

Heat-treatable steels, alloy steels and free-cutting steels
- Part 4: Free-cutting steels (ISO 683-4:2016)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 683-4:2018 sisaldab Euroopa standardi EN ISO 683-4:2018 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 683-4:2018 consists of the English text of the European standard EN ISO 683-4:2018.
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.
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English Version

Heat-treatable steels, alloy steels and free-cutting steels -
Part 4: Free-cutting steels (ISO 683-4:2016)

Aciers pour traitement thermique, aciers alliés et
aciers pour décolletage - Partie 4: Aciers pour
décolletage (ISO 683-4:2016)

Für eine Wärmebehandlung bestimmte Stähle, legierte
Stähle und Automatenstähle - Teil 4: Automatenstähle
(ISO 683-4:2016)

This European Standard was approved by CEN on 18 May 2018.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

The text of ISO 683-4:2016 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 683-4:2018 by Technical Committee ECISS/TC 105 “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of an identical text or by endorsement, at the latest by December 2018, and conflicting national standards shall be withdrawn at the latest by December 2018.

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 10087:1998.

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 683-4:2016 has been approved by CEN as EN ISO 683-4:2018 without any modification.

The European steel numbers to the steel grades are to be found in informative Annex C. Some European steel numbers were not available at the publication of this International standard, for this reason they are given now below.

Steel name	9S20	17SMn20	35SMn20	35SMnPb20
Steel number	1.0721	1.0735	1.0766	1.0767

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 10058, *Hot rolled flat steel bars 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 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).

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

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 17, *Steel*, Subcommittee SC 4, *Heat treatable and alloy steels*.

This second edition cancels and replaces the first edition (ISO 683-4:2014), of which it constitutes a minor revision.

ISO 683 consists of the following parts, under the general title *Heat-treatable steels, alloy steels and free-cutting steels*:

- *Part 1: Non-alloy steels for quenching and tempering*
- *Part 2: Alloy steels for quenching and tempering*
- *Part 3: Case-hardening steels*
- *Part 4: Free-cutting steels*
- *Part 5: Nitriding steels*
- *Part 14: Hot-rolled steels for quenched and tempered springs*
- *Part 15: Valve steels for internal combustion engines*
- *Part 17: Ball and roller bearing steels*
- *Part 18: Bright steel products*

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

Part 4: Free-cutting steels

1 Scope

This part of ISO 683 gives the technical delivery requirements for semi-finished products (e.g. blooms, billets, slabs), bars and wire rod, manufactured from the free-cutting steels listed in [Table 2](#) and supplied in one of the treatment conditions given for the different types of products in [Table 1](#), rows 2 to 4.

This part of ISO 683 covers three groups of free-cutting steels for mechanical purposes as listed in [Table 2](#), namely

- a) not intended for heat treatment,
- b) suitable for case-hardening, and
- c) suitable for quenching and tempering.

Free-cutting steels are often used as bright bars. For these products, refer to ISO 683-18.

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 B](#)).

In addition to this part of ISO 683, the general technical delivery requirements of ISO 404 are applicable.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 643, *Steels — Micrographic determination of the apparent grain size*

ISO 4885, *Ferrous products — 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 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 6929, *Steel products — Vocabulary*

ISO 9443, *Heat-treatable and alloy steels — Surface quality classes for hot-rolled round bars and wire rods — Technical delivery conditions*

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

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

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

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

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.

3.1 ruling section

section for which the specified mechanical properties shall apply

Note 1 to entry: Independent of the actual shape and dimensions of the cross-section of the product, the size of its ruling section is always given by a diameter. This corresponds to the diameter of an “equivalent round bar”. That is a round bar which will show the same cooling rate as the actual ruling section of the product concerned at its position for taking the test pieces, when being cooled from austenitizing temperature.

3.2 free-cutting steels

steels characterized by good machinability with high metal removal rate, mostly obtained by higher than normal contents of sulphur

Note 1 to entry: Other elements besides sulfur can be added for further improving the machinability.

4 Classification and designation

4.1 Classification

The classification of the relevant steel grades is allocated in accordance with ISO 4948-1 and ISO 4948-2. All steels covered by this part of ISO 683 are classified as non-alloy quality steels.

4.2 Designation

For the steel grades covered by this part of ISO 683, the steel names given in the relevant tables are allocated in accordance with ISO/TS 4949.

5 Information to be supplied by the purchaser

5.1 Mandatory information

The manufacturer shall obtain the following information from the purchaser at the time of enquiry and order:

- a) the quantity to be delivered;
- b) the designation of the product form (e.g. slab, bloom, billet, round bar, wire rod);
- c) either the designation of the dimensional standard and the dimensions and tolerances selected from this (see 7.7) or the designation of the drawing or any other document, covering the dimensions and tolerances required for the product;
- d) a reference to this part of ISO 683, i.e. ISO 683-4;