BS EN 10027-1:2016

BSI Standards Publication

Designation systems for steels

Part 1: Steel names

bsi.

National foreword

This British Standard is the UK implementation of EN 10027-1:2016. It supersedes BS EN 10027-1:2005 which is withdrawn.

BSI, as a member of CEN, is obliged to publish EN 10027-1:2016 as a British Standard. However, attention is drawn to the fact that during the development of this European Standard, the UK committee voted against its approval as a European Standard.
The UK committee suggested that amendments be made to Table 1 of EN 10027-1:2016 to address the differences in mechanical and physical properties between hot-finished and cold-formed structural hollow sections. Currently, despite there being different design rules for these products within Eurocode 3 – Design of Steel Structures and Eurocode 4 – Design of Composite and Steel Structures, both hot-finished and cold-formed hollow sections have exactly the same steel names. The UK proposal was for this to be changed to enable a clear differentiation between the two products and hence eliminate any danger that an incorrect product might be supplied or used in a structure. However, as the changes requested by the UK committee were not adopted, the committee advises users of structural hollow sections to apply suitable checks to ensure that they have been supplied with the correct products, which are properly CE marked and certified in accordance with the European Commission Construction Products Regulation.

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 1: Steel names

Systèmes de désignation des aciers - Partie 1: Désignation symbolique

Bezeichnungssysteme für Stähle - Teil 1: Kurznamen

This European Standard was approved by CEN on 15 July 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard 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 CEN-CENELEC Management Centre or to any CEN member.

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European foreword

This document (EN 10027-1:2016) has been prepared by Technical Committee ECISS/TC 100 “Iron and steel - 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 April 2017, and conflicting national standards shall be withdrawn at the latest by April 2017.

This document supersedes EN 10027-1:2005.

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.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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 rules for designating steels by means of symbolic letters and numbers to express application and principal characteristics, e.g. mechanical, physical, chemical, so as to provide an abbreviated identification of steels.

NOTE In the English language the designations covered by this European Standard are known as "steel names"; in the French language as "designation symbolique"; in the German language as "Kurznamen".

1.2 This European Standard applies to steels specified in European Standards (EN), Technical Specifications (TS), Technical Reports (TR) and CEN member's national standards.

1.3 These rules may be applied to non-standardized steels.

1.4 A system of numerical designation of steels known as steel numbers is specified in EN 10027-2.

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 10020:2000, Definition and *classification* of grades of steel

EN 10027-2, *Designation systems for steels - Part 2: Numerical system*

EN 10079:2007, *Definition of steel products*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 10020:2000 and EN 10079:2007 apply.

4 Principles

4.1 A unique steel name

There shall be one unique steel name for each steel.

4.2 Formulation of steel names

Steel names allocated in accordance with this European Standard shall comprise principal symbols as specified in 7.1.

In order to avoid ambiguity, it may be necessary to supplement these principal symbols by additional symbols identifying additional characteristics of the steel or steel product, e.g. suitability for use at high or low temperatures, surface condition, treatment condition, de-oxidation. These additional symbols are given in 7.2.

Unless otherwise specified in this European Standard the symbols used in the steel name shall be written without spaces.

4.3 Allocation of steel names

4.3.1 For steels specified in European Standards (EN), Technical Specifications (TS) and Technical Reports (TR), steel names shall be allocated by the ECISS Technical Committee concerned.

4.3.2 For steels specified in CEN member's national standards and for other steels, steel names shall be allocated by or under the responsibility of the national standards body concerned.

So as to avoid a variety of steel names being assigned to essentially the same steel, the European Registration Office as provided for in EN 10027-2 shall, when a steel number is applied for, cooperate with the national standards body concerned to ensure uniform steel names.

4.4 Consultation

Where there are difficulties or disputes in establishing steel names ECISS/TC100 shall be consulted and shall advise accordingly.

5 Reference to product standards

The complete designation of a steel product where quoted in orders or similar contractual documents shall include, in addition to the steel name, an indication of the technical delivery requirement in which the steel is specified. For steels specified in standards this shall be the reference number of the relevant product standard.

Details of the structures of the steel name for the steel or steel product shall be provided in the relevant product or dimensional standard.

6 Classification of steel names

For the purposes of designation, steel names are classified into two main categories:

— Category 1: steels designated according to their application and mechanical or physical properties (see 7.3).

— Category 2: steels designated according to their chemical composition (see 7.4).

7 Structure of steel names

7.1 Principal symbols

Principal symbols for steels designated according to steel application and its mechanical and physical properties shall be assigned in accordance with 7.3.

Principal symbols for steels designated according to the chemical composition of the steel shall be assigned in accordance with 7.4.

