

Teknisk rapport

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Järn och stål – Europeiska standarder för bestämning av kemisk sammansättning

Iron and steel – European standards for the determination of chemical composition

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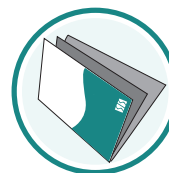
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Dokumentet ersätter SIS-CEN/TR 10261:2008, utgåva 2.

This Technical Report is not a Swedish Standard. This document contains the English version of CEN/TR 10261:2013.

The document replaces SIS-CEN/TR 10261:2008, edition 2.

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Dokumentet är framtaget av kommittén för Kemiska analysmetoder för metaller, SIS/TK 122.

Har du synpunkter på innehållet i det här dokumentet, vill du delta i ett kommande revideringsarbete eller vara med och ta fram standarder inom området? Gå in på www.sis.se - där hittar du mer information.

TECHNICAL REPORT
RAPPORT TECHNIQUE
TECHNISCHER BERICHT

CEN/TR 10261

February 2013

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Supersedes CEN/TR 10261:2008

English Version

**Iron and steel - European standards for the determination of
chemical composition**

Aciers et fontes - Normes européennes pour la
détermination de la composition chimique

Stahl und Eisen - Europäische Normen für die Bestimmung
der chemischen Zusammensetzung

This Technical Report was approved by CEN on 10 June 2012. It has been drawn up by the Technical Committee ECISS/TC 102.

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Foreword

This document (CEN/TR 10261:2013) 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.

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.

This document supersedes CEN/TR 10261:2008.

In comparison with the previous edition of CEN/TR 10261:2008, the following significant technical changes were made:

- Title;
- Clause 2, Definitions – added;
- In 3.1, for nitrogen, addition of EN ISO 15351:2010 and EN ISO 4945:2009;
- In 3.1, for silicon, addition of EN ISO 439:2010;
- In 3.1, for titanium, addition of EN 10211:1995;
- In 3.2, for Al, Cr, Co, Cu, Mn, Mo, Ni, P, Sn and V, addition of EN 10351:2011;
- In 3.2, for C and S, addition of EN ISO 15350:2010;
- In 4.1.9.1, Principle of the method - reworded for technical correction;
- 4.1.12.3, Summary of EN ISO 15351:2010, added;
- 4.1.12.4, Summary of EN ISO 4945:2009, added;
- 4.1.15.3, Summary of EN ISO 439:2010, added;
- 4.1.17.1, Summary of EN 10211:1995, added;
- 4.2.1.1, Summary of EN 10351:2011, added;
- 4.2.4.1, Summary of EN ISO 15350:2010, added;
- Annex A, updated;
- Annex C, the concentration ranges are represented in three different graphics: one for the referee methods, one for the routine methods and one for all the methods available.

1 Scope

This Technical Report lists, under Clause 3, the European Standards, which are currently available for the determination of the chemical composition of steel and iron. In Clause 4, it provides details of the range of application and gives the principle of the method for each standard.

Items which are under preparation as European Standards or as CEN Technical Reports by ECISS/TC 102 are available on the webpage of CEN, through the link <http://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/WP.aspx?param=733643&title=ECISS/TC%20102>.

Annex A contains a list of other European Standards and CEN Technical Reports applicable for the determination of the chemical composition of steels and irons.

Annex B contains a list of withdrawn Euronorms, together with the corresponding replacement European Standards, if any.

Annex C gives graphical representations of the concentration ranges of the methods available in this Technical Report. Figure C.1 gives the concentration ranges of the referee methods, Figure C.2 gives the concentration ranges of the routine methods and Figure C.3 represents the fields of application of all the methods available.

