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Chemical analysis of ferrous materials - Analysis of ferro-silicon - Determination of Si and Al by X-ray fluorescence spectrometry

Analyse chimique des matériaux ferreux - Analyse du ferro-silicium - Détermination de Si et Al dans le ferro-silicium par spectrométrie de fluorescence de rayons X

Chemische Analyse von Ferrolegierungen - Analyse von Ferrosilizium - Bestimmung von Si und Al in Ferrolegierungen durch Röntgenfluoreszenzanalyse

This Technical Report was approved by CEN on 24 April 2011. It has been drawn up by the Technical Committee ECISS/TC 102.

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Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (CEN/TR 10354:2011) has been prepared by Technical Committee ECISS/TC 102 “Methods of chemical analysis for iron and steel”, the secretariat of which is held by SIS.

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1 Scope

This Technical Report describes a X-ray fluorescence (XRF) spectrometric method for the determination of Si and Al contents in ferro-silicon materials.

The method is applicable to:

— Si contents between 40 % and 90 %;

— Al contents between 0,5 % and 6 %.

The correction of the spectrometric measurement from spectral interferences on the analytical lines used is essential. This Technical Report is valid for the analytical lines:

— Si Kα 7.126 (for element contents between 45 % and 90 %);

— Al Kα 8.339 (for element contents between 0,8 % and 6 %);

— Fe Kα 1.937 (for element contents between 10 % and 58 %).

NOTE For matrix matching purposes, iron is included in the analytical program to be prepared.

Within the conditions here above, spectral interferences don't need to be calculated.

2 Principle

Preparation of oxide beads, comprising the oxidation of the sample with strontium nitrate and its melting with lithium tetraborate, in a platinum crucible.

The beads are irradiated by an X-ray beam of suitable energy. The secondary X-rays produced are dispersed by means of crystals and the corresponding intensities are measured by detectors at the selected wavelengths.

The contents of the relevant elements are determined by relating the measured intensities of unknown samples to calibration curves recorded with beads prepared with certified reference materials.

Fixed channel or sequential systems may be used to provide simultaneous or sequential determinations of element concentrations.