



Nederlandse praktijkrichtlijn

NPR-CEN/TR 10261 (en)

Ijzer en staal - Europese normen voor de bepaling
van de chemische samenstelling

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

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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

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

This Technical Report was approved by CEN on 13 August 2018. It has been drawn up by the Technical Committee ECISS/TC 102.

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Contents	Page
European foreword	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 European Standards for the determination of the chemical composition of steels and irons	5
4.1 Mono-elemental methods	5
4.2 Multi-elemental methods	7
5 Range of application and principle of the methods	8
5.1 Mono-elemental methods	8
5.2 Multi-elemental methods	21
Annex A (informative) List of other European Standards and CEN Technical Reports applicable for the determination of the chemical composition of ferrous materials	26
Annex B (informative) List of withdrawn Euro norms and of the corresponding replacement European standards	27
Annex C (normative) Graphical representation of the scope of methods described in this technical report	30
Annex D (informative) Trilingual key of the abbreviations used in the figures given in Annex C	34

European foreword

This document (CEN/TR 10261:2018) 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 shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TR 10261:2013.

In comparison with the previous edition of CEN/TR 10261:2013, the following significant technical changes were made:

- Clause 1: updating the link to the webpage of CEN;
- in 4.1, for carbon, withdrawal of EN 10036;
- in 4.1, for calcium, reference updated;
- in 4.1, for chromium, addition of prCEN/TR 10367;
- in 4.1, for copper, replacement of EN 24946:1990 and EN 24946:1990/AC:1991 with EN ISO 4946;
- in 4.1, for lead, reference updated;
- in 4.1, for manganese, EN 24159:1989 moved to Annex A;
- in 4.1, addition of EN 10361, for nickel;
- in 4.1, for nickel, replacement of EN 24938:1990 and EN 24938:1990/AC:1991 with EN ISO 4938;
- in 4.1, for nickel, reference updated;
- in 4.1, for selenium, addition of CEN/TR 10364;
- in 4.1, for silicon, replacement of EN 24829-2:1990 and EN 24829-2:1990/AC:1991 with EN ISO 4829-2;
- in 4.1, for titanium, updating the date of publication of EN 10211;
- in 4.2, addition of EN 10355.

CEN/TR 10261:2018 (E)**1 Scope**

This document lists, under Clause 4, the European Standards which are currently available for the determination of the chemical composition of steels and cast irons.

In Clause 5, this document provides details on the range of application and gives the principle of the method described in 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 https://standards.cen.eu/dyn/www/?p=204:22:0:::FSP_ORG_ID:733643&cs=123E58BF77E3DE921F548B80C5FF2E5D4

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

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

Annex C shows graphical representations of the content ranges of the methods listed in this document. Figure C.1 gives the content ranges of the referee methods, Figure C.2 gives the content ranges of the routine methods and Figure C.3 represents the fields of application of all the methods described.

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

NOTE Three methods applicable for the analysis of some ferro-alloys are listed in Annex A.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 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

3.2 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)

4 European Standards for the determination of the chemical composition of steels and irons

4.1 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

prEN 10177:2018, *Steels — Determination of calcium content — Flame atomic absorption spectrometric method (FAAS)*

— Carbon, C

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

prCEN/TR 10367, *Alloyed steels — Determination of chromium content — Inductively coupled plasma optical emission spectrometric method*

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 ISO 4946:2016, *Steel and cast iron — Determination of copper — 2,2'-Biquinoline spectrophotometric method (ISO 4946:2016)*

CEN/TR 10261:2018 (E)— **Lead, Pb**

prEN 10181:2018, *Steels — Determination of lead content — Flame atomic absorption spectrometric method (FAAS)*

— **Manganese, Mn**

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

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

— **Nickel, Ni**

prEN 10136:2018, *Steels and cast irons — Determination of nickel content — Flame atomic absorption spectrometric method (FAAS)*

EN 10361:2015, *Alloyed steels - Determination of nickel content - Inductively coupled plasma optical emission spectrometric method*

EN ISO 4938:2016, *Steel and iron — Determination of nickel content — Gravimetric or titrimetric method (ISO 4938:2016)*

— **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)*

— **Selenium, Se**

CEN/TR 10362:2014, *Chemical analysis of ferrous materials - Determination of selenium in steels - Electrothermal atomic absorption spectrometric method*

— **Silicon, Si**

EN ISO 4829-1:2018, *Steel and cast iron — Determination of total silicon contents — Reduced molybdsilicate spectrophotometric method — Part 1: Silicon contents between 0,05 % and 1,0 % (ISO 4829-1:2018)*

EN ISO 4829-2:2016, *Steels — Determination of total silicon contents - Reduced molybdsilicate spectrophotometric method — Part 2: Silicon contents between 0,01 % and 0,05 % (ISO 4829-2:2016)*

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 10211:2013, *Chemical analysis of ferrous materials — Determination of titanium in steels and cast irons — Flame atomic absorption spectrometric method*

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

— **Vanadium, V**

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

4.2 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*

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