Annex D provides a trilingual key of the abbreviations used in the Figures given in Annex C.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1 referee method
stoichiometric method or a method calibrated against pure metals or stoichiometric compounds, which is to be used for certification analysis or in case of arbitration

2.2 routine method
method calibrated against reference materials or certified reference materials, or against standard solutions commercially available, which is widely used for control purposes (day to day analysis)

3 European Standards available for the determination of the chemical composition of steel and iron

3.1 Mono-elemental methods

— Aluminium, Al

EN 29658:1991, *Steel — Determination of aluminium content — Flame atomic absorption spectrometric method (ISO 9658:1990)*

— Arsenic, As

EN 10212:1995, *Chemical analysis of ferrous materials — Determination of arsenic in steel and iron — Spectrophotometric method*

— **Boron, B**

EN 10200:2012, *Chemical analysis of ferrous materials — Determination of boron in steels — Spectrophotometric method*

EN ISO 13900:2002, *Steel — Determination of boron content — Curcumin spectrophotometric method after distillation (ISO 13900:1997)*

— **Calcium, Ca**

EN 10177:1989, *Chemical analysis of ferrous materials — Determination of calcium in steels — Flame atomic absorption spectrometric method*

— **Carbon, C**

EN 10036:1989, *Chemical analysis of ferrous materials — Determination of total carbon in steels and irons — Gravimetric method after combustion in a stream of oxygen*

EN ISO 15349-2:2003, *Unalloyed steel — Determination of low carbon content — Part 2: Infrared absorption method after combustion in an induction furnace (with preheating) (ISO 15349-2:1999)*

EN ISO 9556:2001, *Steel and iron — Determination of total carbon content — Infrared absorption method after combustion in an induction furnace (ISO 9556:1989)*

— **Chromium, Cr**

EN 10188:1989, *Chemical analysis of ferrous materials — Determination of chromium in steels and irons — Flame atomic absorption spectrometric method*

EN 24937:1990, *Steel and iron — Determination of chromium content — Potentiometric or visual method (ISO 4937:1986)*

EN 24937:1990/AC:1991 (Editorial correction), *Steel and iron — Determination of chromium content — Potentiometric or visual method (ISO 4937:1986)*

— **Copper, Cu**

EN 24943:1990, *Chemical analysis of ferrous metal — Determination of copper content — Flame atomic absorption spectrometric method (ISO 4943:1985)*

EN 24943:1990/AC:1991 (Editorial correction), *Steel and cast iron — Determination of copper content — Flame atomic absorption spectrometric method (ISO 4943:1985)*

EN 24946:1990, *Steel and cast iron — Determination of copper content — 2,2'diquinolyl spectrophotometric method (ISO 4946:1984)*

EN 24946:1990/AC:1991 (Editorial correction), *Steel and cast iron — Determination of copper content — 2,2'diquinolyl spectrophotometric method (ISO 4946:1984)*

— **Lead, Pb**

EN 10181:1989, *Chemical analysis of ferrous materials — Determination of lead in steels — Flame atomic absorption spectrometric method*

— **Manganese, Mn**

EN 10071:2012, *Chemical analysis of ferrous materials — Determination of manganese in steels and irons — Electrometric titration method*

EN 24159:1989, *Ferromanganese and ferrosilicomanganese — Determination of manganese content — Potentiometric method (ISO 4159:1978, ed. 1)*

EN 24159:1989/AC1:1989 (Editorial correction), *Ferromanganese and ferrosilicomanganese — Determination of manganese content — Potentiometric method (ISO 4159:1978, ed. 1)*

EN ISO 10700:1995, *Steel and iron — Determination of manganese content — Flame atomic spectrometric method (ISO 10700:1994)*

— **Nickel, Ni**

EN 10136:1989, *Chemical analysis of ferrous materials — Determination of nickel in steels and irons — Flame atomic absorption spectrometric method*

EN 24938:1990, *Steel and iron — Determination of nickel content — Gravimetric or titrimetric method (ISO 4938:1988)*

EN 24938:1990/AC:1991 (Editorial correction), *Steel and iron — Determination of nickel content — Gravimetric or titrimetric method (ISO 4938:1988)*

— **Niobium, Nb**

EN 10178:1989, *Chemical analysis of ferrous materials — Determination of niobium in steels — Spectrophotometric method*

— **Nitrogen, N**

EN 10179:1989, *Chemical analysis of ferrous materials — Determination of nitrogen (trace amounts) in steels — Spectrophotometric method*

