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

GB/T 3780.14-2019

Carbon black -- Part 14: Determination of sulfur content

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Table of Contents

Foreword

1 Scope

2 Normative references

3 A method---oxygen bomb calorimetry

3.1 Principle

3.2 Reagents and materials

3.3 Instrumentation

Foreword

GB/T 3780 "carbon black" is divided into the following parts.

- Part 1. Test method for iodine absorption;
- Part 2. Determination of oil absorption values;
- Part 4. Determination of the oil absorption value of compressed specimens;
- Part 5. Determination of specific surface area by CTAB method;
- Part 6. Determination of color strength;
- Part 7. Determination of pH;
- Part 8. Determination of heating loss;
- Part 10. Determination of ash;
- Part 12. Inspection of impurities;
- Part 14. Determination of sulfur content;
- Part 15. Determination of light transmittance of toluene extracts;
- Part 17. Indirect measurement of particle size reflectance method;
- Part 18. Identification methods in natural rubber (NR);
- Part 21. Determination of sieve residue water rinse 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 feedstocks.

This part is the 14th part of GB/T 3780.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part replaces GB/T 3780.14-2010 "Carbon Black Part 14. Determination of Sulfur Content", and GB/T 3780.14-2010

The main technical changes are as follows.

--- Added "where C method is preferred and arbitration method" (see Chapter 1);

--- Added "filter paper" (see 3.3.8);

--- Deleted "Figure 1 oxygen bomb calorimeter structure diagram" "Figure 2 oxygen bomb cross-sectional view" and "Figure 3 burner furnace instrument diagram"

The type of instrument is different, and its structure is different (see Figure 1, Figure 2, Figure 3 of the 2010 edition);

--- Added the data recording method of the C method, that is, "the value after the fitting curve can also be recorded according to the operation requirements of the instrument" (see 5.6.2).

This section uses the redrafting method to modify the use of ISO 1138.2007 "rubber compound black carbon sulfur determination".

This section has more structural adjustments than ISO 1138.2007. This section and ISO 1138.2007 are listed in Appendix A.

The bar number comparison checklist.

The technical differences between this part and ISO 1138.2007 and their reasons are as follows.

---About the normative reference documents, this part has made technical adjustments to adapt to China's technical conditions, adjustments

The situation is reflected in Chapter 2, "Regulatory Citations", and the specific adjustments are as follows.

* Added GB/T 3780.8 and GB/T 8170 (see Chapter 2);

* Removed ISO 15671.2000 and translated its main content into Chapter 5 of the section (C---Automatic Analyzer Method).

For ease of use (see Chapter 5, Chapters 2 and 5 of ISO 1138.2007);

- Increased silver nitrate solution for standard users (see 3.2.4);
 - Increased "withstand pressure of at least 3MPa" to increase operability (see 3.3.1);
 - Added "sample" to improve the operability of this part (see 3.4, 4.4, 5.4);
 - Change the controllable temperature of the oven from (105 +/- 2) °C to (125 +/- 1) °C, unified operation (see 3.3.4, 4.3.9, ISO 1138.2007)
- 4.3.9);
- Added "dryer, filter paper" to improve the operability of this part (see 3.3.7, 3.3.8);
 - Increase the "size should match the combustion tube" to increase operability (see 4.3.3, ISO 1138.2007, 4.3.3);
 - Modify "accurate to 1mg" to "accurate to 0.1mg" to improve test accuracy (see 4.5.1, ISO 1138.2007 4.4.1);
 - Decompose Chapter 6 of ISO 1138.2007 into 5.5.1 Instrument Preparation and 5.5.2 Instrument Calibration for this part, and the two parts
- Refer to the test procedure in this section 5.5, and increase the 5.5.3 sample determination in this section to make the standard structure clearer;
- Increased the value of the calculation test results, the value of the specification results (see 3.6.2, 4.6.2, 5.6.3);
 - Added the data recording method of the C method, that is, "the value after the fitting curve can also be recorded according to the operation requirements of the instrument" (see 5.6.2);
 - A, B method increases the precision of the regulations, improve the rigor of the standard (see 6.1.1).

This section also made the following editorial changes.

- Using the International System of Units;
- Added the informative Appendix A "Structural changes in the number of chapters in this section compared with ISO 1138.2007".

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

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

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1 Scope

This part of GB/T 3780 specifies the use of oxygen bomb calorimeter method (A method), combustion furnace method (B method) and automatic analyzer method (C method)

The total sulfur content of carbon black, of which C method is the preferred and arbitration method.

This section applies to all types of carbon black.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article.

Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 3780.8 Carbon black - Part 8. Determination of heat loss (GB/T 3780.8-2019, ISO 1126.2015, MOD)

GB/T 8170 Numerical Rounding Rules and Representation and Determination of Limit Values

3.1 Principle

Weigh an appropriate amount of dried carbon black sample and ignite it in an oxygen bomb calorimeter. After combustion, open the oxygen bomb and rinse the inner surface with water.

The cup was collected for washing, and the barium sulfate precipitated with barium chloride was collected and weighed to calculate the sulfur content.

3.2 Reagents and materials

Unless otherwise stated, only analytically pure reagents and distilled or deionized water or water of comparable purity were used in the analysis.

3.2.1 Barium chloride solution, 100 g/L. Dissolve 100 g of barium chloride ($\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$) in water and dilute to 1000 mL.

3.2.2 Hydrochloric acid, $\rho_{20}=1.19\text{g/mL}$.

3.2.3 2,4,6-trinitrophenol (picric acid) saturated solution. add an appropriate amount of picric acid to a glass bottle filled with water, shake the bottle thoroughly