpose is to test the aggregate structural properties of carbon black and determine the relationship between carbon black and other ingredients.

The mixture can be mixed or kneaded for processing, filling and reinforcement, conductivity and other properties.

---Part 5.Determination of specific surface area CTAB method. The purpose is to directly test the surface area of carbon black and characterize the relationship between carbon black and rubber.

The effective area that molecules can come into contact with.

---Part 6.Determination of tinting strength. The purpose is to indirectly test the particle size and particle size distribution of carbon black and characterize the reinforcement and coating of carbon black.

The ability to cover white pigments.

---Part 7.Determination of pH value. The purpose is to test the degree of oxidation of the carbon black surface and characterize the vulcanization speed of the carbon black-containing compound.

properties such as strength and hydrophilicity of carbon black.

---Part 8.Determination of heating loss. The purpose is to test the amount of carbon black components lost at 125°C. These components are

If the value is high, the quality of the vulcanized rubber may be damaged.

---Part 10.Determination of ash content. The purpose is to test the inorganic impurities and inorganic salts in carbon black originating from raw oil and process.

Class, the ash content is relatively high, which will reduce the application performance of carbon black.

---Part 12.Inspection of impurities. The purpose is to test non-carbon black substances and impurities in carbon black that cannot pass the 850µm test sieve.

Both content and particle size have adverse effects on the performance of rubber products, making local cracks prone to occur where they exist, which may occur in tires.

Can cause a tire blowout.

---Part 14.Determination of sulfur content. The purpose is to test the sulfur content in