EN ISO 10720:2007, *Steel and iron — Determination of nitrogen content — Thermal conductimetric method after fusion in a current of inert gas (ISO 10720:1997)*

EN ISO 15351:2010, *Steel and iron — Determination of nitrogen content — Thermal conductimetric method after fusion in a current of inert gas (Routine method) (ISO 15351:1999)*

EN ISO 4945:2009, *Steel — Determination of nitrogen content — Spectrophotometric method (ISO 4945:1977)*

— **Oxygen, O**

EN 10276-1:2000, *Chemical analysis of ferrous materials — Determination of oxygen in steel and iron — Part 1: Sampling and preparation of steel samples for oxygen determination*

EN 10276-2:2003, *Chemical analysis of ferrous materials — Determination of oxygen content in steel and iron — Part 2: Infrared method after fusion under inert gas*

— **Phosphorus, P**

EN 10184:2006, *Chemical analysis of ferrous materials — Determination of phosphorus in non-alloyed steels and irons — Molybdenum blue spectrophotometric method*

EN ISO 10714:2002, *Steel and iron — Determination of phosphorus content — Phosphovanadomolybdate spectrophotometric method (ISO 10714:1992)*

— **Silicon, Si**

EN 24829-1:1990, *Steel and cast iron — Determination of total silicon content — Reduced molybdsilicate spectrophotometric method — Part 1: Silicon content between 0,05 and 1 % (ISO 4829-1:1986)*

EN 24829-1:1990/AC:1991 (Editorial correction), *Steel and cast iron — Determination of total silicon content — Reduced molybdsilicate spectrophotometric method — Part 1: Silicon content between 0,05 and 1 % (ISO 4829-1:1986)*

EN 24829-2:1990, *Steel and cast iron — Determination of total silicon content — Reduced molybdsilicate spectrophotometric method — Part 2: Silicon content between 0,01 and 0,05 % (ISO 4829-2:1988)*

EN 24829-2:1990/AC:1991 (Editorial correction), *Steel and cast iron — Determination of total silicon content — Reduced molybdsilicate spectrophotometric method — Part 2: Silicon content between 0,01 and 0,05 % (ISO 4829-2:1988)*

EN ISO 439:2010, *Steel and iron — Determination of total silicon content — Gravimetric method (ISO 439:1994)*

— **Sulphur, S**

EN 24935:1991, *Steel and iron — Determination of sulphur content — Infrared absorption method after combustion in an induction furnace (ISO 4935:1989)*

EN ISO 4934:2003, *Steel and iron — Determination of sulfur content — Gravimetric method (ISO 4934:2003)*

— **Titanium, Ti**

EN 10211:1995, *Chemical analysis of ferrous materials — Determination of titanium in steel and iron — Flame atomic absorption spectrometric method*

EN ISO 10280:1995, *Steel and iron — Determination of titanium content — Diantiprylmethane spectrophotometric method (ISO 10280:1991)*

— **Vanadium, V**

EN 24947:1991, *Steel and cast iron — Determination of vanadium content — Potentiometric titration method (ISO 4947:1986)*

3.2 Multi-elemental methods

— **Aluminium, Al; Chromium, Cr; Cobalt, Co; Copper, Cu; Manganese, Mn; Molybdenum, Mo; Nickel, Ni; Phosphorus, P; Tin, Sn and Vanadium, V**

EN 10351:2011, *Chemical analysis of ferrous materials — Inductively coupled plasma optical emission spectrometric analysis of unalloyed and low alloyed steels — Determination of Mn, P, Cu, Ni, Cr, Mo, V, Co, Al (total) and Sn [Routine method]*

— **Aluminium, Al; Lead, Pb; Nickel, Ni; Silicon, Si and Zinc, Zn**

EN 10318:2005, *Determination of thickness and chemical composition of zinc- and aluminium-based metallic coatings — Routine method*

— **Carbon, C; Chromium, Cr; Copper, Cu; Manganese, Mn; Nickel, Ni; Phosphorus, P; Silicon, Si and Sulphur, S**

CR 10320:2004, *Optical emission analysis of low alloy steels (routine method) — Method for determination of C, Si, S, P, Mn, Cr, Ni and Cu*