EUROPEAN STANDARD
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EN 10027-2

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Descriptors: Iron and steel products, steels, alloy steels, non-alloy steels, heat treatable steels, designation, steel numbers

English version

Designation systems for steels – Part 2: Steel numbers

Systèmes de désignation des aciers – Partie 2: Système numérique

Bezeichnungssysteme für Stähle – Teil 2: Nummernsystem

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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.

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 Central Secretariat has the same status as the official versions.

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CEN

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

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

This European Standard was prepared by the ECISS Technical Committee 7 (ECISS/TC7) 'Designation of steel' the secretariat of which is UNSIDER (Ente Italiano di Unificazione Siderurgica).

It is the second part of the European Standard 'Designation systems for steel', the first part being 'Steel names'.

This European Standard EN 10027-2 was approved by CEN on 1991-12-20.

According to the Common CEN/CENELEC rules, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Contents

1 Scope

1.1 This Part 2 of this European Standard sets out a numbering system, referred to as steel numbers, for the designation of steel grades. It deals with the structure of steel numbers and the organization for their registration, allocation and dissemination. Such steel numbers are complementary to steel names set out in EN 10027-1.

Application of this Part 2 of the European Standard is obligatory for steels specified in European Standards. Application is optional for national steels and proprietary steels.

NOTE. Although the scope of the system is limited to steel it is structured so as to be capable of being extended to include other industrially produced materials.

1.2 Steel numbers established according to this system have a fixed number of digits (see clause **5**). They are better suited for data processing than steel names established according to EN 10027-1.

1.3 For steels specified in European Standards the application for allocation of steel numbers (see **A.6** to **A.9**) is the responsibility of the ECISS Technical Committee concerned. For national steel grades the responsibility is that of the national competent body.

NOTE. Applications from European organizations having a specific interest in the standardization of steel and steel products, e.g. AECMA, EUROFER are submitted via the ECISS Central Secretariat (see **A.9**).

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed as follows. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 10020 Definition and classification of grades of steel

EN 10027 Designation systems for steel
Part 1 : Steel names, principal symbols

EN 10079 Definition of steel products

3 Definitions

For the purpose of this Part 2 of this European Standard the definitions given in EN 10020 and EN 10079 shall apply.

4 Principles

4.1 Each steel number shall refer only to one steel grade. Conversely, each steel grade shall correspond to one steel number. Accordingly a number allocated to a steel shall not, in principle, (see **4.3**) be used for any other steel grade. (See **A.1** and **A.2**.)

4.2 Steel numbers shall be allocated by the European Registration Office in accordance with annex A.

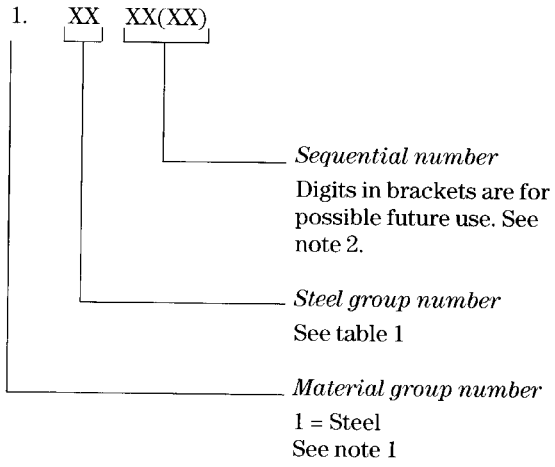
4.3 The European Registration Office (see **A.9**) shall revise the list of Registered Steels at appropriate intervals. The object of such revisions is to review, in cooperation with the bodies responsible for the application of steel numbers, those steel numbers for steels no longer in production. Such steel numbers are transferred to an annex to the list for a transitional period and eventually deleted. The revised list of Registered Steels is published.

Steel numbers deleted according to the above procedure may become available for re-allocation to future steel grades.

4.4 Steel numbers shall not normally be changed. If under exceptional circumstances, a change is unavoidable it shall be in accordance with **4.1**, **4.2** and **4.3**.

5 Structure of steel numbers

The structure of steel numbers is set out as follows:



NOTE 1. Numbers 2 to 9 may be allocated to other materials. See note to clause **1**.

NOTE 2. At present the sequential number comprises two digits. Should an increase in the number of digits be necessary by reason of an increase in the number of steel grades to be considered, a sequential number of up to four digits is envisaged. In that case a revision of this Part 2 of the European Standard will be published.