Where a steel is specified in the form of a steel casting, its name as specified in Tables 1 to 15 shall be preceded by the letter G.

Where a steel is produced by powder metallurgy, its name as specified in Tables 14 and 15 shall be preceded by the letters PM.

7.2 Additional symbols

Additional symbols may be added to the principal symbols and assigned in accordance with 7.3 and 7.4.

Additional symbols are divided into two groups, i.e. group 1 and group 2 (see 7.3 and 7.4). If the symbols for group 1 are inadequate to describe the steel fully, then additional symbols from group 2 may be added. Symbols of group 2 shall only be used in conjunction with and follow symbols of group 1.

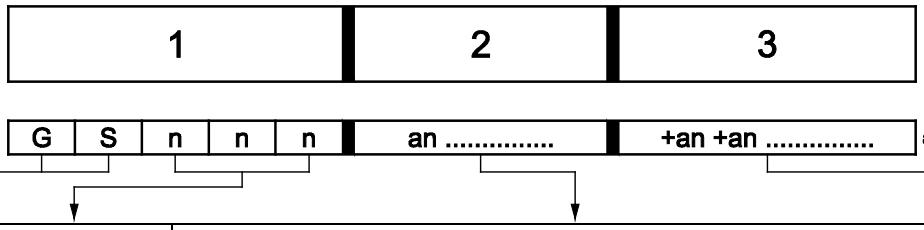
Further additional symbols for steel products may follow the additional symbols of group 1 and group 2 and shall be selected in accordance with 7.3 and 7.4 from Tables 16, 17 and 18. These symbols shall be separated from preceding symbols by the plus sign (+).

Additional symbols selected from Tables 16, 17 and 18 may be added to steel numbers allocated in accordance with EN 10027–2 and, when used, separated from the steel number by the plus sign (+).

7.3 Steels designated according to their application and mechanical or physical properties

The designation of steel according to their application and mechanical or physical properties shall be made in accordance with Table 1 to Table 11.

Table 1 — Structural steels



Principal symbols		Additional symbols						
		For steel						For steel product
Letter	Mechanical property	Group 1 [b]				Group 2 [c d]		
G = steel casting (where necessary) S = structural steel	nnn = specified minimum yield strength [e] in MPa [f] for the smallest thickness range	Impact property Energy Joules (J)			Test temperature	C = Special cold forming D = Hot dip coating E = Enamelling *F* = Forgings H = Hollow section L = Low temperature M = Thermomechanically rolled *N* = Normalized or normalized rolled *P* = Sheet piling Q = Quenched and tempered S = Ship building T = Tubes W = Weather resistant an = Chemical symbol of specified additional elements, e.g. Cu, together, where necessary, with a single digit representing 10 × the average (rounded to 0,1 %) of that specified range of the content of that element	Tables 16, 17 and 18
		27J	40 J	60 J	°C			
		JR	KR	LR	20			
		J0	K0	L0	0			
		J2	K2	L2	−20			
		J3	K3	L3	−30			
		J4	K4	L4	−40			
		J5	K5	L5	−50			
		J6	K6	L6	−60			
		A = Precipitation hardening M = Thermomechanically rolled *N* = Normalized or normalized rolled Q = Quenched and tempered G = Other characteristics followed, where necessary by 1 or 2 digits						

Key
1 = Principal symbols
2 = Additional symbols for steel
3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

[b] Symbols A, M, N and Q in Group 1 apply to fine grain steels.

[c] Symbols of Group 2, other than chemical symbols, may be suffixed by one or two digits in order to distinguish

between qualities in accordance with the relevant product standard.

[d] If two of the symbols of this Group are needed the chemical symbol shall be the last one.

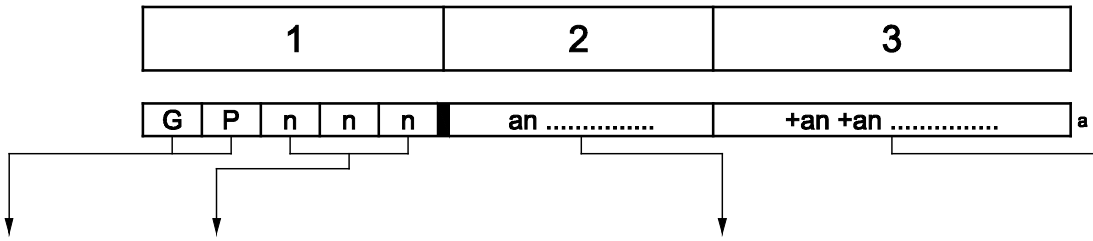
[e] The term "yield strength" refers to upper or lower yield strength (R_{eH}) or (R_{eL}) or proof strength (R_p), or proof strength total extension (R_t) depending on the requirement specified in the relevant product standard.

