

ICS 83.040.20

CCS G 49



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

GB/T 3780.7-2025

Replacing GB/T 3780.7-2016

Carbon black - Part 7: Determination of pH value

炭黑 第7部分：pH值的测定

Issued on: August 1, 2025

Implemented on: February 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

Table of Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and Definitions

4 Test conditions

5 Reagents or materials

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 7 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;
- 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 3780.7-2016 "Carbon black - Part 7: Determination of pH value" and is consistent with GB/T 3780.7-2016.

In addition to structural adjustments and editorial changes, the main technical changes are as follows.

- Changed "Scope" (see Chapter 1, Chapter 1 of the 2016 edition);
- Deleted "Standard buffer solutions that meet the requirements of this part can be purchased commercially, or prepared according to GB/T 9724 or Appendix A" "Should comply with the provisions of GB/T 9724" was added (see 5.1, 3.1 of the 2016 edition);
- Added "calibration with a standard buffer solution of known pH value at the test temperature" (see 6.3);
- Added magnetic stirrer and magnetic stirring bar (see 6.11, 6.12);
- Added "When adding ethanol or acetone, the volume of water should be reduced to ensure the ratio of carbon black to water shown in Table 1".

The sample weight is specified (see 8.1.1, 7.1 of the 2016 edition);

- Changed the step of "calibrating the instrument with standard buffer solution" (see 8.1.6, 7.6 of the 2016 edition);
- Changed the method for testing pH value by boiling mud method (Method A) (see 8.1.7, 7.7 of the 2016 edition);
- Added the test steps and precision requirements of the ultrasonic slurry method (Method B) (see 8.2, 10.2);
- Deleted "standard buffer solution" (see Appendix A of the 2016 edition).

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document was proposed by the China Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Rubber and Rubber Products of Standardization (SAC/TC35).

This document was drafted by: Longxing Chemical Co., Ltd., Zhonghao Heiyuan Chemical Research and Design Institute Co., Ltd., Iksda (Qingdao) Control Co., Ltd., Wuxi Shuangcheng Carbon Black Technology Co., Ltd., Qujing Zhongyi Fine Chemical Co., Ltd., Shanxi Anlun Chemical Co., Ltd. company.

The main drafters of this document are: Hou Hegang, Liu Jian, Chen Xiaoyan, Tang Guojun, Hu Xiaoli, Xue Yalei, Xiong Jinli, and Nie Suqing.

The previous versions of this document and the documents it replaces are as follows.

- First published as GB/T 3780.7-1983 in 1983, first revised in 1996;
- In the second revision in 2006, the content of GB/T 3781.4-1993 "Determination of pH value of acetylene black" was incorporated (The previous versions of GB/T 3781.4-1993 are: GB/T 3781.4-1983) and GB/T 7045-2003 "Color Determination of pH value of carbon black" (the previous versions of GB/T 7045-2003 are: GB/T 7045- 1986, GB/T 7045-1993); revised for the third time in 2016;
- This is the fourth revision.

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 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.

- Part 6: Determination of tinting strength. Applicable to testing the particle size distribution of carbon black, which can determine its effect on rubber.

Reinforcement effect. Carbon black with high tinting strength value has a more concentrated particle size distribution, which can greatly improve the reinforcing effect of carbon black.

- Part 7: Determination of pH value. Applicable to testing the pH value of carbon black, which affects the vulcanization speed of rubber products.

degree and vulcanization time.

- Part 8: Determination of heating loss. Applicable to the determination of low temperature volatiles such as moisture in carbon black.

When the temperature is high, the rubber products will produce bubbles due to the vulcanization of low-temperature volatiles such as water at high temperatures, affecting the performance of rubber products such as tires. quality.

- Part 10: Determination of ash content. A high ash content in carbon black will affect the purity of carbon black and reduce the carbon content in carbon black.

- Part 12: Inspection of impurities. Impurities in carbon black are foreign matter introduced