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Table 1. Steel groups

	Non-alloy steels			Alloy steels						
	Base steels	Quality steels	Special steels	Quality steels	Special steels					
Nr					Tool steels	Miscellaneous steels	Stainless and heat resisting steels	Structural, pressure vessel and engineering steels		
0	00 | 90 Base steels		10 Steels with special physical properties		20 Cr	30	40 Stainless steel with < 2.5 % Ni without Mo, Nb and Ti	50 Mn-Si-Cu	60 Cr-Ni with ≥ 2,0 < 3,0 % Cr	70 Cr Cr-B	80 Cr-Si-Mo Cr-Si-Mn-Mo Cr-Si-Mo-V Cr-Si-Mn-Mo-V
1		01 | 91 General structural steels with R_m < 500 N/mm²	11 Structural, pressure vessel and engineering steels with C < 0.50 %		21 Cr-Si Cr-Mn Cr-Mn-Si	31	41 Stainless steel with < 2.5 % Ni and Mo but without Nb and Ti	51 Mn-Si Mn-Cr	61	71 Cr-Si Cr-Mn Cr-Mn-B Cr-Si-Mn	81 Cr-Si-V Cr-Mn-V Cr-Si-Mn-V
2		02 | 92 Other structural steels not intended for heat treatment with R_m < 500 N/mm²	12 Structural, pressure vessel and engineering steels with C ≥ 0.50 %		22 Cr-V Cr-V-Si Cr-V-Mn Cr-V-Mn-Si	32 High speed steel with Co	42	52 Mn-Cu Mn-V Si-V Mn-Si-V	62 Ni-Si Ni-Mn Ni-Cu	72 Cr-Mo with < 0.35 % Mo Cr-Mo-B	82 Cr-Mo-W Cr-Mo-W-V
3		03 | 93 Steels with average C < 0.12 % or R_m < 400 N/mm²	13 Structural pressure vessel and engineering steels with special requirements		23 Cr-Mo Cr-Mo-V Mo-V	33 High speed steel without Co	43 Stainless steel with ≥ 2.5 % Ni without Mo, Nb and Ti	53 Mn-Ti Si-Ti	63 Ni-Mo Ni-Mo-Mn Ni-Mo-Cu Ni-Mo-V Ni-Mn-V	73 Cr-Mo with ≥ 0.35 % Mo	83
4		04 | 94 Steels with average C ≥ 0.12 % < 0.25 % or R_m ≥ 400 < 500 N/mm²	14		24 W Cr-W	34	44 Stainless steel with ≥ 2.5 % Ni with Mo but without Nb and Ti	54 Mo Nb, Ti, V, W	64	74	84 Cr-Si-Ti Cr-Mn-Ti Cr-Si-Mn-Ti
5		05 | 95 Steels with average C ≥ 0.25 % < 0.55 % or R_m ≥ 500 < 700 N/mm²	15 Tool steel		25 W-V Cr-W-V	35 Bearing steels	45 Stainless steels with special additions	55 B Mn-B < 1.65 % Mn	65 Cr-Ni-Mo with < 0.4 % Mo + < 0.2 % Ni	75 Cr-V with < 2.0 % Cr	85 Nitriding steels
6		06 | 96 Steels with average C ≥ 0.55 % or R_m ≥ 700 N/mm²	16 Tool steel		26 W excluding groups 24, 25 and 27	36 Materials with special magnetic properties without Co	46 Chemical resistant and high temp Ni alloys	56 Ni	66 Cr-Ni-Mo with < 0.4 % Mo + ≥ 2.0 < 3.5 % Ni	76 Cr-V with ≥ 2.0 % Cr	86
7		07 | 97 Steels with higher P or S content	17 Tool steel		27 With Ni	37 Materials with special magnetic properties and with Co	47 Heat resistant steels with < 2.5 % Ni	57 Cr-Ni with < 1.0 % Cr	67 Cr-Ni-Mo with < 0.4 % Mo + ≥ 3.5 < 5.0 % Ni, or ≥ 0.4 % Mo	77 Cr-Mo-V	87 Steels not for heat treatment by user
8			18 Tool steel	08 | 98 Steels with special physical properties	28 Other	38 Materials with special physical properties without Ni	48 Heat resistant steels with ≥ 2.5 % Ni	58 Cr-Ni with ≥ 1.0 < 1.5 % Cr	68 Cr-Ni-V Cr-Ni-W Cr-Ni-V-W	78	88 High strength weldable steels not intended for heat treatment by user
9			19	09 | 99 Steels for other applications	29	39 Materials with special physical properties and with Ni	49 Materials with elevated temperature properties	59 Cr-Ni with ≥ 1.5 < 2.0 % Cr	69 Cr-Ni except groups 57 to 68	79 Cr-Mn-Mo Cr-Mn-Mo-V	89 High strength weldable steels not intended for heat treatment by user