[f] 1 MPa = 1 N/mm^2.

Table 1 (*continued*)

Examples of steel names for structural steels	
Standard	Steel name according to EN 10027–1
EN 10025–2	S235JR S355JR S355J0 S355J2 S355K2 S450J0
EN 10025–3	S355N S355NL
EN 10025–4	S355M S355ML
EN 10025–5	S235J0W S235J2W S355J0WP S355J2WP S355J0W S355J2W S355K2W
EN 10025–6	S460Q S460QL S460QL1
EN 10149–2	S355MC
EN 10149–3	S355NC
EN 10210–1	S355J2H
EN 10248–1	S355GP
EN 10346	S350GD S350GD+Z

Table 2 — Steels for pressure purposes



Principal symbols		Additional symbols		
Letter	Mechanical property	For steel		For steel products
		Group 1 [b]	Group 2 [c]	
G = steel casting (where necessary) *P* = steels for pressure purposes	nnn = specified minimum yield strength [d] in MPa [e] for the smallest thickness range	B = Gas bottles M = Thermomechanically rolled *N* = Normalized or normalized rolled Q = Quenched and tempered S = Simple pressure vessels T = Tubes G = Other characteristics followed, where necessary, by 1 or 2 digits	H = High temperature L = Low temperature R = Room temperature X = High and low temperature	Tables 16, 17 and 18

Key

1 = Principal symbols

2 = Additional symbols for steel

3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

[b] Symbols M, N and Q in group 1 apply to fine grain steels.

[c] Symbols of group 2, other than chemical symbols, may be suffixed by one or two digits in order to distinguish between qualities in accordance with the relevant product standard.

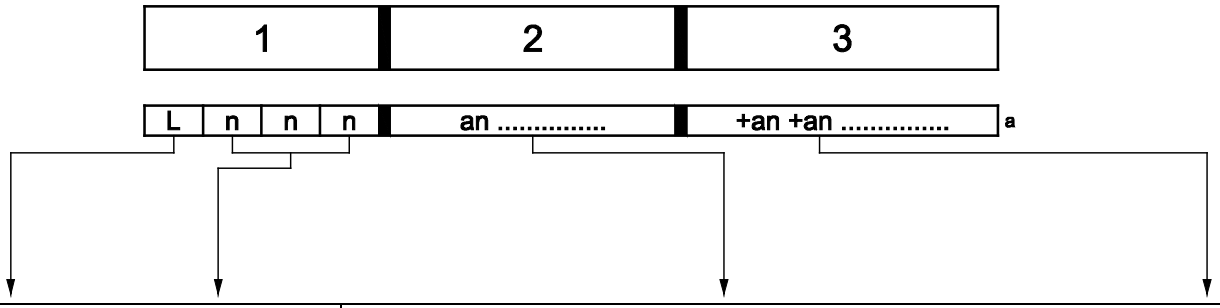
[d] The term "yield strength" refers to upper or lower yield strength (R_{eH}) or (R_{eL}) or proof strength (R_p), or proof strength total extension (R_t) depending on the requirement specified in the relevant product standard.

[e] 1 MPa = 1 N/mm^2.

Table 2 ***(continued)***

Examples of steel names	
Standard	Steel name according to EN 10027–1
EN 10028–2	P265GH
EN 10028–3	P355NH
EN 10028–5	P355M P355ML1
EN 10028–6	P355Q P355QH P355QL1
EN 10120	P265NB
EN 10207	P265S
EN 10213	GP240GR GP240GH

Table 3 — Steels for line pipe



Principal symbols		Additional symbols		
Letter	Mechanical property	For steel		For steel products
		Group 1 [b]	Group 2	
L = steels for line pipe	nnn = specified minimum yield strength [c] in MPa [d] for the smallest thickness range	M = Thermomechanically rolled *N* = Normalized or normalized rolled Q = Quenched and tempered G = Other characteristics followed, where necessary by 1 or 2 digits	a = class requirement followed, where necessary, by one digit S = Sour service O = Offshore E = European onshore natural gas transmission	Tables 16, 17 and 18

Key

1 = Principal symbols

2 = Additional symbols for steel

3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

[b] Symbols M, N and Q in group 1 apply to fine grain steels.

[c] The term "yield strength" refers to upper or lower yield strength (R_{eH}) or (R_{eL}) or proof strength (R_p), or proof strength total extension (R_t) depending on the requirement specified in the relevant product standard.

