

# SVENSK STANDARD

## SS-EN 10177:2019

Fastställt/Approved: 2019-06-17  
Utgåva/Edition: 2  
Språk/Language: engelska/English  
ICS: 77.040.30;77.080

---

### **Kemiska analysmetoder för järn och stål – Bestämning av kalciumhalt i stål – Spektrometrisk flamatombabsorptionsmetod**

### **Steels – Determination of calcium content – Flame atomic absorption spectrometric method (FAAS)**

This preview is downloaded from [www.sis.se](http://www.sis.se). Buy the entire standard via <https://www.sis.se/std-80012504>

# Standarder får världen att fungera

*SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.*

## Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

## Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

## Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

**Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på [www.sis.se](http://www.sis.se) eller ta kontakt med oss på tel 08-555 523 00.**



# Standards make the world go round

*SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.*

## Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

## Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

## Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

**If you want to know more about SIS, or how standards can streamline your organisation, please visit [www.sis.se](http://www.sis.se) or contact us on phone +46 (0)8-555 523 00**



Europastandarden EN 10177:2019 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 10177:2019.

Denna standard ersätter SS-EN 10177, utgåva 1.

The European Standard EN 10177:2019 has the status of a Swedish Standard. This document contains the official version of EN 10177:2019.

This standard supersedes the SS-EN 10177, edition 1.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

*Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS som även lämnar allmänna upplysningar om svensk och utländsk standard.*

*Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.*

Denna standard är framtagen av kommittén för Kemiska analysmetoder för metaller, SIS/TK 122.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på [www.sis.se](https://www.sis.se) - där hittar du mer information.



EUROPEAN STANDARD

**EN 10177**

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2019

ICS 77.040.30

Supersedes EN 10177:1989

English Version

## Steels - Determination of calcium content - Flame atomic absorption spectrometric method (FAAS)

Aciers - Détermination de la teneur en calcium -  
Méthode par spectrométrie d'absorption atomique  
dans la flamme (SAAF)

Stahl - Bestimmung des Calciumgehalt -  
Flammenatomabsorptionsspektrometrisches  
Verfahren (FAAS)

This European Standard was approved by CEN on 22 April 2019.

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-CENELEC 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-CENELEC 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**SS-EN 10177:2019 (E)**

<b>Contents</b>	<b>Page</b>
European foreword.....	3
<b>1 Scope</b> .....	<b>4</b>
<b>2 Normative references</b> .....	<b>4</b>
<b>3 Terms and definitions</b> .....	<b>4</b>
<b>4 Principle</b> .....	<b>4</b>
<b>5 Reagents</b> .....	<b>4</b>
<b>6 Apparatus</b> .....	<b>5</b>
<b>6.1 Ordinary laboratory apparatus</b> .....	<b>5</b>
<b>6.2 Atomic absorption spectrometer</b> .....	<b>6</b>
<b>6.2.1 General</b> .....	<b>6</b>
<b>6.2.2 Minimum precision</b> .....	<b>6</b>
<b>6.2.3 Additional performance requirements</b> .....	<b>6</b>
<b>7 Sampling</b> .....	<b>6</b>
<b>8 Procedure</b> .....	<b>6</b>
<b>8.1 Test portion</b> .....	<b>7</b>
<b>8.2 Blank test</b> .....	<b>7</b>
<b>8.3 Determination</b> .....	<b>7</b>
<b>8.3.1 Preparation of the test solution</b> .....	<b>7</b>
<b>8.3.2 Treatment of the test solution</b> .....	<b>7</b>
<b>8.3.3 Preparation of the calibration solutions</b> .....	<b>7</b>
<b>8.3.4 Adjustment of the atomic absorption spectrometer</b> .....	<b>8</b>
<b>8.3.5 Spectrometric measurements</b> .....	<b>9</b>
<b>9 Expression of results</b> .....	<b>10</b>
<b>9.1 Use of the calibration curve</b> .....	<b>10</b>
<b>9.2 Use of bracketing method</b> .....	<b>10</b>
<b>10 Test report</b> .....	<b>10</b>
<b>Annex A (informative) Precision</b> .....	<b>11</b>
<b>Bibliography</b> .....	<b>12</b>

## European foreword

This document (EN 10177:2019) has been prepared by Technical Committee CEN/TC 459 “ECISS - European Committee for Iron and Steel Standardization”<sup>1</sup>, the secretariat of which is held by AFNOR.

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 December 2019, and conflicting national standards shall be withdrawn at the latest by December 2019.

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 EN 10177:1989.

In comparison with EN 10177:1989, the following significant technical changes were made:

- Clause 1: limits of the scope changed;
- Normative references: revised;
- Clause 4: possibility for using aqua regia for the dissolution and other suitable radiation sources added;
- Clause 5: preparation of iron base solution added;
- 8.3: details regarding the preparation of the test solution added
- 8.3.3: calibration solutions expanded;
- 8.3.5 and Clause 9: bracketing method for the spectrometric measurements added;
- Clause 10: editorially updated;
- Bibliography: added.

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

---

<sup>1</sup> Through its subcommittee SC 2 “Methods of chemical analysis for iron and steel” (secretariat: SIS)

## SS-EN 10177:2019 (E)

### 1 Scope

This document specifies a flame atomic absorption spectrometric method (FAAS) for the determination of calcium content in non-alloy and low alloy steels.

The method is applicable to calcium contents between 4 µg/g and 120 µg/g.

The method can be adapted to higher calcium contents by changing the test portion or the dilution process, provided the criteria in 6.2.2 and 6.2.3 are still met.

### 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.

EN ISO 648, *Laboratory glassware — Single-volume pipettes (ISO 648)*

EN ISO 1042, *Laboratory glassware — One-mark volumetric flasks (ISO 1042)*

EN ISO 14284, *Steel and iron — Sampling and preparation of samples for the determination of chemical composition (ISO 14284)*

### 3 Terms and definitions

No terms and definitions are listed in this document.

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>

### 4 Principle

Dissolution of a test portion in hydrochloric acid followed by oxidation with nitric acid.

NOTE 1 Aqua regia can be used for simultaneous dissolution and oxidation of the test portion.

Addition of a solution of potassium chloride and nebulization of the test solution into an acetylene/nitrous oxide flame of an atomic absorption spectrometer.

NOTE 2 Potassium chloride is added to suppress ionization of calcium.

Spectrometric measurement of the atomic absorption of the 422,7 nm spectral line emitted by a calcium hollow-cathode lamp.

NOTE 3 Other suitable radiation sources can also be used, provided the criteria in 6.2.2 and 6.2.3 are still met.

### 5 Reagents

During the analysis, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

The following concentrations and amounts can be modified, provided the changes are taken into account in 8.3 and Clause 9.

#### 5.1 Pure iron.