SLOVENSKI STANDARD
SIST EN 10083-2 + A1:1997

01-maj-1997

Jekla za poboljšanje - 2. del: Tehnični dobavni pogoji za kakovostna nelegirana jekla (vključuje dodatek A1:1996)

Quenched and tempered steels - Part 2: Technical delivery conditions for unalloyed quality steels (includes amendment A1:1996)

Vergütungsstähle - Teil 2: Technische Lieferbedingungen für unlegierte Qualitätsstähle (enthält Änderung A1:1996)

Aciers pour trempe et revenu - Partie 2: Conditions techniques de livraison des aciers de qualité non alliés (inclut l'amendement A1:1996)

Ta slovenski standard je istoveten z: **EN 10083-2:1991 + A1:1996**

ICS:

77.140.10 Jekla za toplotno obdelavo Heat-treatable steels

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Descriptors: iron- and steel products, unalloyed steels, heat treatable steels, quenching (cooling), tempering, delivery condition, specifications, designation, marking

English version

Quenched and tempered steels - Part 2: Technical delivery conditions for unalloyed quality steels (includes amendment A1:1996)

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This amendment 1 modifies the European Standard EN 10083-2:1991.This amendment was approved by CEN on 1995-07-01. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Annexes

Foreword

This Amendment EN 10083-2:1991+A1:1996 to EN 10083-2:1991 has been prepared by Technical Committee ECISS/TC 23 "Steels for heat treatment, alloy steels and free-cutting steels - Qualities", the secretariat of which is held by DIN.

When the European Committee for Iron and Steel Standardization (ECISS) was formed and its programme of work was drawn up, Technical Committee TC 23 was requested to replace EURONORM 83-70 `Quenched and tempered steels; Quality standard' by a European Standard.

The discussions within ECISS/TC23 were based on the International Standard ISO/683-1 1987 'Heat-treatable steels, alloy steels and free-cutting steels - Part 1 : Direct hardening unalloyed and low-alloyed wrought steel in form of different black products'.

This Amendment to the European Standard EN 10083-2:1991 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 1997, and conflicting national standards shall be withdrawn at the latest by February 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this Amendment: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

1.1 This European Standard gives the technical delivery requirements for

- semi-finished products, hot formed, for example blooms, billets, slabs (see notes 2 and 3)
- bars (see note 2)
- rod
- wide flats
- hot rolled sheet/plate and strip
- hammer and drop forgings (see note 2)

manufactured from the direct hardening unalloyed steels (see note 4) listed in table 3 and supplied in one of the heat treatment conditions given for the different types of products in table 1, lines 2 to 7 and in one of the surface conditions given in table 2.

The steels are in general intended for the fabrication of quenched and tempered machine parts, but are partly (see table 7) also used in the normalized condition.

The requirements for mechanical properties given in this European Standard are restricted to the sizes given in tables 6 and 7.

NOTE 1: EURONORMS and European Standards relating to steels complying with the requirements for the chemical composition in table 3 but which are supplied in other product forms or treatment conditions than given above or are intended for special applications, and EURONORMS for similar steel grades are listed in annex C.

NOTE 2: Hammer-forged semi-finished products (blooms, billets, slabs, etc.) and hammer-forged bars are included under semi-finished products or bars and not under the term `hammer and drop forgings'.

NOTE 3: Special agreements shall be made when ordering unworked continuous cast semi-finished products.

NOTE 4: In accordance with EN 10020, the steels covered by this European Standard are unalloyed quality steels. Unalloyed and alloyed special steels are standardized in EN 10083-1. The differences between quality steels and special steels are:

- no minimum impact values are specified;

- no hardenability requirements in the Jominy;

- the oxidic inclusion content is not limited;

- the maximum phosphorus and sulphur contents are higher.

NOTE 5: Boron steels for quenching and tempering are standardised in EN 10083-3.

1.2 In special cases deviations or supplements to these technical delivery conditions may be agreed at the time of enquiry and order (see annex B).

1.3 In addition to the specifications of this European Standard the general technical delivery requirements of EN 10221 are applicable unless otherwise specified.

2 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate points in the text and the publications are listed hereafter. Subsequent amendments to, or revisions of, any of these publications apply to this European Standard only when incorporated in it by amendment or revision. In the case of undated references, the most recent edition of the publication referred to applies.

EURONORM 18[1)]	Selection and preparation of samples and test pieces for steel and iron and steel products
EURONORM 103[1)]	Micrographic determination of the ferritic or austenitic grain size of steels
EN 10002-1	Metallic materials - tensile test Part 1 : Methods of test (at ambient temperature)
EN 10003-1	Metallic materials - Brinell hardness test - Test Method.
EN 10020	Definition and classification of grades of steel
EN 10021	General technical delivery conditions for steel and iron and steel products

[1)] It may be agreed at the time of ordering ....

EN 10027-1	Designation system for steel Part 1: Steel names, principal symbols
EN 10027-2	Designation system for steel Part 2: Steel numbers
EN 10052	Vocabulary of heat treatment terms for ferrous products
EN 10079	Definition of steel products.
EN 10163-2	Delivery requirements for surface condition of hot rolled steel plates, wide flats and sections Part 2. Plates and wide flats.
EN 10221	Surface quality classes for hot-rolled bars and rods - Technical delivery conditions.
EN 10204	Steel and steel products - Types of inspection documents
CR 10260 ECISS IC10	Designation system for steel Additional symbols for steel names.

3 Definitions

3.1 quenched and tempered steels: For the purposes of this standard, quenched and tempered steels are engineering steels which because of their chemical composition are suitable for hardening and in the quenched and tempered condition have good toughness at a given tensile strength.

3.2 product form: The definitions of EN 10079 shall apply for the product forms.