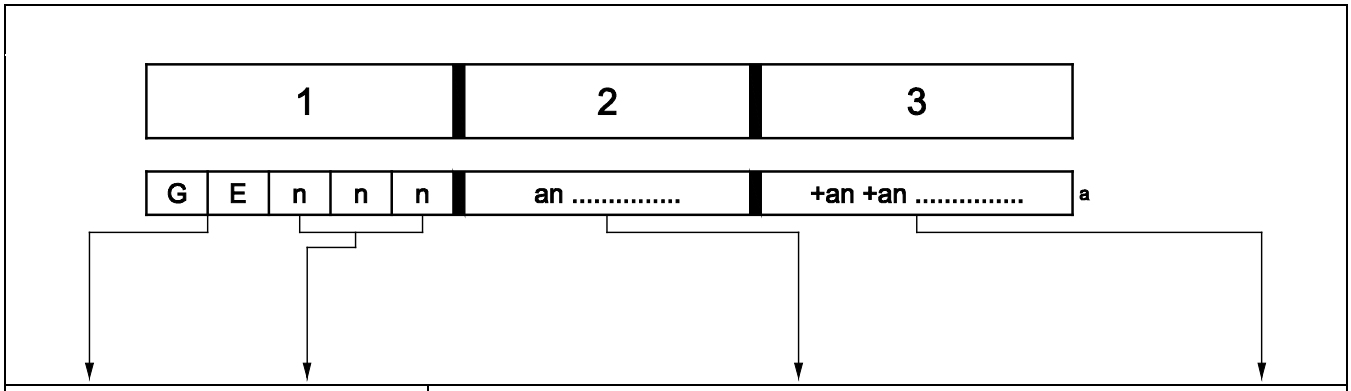
[d] 1 MPa = 1 N/mm^2.

Table 3 *(continued)*

Examples of steel names	
Standard	Steel name according to EN 10027–1
EN ISO 3183	L360

EN ISO 3183	L360N L360Q L360M

Table 4 — Steels for engineering



Principal symbols		Additional symbols		
Letter	Mechanical property	For steel		For steel products
		Group 1	Group 2	
G = steel casting (where necessary) E = engineering steels	nnn = specified minimum yield strength [b] in MPa [c] for the smallest thickness range	G = other characteristics followed, where necessary by 1 or 2 digits or in case where impact properties are specified the rules of Table 1 Group 1 shall be applied	C = suitability for cold drawing	Table 18

Key

1 = Principal symbols

2 = Additional symbols for steel

3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

[b] The term "yield strength" refers to upper or lower yield strength (R_{eH}) or (R_{eL}) or proof strength (R_p), or proof strength total extension (R_t) depending on the requirement specified in the relevant product standard.

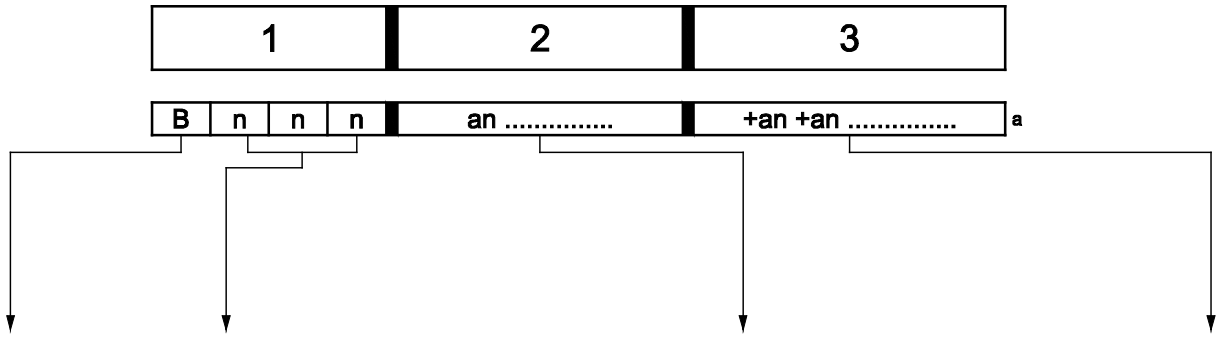
[c] 1 MPa = 1 N/mm^2.

