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

GB/T 3781.9-2025

Replacing GB/T 3781.9-2019

Acetylene black - Part 9: Determination of resistivity

乙炔炭黑 第9部分：电阻率的测定

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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 9 of GB/T 3781 "Acetylene Black". GB/T 3781 has already published the following parts.

- Part 6: Determination of apparent volume;
- Part 8: Determination of hydrochloric acid absorption volume;
- Part 9: Measurement of resistivity.

This document supersedes GB/T 3781.9-2019 "Acetylene Black - Part 9: Determination of Resistivity" and is consistent with GB/T 3781.9-2019.

Aside from structural adjustments and editorial changes, the main technical changes are as follows.

- The reagent "ethanol" has been removed (see section 4.2 in the 2019 edition);
- Added the instruments and equipment "DC Low Resistance Tester", "Stirrer" and "Stopwatch" (see 6.1, 6.6 and 6.10);
- The oven temperature control has been changed from " $(125\pm 1)^{\circ}\text{C}$ " to " $(125\pm 2)^{\circ}\text{C}$ " (see 6.5, 5.2 in the 2019 version);
- Added "Test Procedure A" (see 8.1);

- Added data processing for Method A test (9.1);
- Precision has been changed (see Chapter 10, Chapter 9 in the 2019 edition).

Please note that some content in this document may involve patents. The issuing organization of this document assumes no 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 Standardization of Rubber and Rubber Products (SAC/TC35).

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This document was first published in 1983, revised for the first time in 1993, revised a second time in 2006, and revised a third time in 2019. This revision is... Fourth revision.

Introduction

Acetylene black is a solid powder produced by the thermal cracking of acetylene gas. It is mainly composed of carbon elements and consists of colloidal particles that are approximately spherical in shape.

Acetylene black exists in aggregate form at a particle size. Its physicochemical properties are mainly manifested in particle size, surface area, structure, electrical conductivity, and surface activity.

The test method for the sex is based on the GB/T 3781 series standards and is proposed to consist of the following parts.

- Part 6: Determination of Apparent Volume. The purpose is to determine the apparent volume of acetylene black; the results are used for the classification of acetylene black.

Used for calculating the volume of packaging bags and shipments during product packaging and transportation.

- Part 8: Determination of Hydrochloric Acid Absorption. The purpose is to determine the structural properties of acetylene black, and the results are used to characterize the absorption capacity of acetylene black.

The ability of the liquid medium required for battery operation.

- Part 9: Resistivity Measurement. The purpose is to determine the conductivity of acetylene black, and the results are used to characterize the performance of acetylene black in batteries or...

Electrical conductivity in composite products.

Acetylene black, Part 9: Determination of resistivity Warning. This document is intended for use by individuals with prior laboratory experience. This document does not address all potential safety concerns.

Users are responsible for taking appropriate safety and health measures and ensuring compliance with relevant national regulations.

1 Scope

This document describes the methods for determining the resistivity of acetylene black, which are divided into Method A and Method B.

This document applies to acetylene black.

2 Normative references

GB/T 3780.8

GB/T 3782

GB/T 8170

GB/T 12804

GB/T 12827

3 Terms and Definitions

This document does not contain any terms or definitions that need to be defined.

4 Principles

The sample was thoroughly mixed with dibutyl phthalate to form a uniformly dispersed and stable sample slurry. The resistivity of the sample slurry was then measured.

The conductivity rate is used to characterize the electrical conductivity of acetylene black.

5 Reagents and Materials

5.1 Dibutyl phthalate. analytical grade.

5.2 Standard reference acetylene black. SRAB1, GB/T 12827.

6 Instruments and Equipment

6.1 DC low resistance tester, accurate to 0.1ohm.

6.2 Resistivity meter, accurate to 0.01ohm-m.

6.3 Measurement cell, specifications are shown in Figure 1.

6.4 Analytical balance with a resolution of 0.1 mg.

6.5 Oven, gravity convection type, temperature controllable at $(125 \pm 2)^{\circ}\text{C}$, temperature uniformity less than or equal to $\pm 5^{\circ}\text{C}$.

6.6 Stirrer with stir bar.

6.7 Graduated cylinder, capacity 50mL, minimum graduation 1mL, conforming to the capacity tolerance specified in GB/T 12804.

6.8 Beaker, capacity 150mL, inner diameter 55mm.

6.9 Vacuum dryer, containing an effective desiccant.

6.10 Stopwatch. The unit is millimeters.

Index number explanation. 1---Silver sheet electrode;

2---Electrode silver wire lead; 3---Lead sleeve.

Figure 1 Schematic diagram of the measuring cell specifications

7 Samples

Sampling shall be performed in accordance with the provisions of GB/T 3782.

8.1 Method A

8.1.1 Before daily testing, the resistivity should be checked using standard reference acetylene black and should meet the requirements of GB/T 12827. New stirring equipment.

Before testing, a suitable rotation speed should be determined using standard reference acetylene black, and its resistivity should meet the requirements of GB/T 12827.

8.1.2 According to GB/T 3780.8, take an appropriate amount of sample in a beaker, dry it in an oven at 125°C for 1 hour, and then transfer it to a vacuum desiccator.

Cool to room temperature before use.

8.1.3 Weigh 1 g of the dried sample into a clean, dry 150 mL beaker, accurate to 1 mg, and measure 50 mL of diphthalic acid using a graduated cylinder.

The butyl ester was slowly added to the beaker, and the sample was allowed to stand to soak in.