BS EN 10027-2:2015

BSI Standards Publication

Designation systems for steels

Part 2: Numerical system

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National foreword

This British Standard is the UK implementation of EN 10027-2:2015. It supersedes BS EN 10027-2:1992 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ISE/100, Steel, General Issues.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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English Version

Designation systems for steels - Part 2: Numerical system

Systèmes de désignation des aciers - Partie 2: Système numérique

Bezeichnungssysteme für Stähle - Teil 2: Nummernsystem

This European Standard was approved by CEN on 7 February 2015.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 10027-2:2015) has been prepared by Technical Committee ECISS/TC 100 “General issues”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by October 2015, and conflicting national standards shall be withdrawn at the latest by October 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 10027-2:1992.

In comparison with EN 10027-2:1992, the following significant changes were made:

a) in 4.3 the wording was modified;

b) in Clause 5 the number of digits for the sequential number were extended to 4 and a NOTE as well as an explanatory text were added;

c) the standard was revised editorially.

This document is the second Part of the European Standard "Designation systems for steels", the first Part being "Steel names".

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

1.1 This European Standard specifies 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.

This European Standard is applicable to steels specified in European Standards. This European Standard may be applied to national steels and proprietary steels.

NOTE Although the scope of the systems 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 in accordance with this system have a fixed number of digits (see Clause 5). They are better suited for data processing than steel names established in accordance with 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 specified interest in the standardization of steel and steel products (e.g. ASD, EUROFER) are submitted via the ECISS Central Secretariat (see A.9).

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.

EN 10020, *Definition and classification of grades of steel*

EN 10027-1, *Designation systems for steels — Part 1: Steel names*

EN 10079, *Definition of steel products*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 10020 and EN 10079 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.

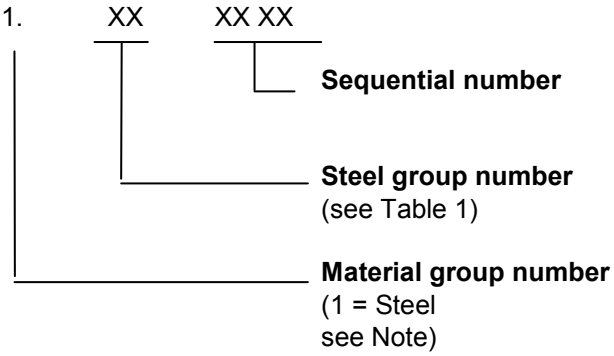
4.3 The European Registration Office (see A.9) shall revise the list of registered steels at appropriate intervals. The object of such revisions is to review, in cooperation with the bodies responsible for the application of steel numbers, those steel numbers for steels no longer in production. The revised list of registered steels is published on the internet (www.stahldaten.de).

Steel numbers deleted in accordance with the above procedure shall not be re-allocated to future steel grades.

NOTE Information concerning deleted steel grades can be received from the European Registration Office.

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



NOTE Numbers 2 to 9 of the material group may be allocated to other materials. See note to 1.1 or 1.3.

For allocating new steel numbers with a 4 digit sequential number it shall be ensured that the 1st two digits of the sequential number are completely filled (e.g. 1.xx99) before allocating the last two digits of the sequential number (e.g. 1.xx9901).

Table 1 — Steel group number [a, b]

Non-alloy steels					Alloy steels								
Base steels		Quality steels		Special steels	Quality steels		Special steels						
							Tool steels	Miscellaneous steels	Stainless and heat resisting steels	Structural, pressure vessel and engineering steels			
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 % Cr < 3 % Cr	70 Cr Cr-B	80 Cr-Si-Mo Cr-Si-Mn-Mo Cr-Si-Mo-V Cr-Si-Mn-Mo-V
		01 | 91 General structural steels, with R_m < 500 MPa		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
		02 | 92 Other structural steels not intended for heat treatment, with R_m < 500 MPa		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
		03 | 93 Steels with average < 0,12 % C or R_m < 400 MPa		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 but 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
		04 | 94 Steels with average ≥ 0,12 % C < 0,25 % C or R_m ≥ 400 MPa < 500 MPa		14			24 W Cr-W	34 Wear-resistant steel	44 Stainless steel with ≥ 2,5 % Ni and 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
		05 | 95 Steels with average ≥ 0,25 C < 0,55 % C or R_m ≥ 500 MPa < 700 MPa		15 Tool steels			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 + < 2 % Ni	75 Cr-V with < 2,0 % Cr	85 Nitriding steels