NOTE 1. The classification of steel groups is in accordance with the classification of steels in EN 10020.

NOTE 2. The following information is provided in the boxes of the table:

(a) steel group number, in upper left hand side;

(b) principal characteristic of the steel group;

(c) R_m = tensile strength.

The limiting values for the chemical composition and tensile strength (R_m) are for guidance only.

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Annex A (normative)

Provisions and procedures for the allocation of steel numbers

A.1 Steel numbers are allocated to steel grades in accordance with clause **4**, according to specified characteristics which include:

(a) chemical composition;

(b) characteristics as determined by standard test methods, e.g. hardness, tensile properties, impact properties, hardenability, corrosion resistance, metallographic characteristics;

(c) suitability for processing, e.g. cold forming;

(d) suitability for specific applications, e.g. tyre cord wire.

Differences in delivery requirements which do not affect the material characteristics, e.g. type of marking, surface appearance, dimensions, shall not be reason to allocate a different steel number.

A.2 Specification of more restrictive or supplementary requirements for the characteristics of the material shall not normally be reason to allocate a new steel number.

A.2.1 Where a manufacturer internally restricts the specified requirements for the material characteristics for a steel in order to reduce the probability of deviating from the specified requirements this shall not be considered reason to allocate a new number.

A.2.2 Where modifications or additional requirements cause a significant alteration in the characteristics of the material, or change the classification of the grade according to EN 10020 (e.g. reduction in maximum sulphur content from 0.035 % to 0.010 %), this shall be considered reason to allocate a new steel number.

NOTE. For practical reasons an existing steel number may be supplemented by an appropriate symbol or text in order to denote certain specific requirements. Such additions do not form part of the steel number.

A.3 Steel numbers shall only be allocated to steel grades that have a commercial standing.

A.4 The justification of a new steel number shall always be verified by reference to the latest listing of allocated numbers in order to determine the availability of a useable number (see **A.12**).

A.5 In accordance with **4.1** and **4.3**, for a new steel number to be allocated, the characteristics (see **A.1**) shall be significantly different from any other steel grade for which a steel number has already been allocated.

A.6 A request for the allocation of a steel number shall be submitted on the relevant steel number assignment form. See annex B.

A.7 The guidance provided in annex B should be carefully read and the information provided as indicated.

NOTE. The forms are designed to serve as a data input sheet to facilitate the processing of each request through to a final print out of data by electronic data processing equipment and to minimize transcription errors.

A.8 To further assist in the allocation of a steel number the requester is asked to suggest a possible steel group number. See table 1.

A.9 Each completed application form shall be sent to:

Verein Deutscher Eisenhuttenleute (VDEh)
Abteilung Europäische Stahlregistratur
Sohnstrasse 65
D-4000 Düsseldorf 1
Germany

which will act as the appointed European Registration Office for the allocation and administration of steel numbers.

NOTE. For applications from other European organizations (see note to **1.3**) a copy of the application may be sent direct to the European Registration Office.

A.10 The European Registration Office is responsible to ECISS to which it shall report annually.

A.11 The European Registration Office shall inform applicants of the action taken, within 3 months. Disputes concerning the allocation of a steel number may be referred to the Coordinating Commission (COCOR) of ECISS by or via the responsible body (see **1.3**).

A.12 The European Registration Office shall prepare and publish at appropriate intervals a list of all the registered steels and their steel numbers.

Annex B (normative)

Guidance for completing Forms I and II

B.1 Application forms

Application forms for the allocation of steel numbers are as follows and details are attached to this annex.

(a) Form I. For the allocation of steel numbers where chemical composition are the primary specifying criteria

(b) Form II. For the allocation of steel numbers where mechanical properties are the primary specifying criteria.

Before completing the forms the requester should be thoroughly familiar with EN 10027-2 and in particular annex A.