3.3 types of heat treatment: The definitions of EN 10052 shall apply for the types of heat treatment given in this standard.

3.4 unalloyed and alloy steel: The definitions of EN 10020 shall apply for the classification into unalloyed and alloy steel.

3.5 ruling section for heat treatment: The ruling section of a product is the section for which the mechanical properties have been specified (see annex A).

Whatever the actual shape and dimensions of the cross-section of the product, the size of its ruling section is always expressed as a diameter. This corresponds to the diameter of an `equivalent round bar`. That is a round bar which, at the position of its cross-section specified for taking test pieces for mechanical tests, will, when being cooled from the austenitizing temperature, show the same cooling rate as the actual ruling section of the product concerned at its position for taking test pieces.

4 Designation and ordering

4.1 The steel names are allocated in accordance with EN 10027-1 and ECISS Information Circular IC10; the steel numbers are allocated in accordance with EN 10027-2.

4.2 In accordance with the following examples, the standard designation of a steel specified in this EN consists of:

- the term `steel';
- the number of this EN;
- the name or number of the steel grade (see table 3);
- if appropriate, the designation of the heat treatment condition (see table 1).

For example: Steel EN 10083-2-C45+N or steel EN 10083-2-1.0503+N.

4.3 The information in the relevant dimensional standard shall apply to the standard designation of the products.

4.4 The order shall contain all the information necessary to describe the required products and their condition (see table 2) and testing clearly. If additional or special requirements are to be met, the relevant clause number from annex B shall be given to indicate this, with details if necessary.

5 Requirements

5.1 Manufacturing process

5.1.1 *General*

The manufacturing process of the steel and of the products is left to the discretion of the manufacturer with the restrictions given by the requirements in **5.1.2** and **5.1.3**.

5.1.2 *Deoxidation*

All steels shall be killed.

5.1.3 *Heat treatment and surface condition at delivery*

5.1.3.1 *Normal condition at delivery*

Unless otherwise agreed at the time of order, the products shall be delivered in the untreated, i.e. hot worked, condition.

5.1.3.2 *Particular heat treatment condition*

If so agreed at the time of order, the products shall be delivered in one of the heat-treatment conditions given in table 1, lines 3 to 7.

5.1.3.3 *Particular surface condition*

If so agreed at the time of order, the products shall be delivered with one of the particular surface conditions given in table 2, lines 3 to 8.

5.2 Chemical composition and mechanical properties

5.2.1 The requirements given in table 1, column 9 shall apply for each heat treatment condition.

5.2.2 The mechanical property values given in tables 6 and 7 shall apply to specimens in the `quenched and tempered' and `normalized' heat treatment conditions which have been taken and prepared in accordance with figures 1 or 2 and 3 and table 9 (see also footnote 1 of table 1).

5.3 Technological properties

5.3.1 *Machinability*

All steels are machinable in the `soft-annealed' condition. (See also table 1, line 7 and table 3, footnote 2.)

5.3.2 *Shearability of semi-finished products and steel bars*

5.3.2.1 Under suitable shearing conditions (avoiding local stress peaks, preheating, application of blades with a profile adapted to that of the product, etc.) all steel grades are shearable in the soft annealed condition and in the normalized condition.

// **5.3.2.2** Steel grades C45 to C60 are also shearable under suitable conditions, if they are supplied in the `treated for shearability' condition with the hardness requirements as specified in table 5.

// **5.3.2.3** The steel grades C22 to C40 are shearable in the untreated condition under suitable conditions.

// Shearability may also be assumed for steel grade C45 with dimensions greater than 80 mm and in the untreated condition.

5.4 Structure

Unless otherwise agreed at the time of enquiry and order, the grain size shall be left to the discretion of the manufacturer. If a fine grain structure is required in accordance with a reference treatment, special requirement **B.3** shall be ordered.

5.5 Internal soundness

Requirements for internal soundness may be agreed upon at the time of enquiry and order, e.g. on the basis of non-destructive tests (see annex B clause **B.4**).

5.6 Surface quality

5.6.1 All products shall have a smooth finish appropriate to the shaping processes applied.

5.6.2 Minor surface imperfections, which may occur also under normal manufacturing conditions, such as scores originating from rolled-in scale in the case of hot-rolled products, shall not be regarded as defects.

5.6.3 Where appropriate, requirements relating to surface quality of the products shall be agreed upon at the time of enquiry and order, if possible with reference to European Standards.

NOTE 1: EN 10163-2 specifies requirements for the surface quality of hot-rolled sheet/plate and wide flats. EN 10221 contains surface quality classification for hot rolled bars and rods.

NOTE 2: It is more difficult to detect and eliminate surface discontinuities from coiled products than from cut lengths. This should be taken into account when agreements on surface quality are made.

5.6.4 If suitability of bars and rods for bright drawings is required, this shall be agreed at the time of order.

5.6.5 The removal of surface defects by welding is only permitted with the approval of the customer or his representative.

Until a relevant European Standard is published, the method and permissible depth of defect removal, where appropriate, shall be agreed at the time of enquiry and order.

5.7 Dimensions, tolerances on dimensions and shape tolerances

The nominal dimensions, tolerances on dimensions and shape tolerances for the products shall be agreed at the time of enquiry and order, wherever possible with reference to the dimensional standards applicable (see annex D).

5.8 Cast separation

The products shall be delivered separated by cast.

6 Inspection testing and conformity of products with the requirements

6.1 Inspection and testing procedures and types of documents

6.1.1 Products complying with this European Standard shall be ordered and delivered with one of the test certificates as specified in EN 10204. The type of test certificate shall be agreed at the time of enquiry and order. If the order does not contain any specification of this type, a works test certificate shall be issued.