
**Rubber compounding ingredients —
Carbon black — Determination of sulfur
content**

*Ingrédients de mélange du caoutchouc — Noir de carbone — Dosage
du soufre total*



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Foreword

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ISO 1138 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 3, *Raw materials (including latex) for use in the rubber industry*.

This second edition cancels and replaces the first edition (ISO 1138:1981). The temperature of the oven in Method A has been changed to 125 °C, a method using an automatic analyser has been added, and the text has been up-dated editorially.

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Rubber compounding ingredients — Carbon black — Determination of sulfur content

1 Scope

This International Standard specifies three methods for the determination of the total sulfur in all types of carbon black for use in the rubber industry:

- Method A, using an oxygen bomb calorimeter;
- Method B, using a combustion furnace;
- Method C, using an automatic analyser.

With respect to safety aspects and test precision, it is preferable to use automatic systems. Classical chemical analysis (Method A and Method B) is acceptable if automatic equipment is not available.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15671, *Rubber and rubber additives — Determination of total sulfur content using an automatic analyser*

3 Method A: Oxygen bomb calorimeter

3.1 Principle

A weighed test portion of dried carbon black is ignited in an oxygen bomb calorimeter. After the bomb is opened, the inner surfaces are washed with water, and the washings collected in a beaker. The sulfur in the washings is precipitated as barium sulfate, which is collected and weighed. The percentage of sulfur is calculated.

3.2 Reagents

During the analysis, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

3.2.1 Barium chloride, 100 g/l solution.

Dissolve 100 g of barium chloride dihydrate ($\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$) in water and dilute to 1 l.

3.2.2 Hydrochloric acid, ρ_{20} 1,19 g/ml.

3.2.3 Picric acid, saturated solution.

Add an excess of picric acid to water in a glass-stoppered bottle. Shake the bottle well to dissolve enough picric acid to saturate the solution. A few crystals of picric acid shall remain in contact with the solution after saturation.