B.2 Steel group number suggested by the requester

The steel group number suggested by the requester shall be in accordance with EN 10027-2. While the requester's suggestion may or may not be the number finally allocated it will assist the registration office.

B.3 Steel name

The steel name for the steel grade shall be in accordance with EN 10027-1.

B.4 Product

Indicate:

(a) *product form* using the terms in EN 10079 or suitable abbreviations, e.g.:

- FL = flat products
- B = bars or sections
- W = wire
- FO = forgings
- C = castings
- TS = seamless tube
- TW = welded tube

(b) *thickness in mm* preferably using ranges, e.g.:

≤ 16 mm, > 16 ≤ 40, > 40 ≤ 100, > 100

(c) *treatment condition* using the symbols in accordance with EN 10027-1 for which the specified properties apply. See **B.6**.

Example: FL/< 16/N indicates a flat product equal to or less than 16 mm thick in the normalized condition.

B.5 Chemical composition

Express chemical composition limits as, for example, 0.13-0.18 (not .13-.18 or 0.13 to , 18), ≤ 1.50, ≥ 0.040.

B.6 Mechanical characteristics

The symbols used are as follows:

R_e = specified yield strength (R_{eH} or $R_{p0.2}$) in N/mm^2, with an indication of the type e.g. $R_{eH} \geq 240$;

R_m = specified tensile strength in N/mm^2, e.g. 400-650, ≤ 700;

A or A_{80} = minimum specified percentage elongation after fracture (see form II);

KV min = minimum impact energy in Joules (J) using Charpy V notch test piece;

L = longitudinal test piece;

T = transverse test piece;

RT = room temperature;

TT_{KV} = maximum transition temperature in °C of the impact energy/testing temperature curve with $KV = 27$ J as transition criterion.

B.7 Specified in

The standard or specification in which the steel grade is specified shall be indicated.

B.8 Application

Indicate application, e.g. structural steel, engineering steel, steel for case hardening, for welding electrodes, for turbines, tool steels, for manufacturing wire ropes, etc.

B.9 Characteristics

Indicate characteristics, e.g. suitable for cold heading or cold extrusion, non-magnetic, etc.

B.10 Additional information

Where the space elsewhere in the form is not sufficient for an exact description of the steel concerned, use the space headed 'Additional information'.

B.11 Warning note

Organizations and individuals who deal with the allocation and administration of steel numbers take no position with regard to the validity of any patent rights claimed in connection with any steel under consideration. Users of steel numbers are expressly advised that the determination of the validity of any such patent rights and the risk of infringement is entirely their own responsibility.

Form I The allocation of steel numbers where chemical composition is the primary specifying criteria

Requester	**Name** **Organization** **Address** **Telephone, telex, telefax**

	Steel number	Steel name	Product [1]			C %	Si %	Mn %	P %	S %
			Form	Thickness mm	Condition					
Requester (R)	1.									
Assigner (A)	1.									

Cr %	Mo %	Ni %			Specified in	Application	Characteristics	Date

Additional information (of R or A):

[1] For product names, use the terms and definitions in EN 10079.

Form II The allocation of steel numbers where mechanical properties are the primary specifying criteria

Requester	**Name** **Organization** **Address** **Telephone, telex, telefax**

	Steel number	Steel name	Product (1)			R_e N/mm²	R_m N/mm²	(2) A min A_{80} %	KV min @ RT		TT_{KV} max	
			Form	Thickness mm	Condition				L J	T J	L °C	T °C
Requester (R)	1.											
Assigner (A)	1.											

C %	Si %	Mn %	P %	S %	Specified in	Application	Characteristics	Date

Additional information (of R or A):

(1) For product names, use the terms and definitions in EN 10079.

(2) Delete inappropriate symbol.

National appendix NA

The United Kingdom participation in the preparation of this European Standard was entrusted by the Iron and Steel Standards Policy Committee (ISM/-) to Technical Committee ISM/32 upon which the following bodies were represented:

British Steel Industry
National Association of Steel Stockholders

National appendix NB

The British Standards corresponding to the European Standards referred to in the text are as follows:

European Standard	British Standard
EN 10020	BS EN 10020 Definition and classification of grades of steel
EN 10027-1	BS EN 10027-1 Designation systems for steels Part 1 : Steel names, principal symbols
EN 10079	BS EN 10079 Definition of steel products