Steel and iron - Determination of total carbon and sulfur content - Infrared absorption method after combustion in an induction furnace (routine method)

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 15350:2010 sisaldab Euroopa standardi EN ISO 15350:2010 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 15350:2010 consists of the English text of the European standard EN ISO 15350:2010.
Standard on kinnitatud Eesti Standardikeskuse 30.06.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 30.06.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 21.04.2010.	Date of Availability of the European standard text 21.04.2010.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 77.080.01

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 15350

April 2010

ICS 77.080.01

English Version

Steel and iron - Determination of total carbon and sulfur content - Infrared absorption method after combustion in an induction furnace (routine method) (ISO 15350:2000)

Aciers et fontes - Dosage du carbone et du soufre totaux - Méthode par absorption dans l'infrarouge après combustion dans un four à induction (méthode pratique) (ISO 15350:2000)

Stahl und Eisen - Bestimmung der Gesamtgehalte an Kohlenstoff und Schwefel - Infrarotabsorptionsverfahren nach Verbrennung in einem Induktionsofen (Standardverfahren) (ISO 15350:2000)

This European Standard was approved by CEN on 18 March 2010.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

The text of ISO 15350:2000 has been prepared by Technical Committee ISO/TC 17 “Steel” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 15350:2010 by Technical Committee ECISS/TC 102 “Methods of chemical analysis for iron and steel” the secretariat of which is held by SIS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2010, and conflicting national standards shall be withdrawn at the latest by October 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 15350:2000 has been approved by CEN as a EN ISO 15350:2010 without any modification.

Contents

Page

Steel and iron — Determination of total carbon and sulfur content — Infrared absorption method after combustion in an induction furnace (routine method)

1 Scope

This International Standard specifies an infrared absorption method, after combustion in an induction furnace, for the determination of the total carbon and sulfur content in steel and iron.

The method is applicable to carbon contents of mass fraction between 0,005 % and 4,3 % and to sulfur contents of mass fraction between 0,000 5 % and 0,33 %.

This method is intended to be used in normal production operations and is intended to meet all generally accepted, good laboratory practices of the type expected by recognized laboratory accreditation agencies. It uses commercially available equipment, is calibrated and calibration verified using steel and iron certified reference materials, and its performance is controlled using normal statistical process control (SPC) practices.

This method can be used in the single element mode, i.e., determination of carbon and sulfur independently or in the simultaneous mode, i.e., determination of carbon and sulfur concurrently.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 437:1982, *Steel and cast iron — Determination of total carbon content — Combustion gravimetric method*.

ISO 4934:1980, *Steel and cast iron — Determination of sulfur content — Gravimetric method*.

ISO 4935:1989, *Steel and iron — Determination of sulfur content — Infrared absorption method after combustion in an induction furnace*.

ISO 5725-1:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions*.

ISO 5725-2:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*.

ISO 5725-3:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 3: Intermediate measures of the precision of a standard measurement method*.

ISO 9556:1989, *Steel and Iron — Determination of total carbon content — Infrared absorption method after combustion in an induction furnace*.

ISO 10701:1994, *Steel and iron — Determination of sulfur content — Methylene blue spectrophotometric method*.

ISO 13902:1997, *Steel and iron — Determination of high sulfur content — Infrared absorption method after combustion in an induction furnace*.

ISO 14284:1996, *Steel and iron — Sampling and preparation of samples for the determination of chemical composition*.

3 Principle

3.1 Carbon

The carbon is converted to carbon monoxide and/or carbon dioxide by combustion in a stream of oxygen. Measurement is by infrared absorption of the carbon monoxide and carbon dioxide carried by a current of oxygen.

3.2 Sulfur

The sulfur is converted to sulfur dioxide by combustion in a stream of oxygen. Measurement is by infrared absorption of the sulfur dioxide carried by a current of oxygen.

4 Reagents

4.1 Acetone, the residue after evaporation shall have a mass fraction less than 0,000 5 %.

4.2 Cyclohexane, the residue after evaporation shall have a mass fraction less than 0,000 5 %.

4.3 Inert ceramic, attapulques clay impregnated with sodium hydroxide and having particle sizes from 0,7 mm to 1,2 mm for absorption of carbon dioxide.

4.4 Pure iron, used as an accelerator, 0,4 mm to 0,8 mm size with carbon and sulfur contents with a mass fraction of less than 0,001 % respectively.

4.5 Magnesium perchlorate, reagent grade, having particle size from 0,7 mm to 1,2 mm for absorption of moisture.

4.6 Oxygen, ultra high purity (mass fraction minimum 99,5 %)

An oxidation catalyst [copper(II) oxide or platinum] tube heated to 600 °C followed by suitable carbon dioxide and water absorbents shall be used when the presence of organic contaminants is suspected in the oxygen.

4.7 Platinum or platinized silica, heated to 350 °C for the conversion of carbon monoxide to carbon dioxide.

4.8 Accelerator, copper, tungsten-tin or tungsten for carbon determination and tungsten for sulfur determination, 0,4 mm to 0,8 mm size with carbon and sulfur contents of mass fraction less than 0,001 % and 0,000 5 % respectively.

4.9 Cellulose cotton, for the collection of sulfur trioxide

4.10 Steel and iron certified reference materials (CRMs), all reference materials used for calibration and calibration verification shall be certified by internationally-recognized bodies and validated by adequate performance on one or more national or international interlaboratory test programmes. Preference shall be given to materials that were certified using referee methods, e.g. ISO 437 and ISO 9556 for carbon, and ISO 4934, ISO 4935, ISO 10701 and ISO 13902 for sulfur, traceable to SI units as opposed to those based on other certified reference materials.

4.11 Steel and iron reference materials (RMs), those used for statistical process control of the method need not be certified, but adequate homogeneity data shall be available, either from the certifying body or from the laboratory that uses the material, in order to ensure the validity of the control data generated.