International Standard

ISO 10701

Steel and iron — Determination of sulfur content — Methylene blue spectrophotometric method

Aciers et fontes — Détermination du soufre — Méthode spectrophotométrique au bleu de méthylène

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Foreword

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This document was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 1, *Methods of determination of chemical composition*.

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This second edition cancels and replaces the first edition (ISO 10701:1994), which has been technically revised.

The main changes are as follows:

— Clause 2, Normative references has been updated;

— the mandatory Clause 3, terms and definitions has been added and subsequent clauses have been renumbered;

— Clause 10, Special case, has been moved into 8.3.1;

— the precision data has been re-evaluated.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Steel and iron — Determination of sulfur content — Methylene blue spectrophotometric method

1 Scope

This document specifies a methylene blue spectrophotometric method for the determination of sulfur in steel and iron.

The method is applicable to sulfur contents between 0,000 3 % (mass fraction) to 0,010 % (mass fraction).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 648, *Laboratory glassware — Single-volume pipettes*

ISO 1042, *Laboratory glassware — One-mark volumetric flasks*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 14284, *Steel and iron — Sampling and preparation of samples for the determination of chemical composition*

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3 Terms and definitions

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No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Principle

Dissolution of a test portion in a mixture of hydrochloric and nitric acids.

Evaporation with perchloric acid until white fumes appear to remove hydrochloric and nitric acids.

Dissolution of the salts in hydrochloric acid. Evolution of hydrogen sulfide by reducing with a mixture of hydroiodic and hypophosphorous acids in a nitrogen atmosphere, distillation, and absorption into a zinc acetate solution.

Formation of methylene blue by reacting with *N,N*-dimethyl-*p*-phenylenediamine and iron(III) solution.

Spectrophotometric measurement at a wavelength of about 665 nm.

Niobium, silicon, tantalum and titanium interfere in the determination of sulfur.

Depending on the contents of the interfering elements, the application ranges and test portion masses given in Table 1 apply.

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