Non-alloy steels					Alloy steels									
Base steels		Quality steels		Special steels	Quality steels		Special steels							
							Tool steels	Miscellaneous steels	Stainless and heat resisting steels	Structural, pressure vessel and engineering steels				
		06	96	16			26	36	46	56	66	76	86	
		Steels with average ≥ 0,55 % C or R_m ≥ 700 MPa		Tool steels			W, excluding groups 24, 25 and 27	Materials with special magnetic properties, without Co	Chemically resistant and high-temperature Ni alloys	Ni	Cr-Ni-Mo with < 0,4 % Mo + ≥ 2 % Ni < 3,5 % Ni	Cr-V with < 2,0 % Cr		
		07	97	17			27	37	47	57	67	77	87	
		Steels with higher P- or S content		Tool steels			With Ni	Materials with special magnetic properties with Co	Heat resistant steels with < 2,5 % Ni	Cr-Ni with < 1,0 % Cr	Cr-Ni-Mo with < 0,4 % Mo + ≥ 3,5 % Ni < 5 % Ni or ≥ 0,4 % Mo	Cr-Mo-V		
				18	08	98	28	38	48	58	68	78	88	
				Tool steels	Steels with special physical properties		Other	Materials with special magnetic properties, without Ni	Heat resistant steels with ≥ 2,5 % Ni	Cr-Ni with ≥ 1,0 % Cr < 1,5 % Cr	Cr-Ni-V Cr-Ni-W Cr-Ni-V-W			
				19	09	99	29	39	49	59	69	79	89	
					Steels for other applications			Materials with special physical properties, with Ni	Materials with elevated temperature properties	Cr-Ni with ≥ 1,5 % Cr < 2,0 % Cr	Cr-Ni, except groups 57 to 68	Cr-Mn-Mo Cr-Mn-Mo-V Cr-Mn-Mo-Ni		

↑ Steels not for heat treatment by user

↓ High strength weldable steels

Footnotes to Table 1:

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

b The following information is provided in the boxes of the table:
- steel group number, in upper left-hand side;
- principal characteristics of the steel group;
- R_m = tensile strength.

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

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 and 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 even to changing the classification of the grade to EN 10020 (e.g. reduction in maximum sulfur content from 0,035 % to 0,010 %), this shall be considered reason to allocate a new steel number.

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 usable 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 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:

Stahlinstitut VDEh

Europäische Stahlregistratur

Sohnstraße 65

D-40237 Düsseldorf

(www.stahldaten.de)

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

NOTE For an application from other European organizations (see note to 1.3), a copy of the application may be sent directly 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 publish at appropriate intervals all the registered steels and their steel numbers on the internet.

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 is the primary specifying criterion.

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 this standard 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 this standard. 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 of 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; > 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 0.18), ≤ 1.50, ≥ 0.040.

B.6 Mechanical properties

The symbols used are as follows:

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

R_m = specified tensile strength, in MPa; (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 a 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 steels, 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 hardening 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 criterion

Requester	Name Organization Address Telephone, telefax, e-mail

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

Cr %	Mo %	Ni %			Specified in	Application	Characteristics	Date

Additional information (of R or A):

a 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, telefax, e-mail

Information regarding	Steel number	Steel name	Product[a]			R_e MPa	R_m MPa	b $A_{min.}$ $A_{80\ min.}$	$KV_{min.,\ RT}$		$TT_{KV,\ max.}$	
			Form	Thickness, in mm	Condition				L J	T J	L °C	T °C
Requester (R)	1.											
Assigner (A)	1.											

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

Additional information (of R or A):

a For product names use the terms and definitions in EN 10079.

b Delete inappropriate symbol.

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