

Heat-treatable steels, alloy steels and free-cutting steels  
- Part 3: Case-hardening steels (ISO 683-3:2019)

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 683-3:2019 sisaldab Euroopa standardi EN ISO 683-3:2019 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 683-3:2019 consists of the English text of the European standard EN ISO 683-3:2019.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 13.02.2019.	Date of Availability of the European standard is 13.02.2019.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

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English Version

Heat-treatable steels, alloy steels and free-cutting steels -  
Part 3: Case-hardening steels (ISO 683-3:2019)

Aciers pour traitement thermique, aciers alliés et  
aciers pour décolletage - Partie 3: Aciers pour  
cémentation (ISO 683-3:2019)

Für eine Wärmebehandlung bestimmte Stähle, legierte  
Stähle und Automatenstähle - Teil 3: Einsatzstähle (ISO  
683-3:2019)

This European Standard was approved by CEN on 17 December 2018.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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

## European foreword

This document (EN ISO 683-3:2019) has been prepared by Technical Committee ISO/TC 17 "Steel" in collaboration with Technical Committee CEN/TC 459/SC 5 "Steels for heat treatment, alloy steels, free-cutting steels and stainless steels" the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by August 2019, and conflicting national standards shall be withdrawn at the latest by August 2019.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 ISO 683-3:2018.

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, 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.

## Endorsement notice

The text of ISO 683-3:2019 has been approved by CEN as EN ISO 683-3:2019 without any modification.

The European steel numbers to the steel grades are to be found in informative Annex B.

The references to following European standards are given for information:

EN 10017, *Steels rod for drawing and/or cold rolling – Dimensions and tolerances*

EN 10021, *General technical delivery conditions for steel products*

EN 10029, *Hot-rolled steel plates 3 mm thick or above – Tolerances on dimensions and shape*

EN 10048, *Hot-rolled narrow steel strip – Tolerances on dimensions and shape*

EN 10051, *Continuously hot-rolled strip and plate/sheet cut from wide strip of non.-alloy and alloy steels – Tolerances on dimensions and shape*

EN 10058, *Hot rolled flat steel bars and steel wide flats for general purposes – Dimensions and tolerances on shape and dimensions*

EN 10059, *Hot rolled square steel bars for general purposes – Dimensions and tolerances on shape and dimensions*

EN 10060, *Hot rolled round steel bars - Dimensions and tolerances on shape and dimensions*

EN 10061, *Hot rolled hexagon steel bars – Dimensions and tolerances on shape and dimensions*

EN 10160, *Ultrasonic testing of steel flat product of thickness equal to or greater than 6 mm (reflection method)*

EN 10204, *Metallic products – Types of inspection documents*

EN 10308, *Non-destructive testing – Ultrasonic testing of steel bars*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 4, *Heat treatable and alloy steels*.

This third edition cancels and replaces the second edition (ISO 683-3:2016), which has been technically revised. The main changes compared with the previous edition are as follows:

- in [Table 1](#), footnote <sup>a</sup> has been added;
- in [Table 3](#), footnote <sup>e</sup> has been changed.

A list of all parts in the ISO 683 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Heat-treatable steels, alloy steels and free-cutting steels —

## Part 3: Case-hardening steels

### 1 Scope

This document specifies the technical delivery requirements for

- semi-finished products, hot formed, e.g. blooms, billets, slabs (see NOTE 1),
- bars (see NOTE 1),
- wire rod,
- finished flat products, and
- hammer or drop forgings (see NOTE 1)

manufactured from the case-hardening non-alloy or alloy steels listed in [Table 3](#) and supplied in one of the heat-treatment conditions given for the different types of products in [Table 1](#) and in one of the surface conditions given in [Table 2](#).

The steels are, in general, intended for the manufacture of case-hardened machine parts.

NOTE 1 Hammer-forged semi-finished products (blooms, billets, slabs, etc.), seamless rolled rings and hammer-forged bars are covered under semi-finished products or bars and not under the term “hammer and drop forgings”.

NOTE 2 For International Standards relating to steels complying with the requirements for the chemical composition in [Table 3](#), however, supplied in other product forms or treatment conditions than given above or intended for special applications, and for other related International Standards, see the Bibliography.

In special cases, variations in these technical delivery requirements or additions to them can form the subject of an agreement at the time of enquiry and order (see [5.2](#) and [Annex A](#)).

In addition to this document, the general technical delivery requirements of ISO 404 are applicable.

### 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.

ISO 377, *Steel and steel products — Location and preparation of samples and test pieces for mechanical testing*

ISO 404, *Steel and steel products — General technical delivery requirements*

ISO 642:1999, *Steel — Hardenability test by end quenching (Jominy test)*

ISO 643, *Steels — Micrographic determination of the apparent grain size*

ISO 4885, *Ferrous materials — Heat treatments — Vocabulary*

ISO 4948-1, *Steels — Classification — Part 1: Classification of steels into unalloyed and alloy steels based on chemical composition*



ISO 4948-2, *Steels — Classification — Part 2: Classification of unalloyed and alloy steels according to main quality classes and main property or application characteristics*

ISO/TS 4949, *Steel names based on letter symbols*

ISO 4967, *Steel — Determination of content of non-metallic inclusions — Micrographic method using standard diagrams*

ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method*

ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method*

ISO 6929, *Steel products — Vocabulary*

ISO 7788, *Steel — Surface finish of hot-rolled plates and wide flats — Delivery requirements*

ISO 9443, *Surface quality classes for hot-rolled bars and wire rod*

ISO/TR 9769, *Steel and iron — Review of available methods of analysis*

ISO 10474, *Steel and steel products — Inspection documents*

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

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 377, ISO 4885, ISO 4948-1, ISO 4948-2, ISO 6929, ISO 14284 and the following apply.

NOTE For deviations from these terms and definitions, see NOTE 1 of the Scope and footnote <sup>a</sup> of [Table 2](#).

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

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

#### 3.1

##### **case-hardening steels**

steels with a relatively low carbon content, which are carburized or carbonitrided on their surface and subsequently hardened

Note 1 to entry: These steels, after hardening, have a high degree of hardness in the surface zone and good resistance to wear, while the core material is characterized principally by extreme toughness.

Note 2 to entry: Further, possibilities for heat treatment of case-hardening steels are, for example, nitrocarburizing and nitriding.

#### 3.2

##### **non-alloy steel**

as defined in ISO 4948-1

#### 3.3

##### **alloy steel**

as defined in ISO 4948-1