International Standard

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Steel and iron — Determination of phosphorus content — Phosphovanadomolybdate spectrophotometric method

Aciers et fontes — Détermination des teneurs en phosphore — Méthode spectrophotométrique au phosphomolybdovanadate

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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,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 459, *ECISS - European Committee for Iron and Steel Standardization,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 10714:1992), which has been technically revised.

The main changes are as follows:

— a complete revaluation of the precision data.

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Steel and iron — Determination of phosphorus content — Phosphovanadomolybdate spectrophotometric method

1 Scope

This document specifies a spectrophotometric method for the determination of phosphorus in steel and cast iron.

The method is applicable to phosphorus contents between 0,001 0 % (mass fraction) and 1,0 % (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*

3 Terms and definitions

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 an oxidizing acid mixture.

Fuming with perchloric acid and removal of chromium as volatile chromyl chloride.

Complexing of silicon and the refractory elements with hydrofluoric acid and complexing of the excess of hydrofluoric acid with orthoboric acid.

Conversion of phosphorus to phosphovanadomolybdate in presence of perchloric and nitric acids.

Extraction of phosphovanadomolybdate by 4-methyl-2-pentanone in presence of citric acid to complex arsenic.

Spectrophotometric measurements at a wavelength of 355 nm.

Arsenic, hafnium, niobium, tantalum, titanium and tungsten interfere in determining phosphorus, but the interferences can be partially overcome by formation of complexes and use of small quantities of test

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