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

GB/T 3780.21-2025

Replacing GB/T 3780.21-2016, GB/T 3781.5-2019

**Carbon black - Part 21: Determination of sieve residue - Water
washing method**

炭黑 第21部分：筛余物的测定 水冲洗法

(English Translation)

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Table of Contents

- Foreword
- Introduction
- 1 Scope
- 2 Normative references
- 3 Terms and Definitions
- 4 Principles
- 5 Instruments and Equipment

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is Part 21 of GB/T 3780 "Carbon Black". GB/T 3780 "Carbon Black" has been published in the following parts.

- Part 1: Test method for iodine adsorption value;
- Part 2: Determination of oil absorption;
- Part 4: Determination of oil absorption value of compression specimen;
- Part 5: Determination of specific surface area - CTAB method;
- Part 6: Determination of tinting strength;
- Part 7: Determination of pH value;
- Part 8: Determination of loss on heating;
- Part 10: Determination of ash content;
- Part 12: Inspection of impurities;
- Part 14: Determination of sulfur content;
- Part 15: Determination of light transmittance of toluene extract;
- Part 17: Indirect determination of particle size - reflectivity method;
- Part 18: Identification methods in natural rubber (NR);
- Part 21: Determination of sieve residue - Water rinse method;

- Part 22: Calculation of process capability index using process control data;
- Part 23: Sampling and identification of carbon black or other ambient particles;
- Part 24: Determination of void volume;
- Part 25: Determination of carbon content in carbon black;
- Part 26: Determination of carbon content in carbon black feed oil;
- Part 27: Determination of aggregate size distribution by disc centrifugal optical sedimentation measurement;
- Part 28: Determination of polycyclic aromatic hydrocarbons content;
- Part 29: Determination of solvent extractables;
- Part 30: Determination of high temperature volatiles by thermogravimetric method;
- Part 31: Determination of total hydrogen content.

This document replaces GB/T 3780.21-2016 "Carbon black - Part 21: Rubber compounding ingredients - Determination of sieve residue - Water rinse method" and GB/T 3781.5-2019 "Acetylene black - Part 5: Determination of coarse particle fraction" has been revised compared to GB/T 3780.21-2016.

Besides the editorial changes, the main technical changes are as follows.

- Changed "Scope" (see Chapter 1, Chapter 1 of the 2016 edition);
- Deleted the test sieve 125 μ m specification and added the test sieve 150 μ m specification [see 5.1a), 4.1a of the 2016 edition];
- Added "rubber hose" [see 5.1f)];
- Change "can be controlled at (125 $\pm$ 5) $^{\circ}$ C" to "can be controlled at (125 $\pm$ 2) $^{\circ}$ C" (see 5.5, 4.5 of the 2016 edition);
- Added "Acetylene black according to GB/T 3782" (see 6.1);
- Added "Acetylene black samples are tested as a single sample, and other samples are tested as double samples" (see 7.1);
- Change "correct the center of the nozzle and the test sieve to ensure that they are in the best position" to "adjust the nozzle to the center of the test sieve [5.1a)] Center" (see 7.2, 6.1 of the 2016 edition);
- Increased sample weight (see 7.5);
- Change "a small water flow is used to flush the periphery of the funnel" to "a small water flow is used to flush the inside of the funnel" (see 7.7, 6.6 of the 2016 edition);
- Change "rub to remove the carbon black remaining on the surface of the residue" to "rub

the sample remaining on the surface of the residue, the residue should not be (See 7.11, 6.10 of the 2016 edition);

--- Change "weighed" to "removed" (see 7.12, 6.11 of the 2016 edition).

This document is modified to adopt ISO 1437:2017 "Rubber compounding ingredients - Determination of carbon black sieve residue".

Compared with ISO 1437:2017, this document has many structural adjustments. The comparison table of the structural number changes between the two documents is shown in Appendix A.

The technical differences between this document and ISO 1437:2017 and their reasons are as follows.

--- Added "conventional untreated various types of carbon black and powders for rubber products" and expanded its applicability according to the needs of my country's standards (see Chapter 1, Chapter 1 of ISO 1437:2017);

--- Replaced ISO 565 (see 5.1) with the normative reference GB/T 6003.1, and added the normative references GB/T 3778, GB/T 3782, GB/T 7044, GB/T 8170 (see 6.1, 8.2), to facilitate users of Chinese standards;

--- Deleted the test sieve 125 μm specification (see 5.1.1 of ISO 1437:2017) because it has been included in other specifications;

--- Changed the oven controllable temperature (see 5.5) to be consistent with other standards of GB/T 3780;

--- Added a dryer (see 5.6) to meet the test requirements;

--- Added samples (see Chapter 6) to make the provisions more comprehensive and clear;

--- Added the provision of parallel testing of samples (see 7.1) to facilitate users of the standard;

--- Added specific steps for cleaning filters on water pipelines (see 7.3, 7.4) to facilitate users of the standard;

--- Changed the sample weight (see 7.5) to expand applicability;

--- Added the method for obtaining the test results (see 8.2) to ensure the standardization of the result values;

--- Deleted the specific description of precision (see Chapter 8 of ISO 1437:2017) to simplify the statement of precision.

The following editorial changes have been made to this document.

--- To coordinate with the existing document, the name of the document was changed to

Carbon black Part 21: Determination of sieve residue - Water rinse method.

Introduction

Carbon black is a type of carbon element that exists in the form of nano-sized particles and amorphous carbon. It is formed by organic matter (natural gas, heavy oil, fuel oil, etc.) in the air.

Carbon black is a product obtained by incomplete combustion or thermal decomposition under conditions of insufficient gas.

Rice material, is listed as one of the 25 basic chemical products and fine chemical products in the international chemical industry. Carbon black is an indispensable it uses a small amount of reinforcing raw materials and can give rubber products a series of excellent properties.

In the carbon black standardization system, the three major characteristic indicators of carbon black, namely, specific surface area, structure and surface activity, are the main indicators for determining the reinforcing capacity of carbon black.

Indicators, focusing on the performance of carbon black, GB/T 3780 "Carbon Black" is intended to be divided into the following parts.

--- Part 1: Test method for iodine absorption value. Applicable to test the surface area of carbon black. The surface area of carbon black will affect the absorption of carbon black in rubber.

dispersion, especially related to tire wear resistance.

--- Part 2: Determination of oil absorption value. Applicable to test the structure of carbon black. The structure is a unique property of carbon black. Carbon black with high structure can to provide better reinforcement for tires, the structures tested in this section are the primary and secondary structures of carbon black.

It is the structure formed by the agglomeration of the smallest unit aggregates of carbon black.

--- Part 4: Determination of oil absorption value of compression specimen. The oil absorption value of compression specimen of carbon black is used to test the primary structure of carbon black.

The structural parameters of the smallest unit aggregate of carbon black, only the primary structure of carbon black can have a reinforcing effect on the tire.

--- Part 5: Determination of specific surface area - CTAB method. Applicable to test the surface area of carbon black, which is the surface area of carbon black and rubber.

The effective area that can produce cross-linking.