Table 4 *(continued)*

Examples of steel names	
Standard	Steel name according to EN 10027–1

EN 10025–2	E295 E295GC E335 E360
EN 10293	GE240
EN 10296–1	E355K2

Table 5 —Steels for reinforcing concrete



Principal symbols		Additional symbols		
Letter	Mechanical property	For steel		For steel products
		Group 1	Group 2	
B = steels for reinforcing concrete	nnn = characteristic yield strength [b] in MPa [c] for the smallest dimensional range	a = ductility class followed, where necessary, by 1 or 2 digits	-	Table 18

Key

1 = Principal symbols

2 = Additional symbols for steel

3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

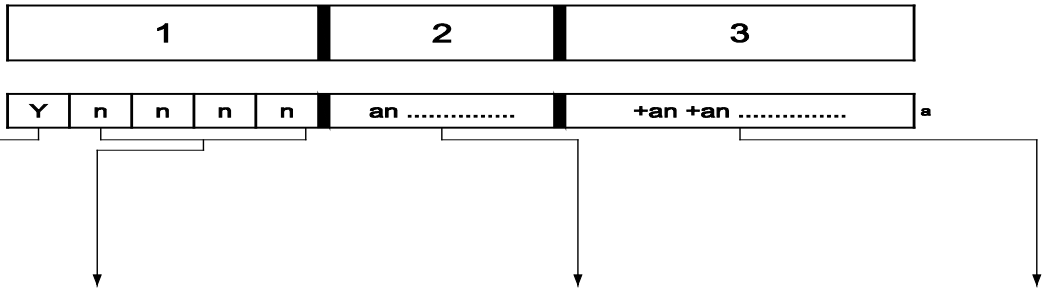
[b] The term "yield strength" refers to upper or lower yield strength (R_{eH}) or (R_{eL}) or proof strength (R_p), or proof strength total extension (R_t) depending on the requirement specified in the relevant product standard.

[c] 1 MPa = 1 N/mm^2.

Table 5 *(continued)*

Examples of steel names	
Standard	Steel name according to EN 10027–1
No standard available	B500A

Table 6 — Steels for prestressing concrete



Principal symbols		Additional symbols		
Letter	Mechanical property	For steel		For steel products
		Group 1 [b]	Group 2	
Y = steels for prestressing concrete	nnnn = [c] nominal tensile strength (R_m) in MPa [d]	C = Cold drawn wire H = Hot rolled bars or hot rolled and processed bars Q = Quenched and tempered wire S = Strand G = Other characteristics followed, where necessary by 1 or 2 digits	-	Table 18

Key

1 = Principal symbols

2 = Additional symbols for steel

3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

[b] Symbols of group 1 may be suffixed by one or two digits in order to distinguish between qualities in accordance with the relevant product standard.

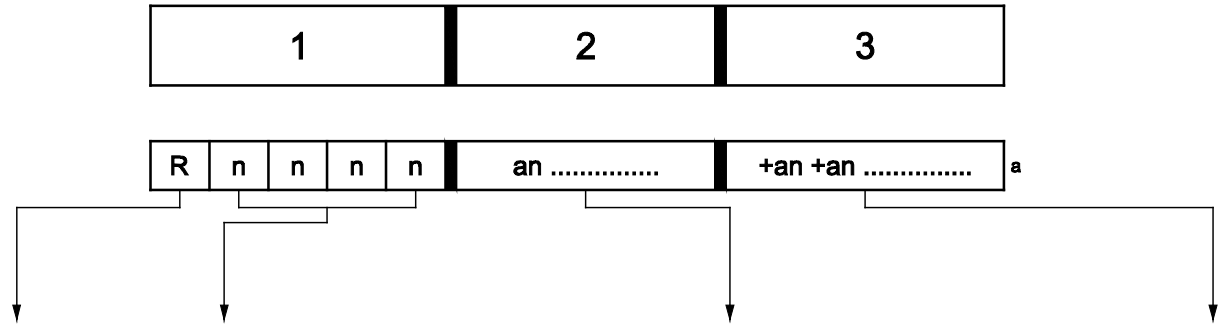
[c] Where tensile strength is specified by 3 digits the first digit shall be zero.

[d] 1 MPa = 1/Nmm^2.

Table 6 *(continued)*

Examples of steel names	
Standard	Steel name according to EN 10027–1
FprEN 10138–2	Y1770C
FprEN 10138–3	Y1770S7
FprEN 10138–4	Y1230H

Table 7 — Steels for or in the form of rails



Principal symbols		Additional symbols		
Letter	Mechanical property	For steel		For steel products
		Group 1	Group 2	
R = steel for or in the form of rails	nnn = specified minimum Brinell Hardness (HBW)	Cr = Chromium alloyed Mn = High manganese content an = Chemical symbol of specified additional elements, e.g. Cu, together, where necessary, with a single digit representing 10 × the average (rounded to 0,1 %) of that specified range of the content of that element G = Other characteristics followed where necessary, by 1 or 2 digits	HT = Heat treated LHT = Low alloy, heat treated Q = Quenched and tempered	-

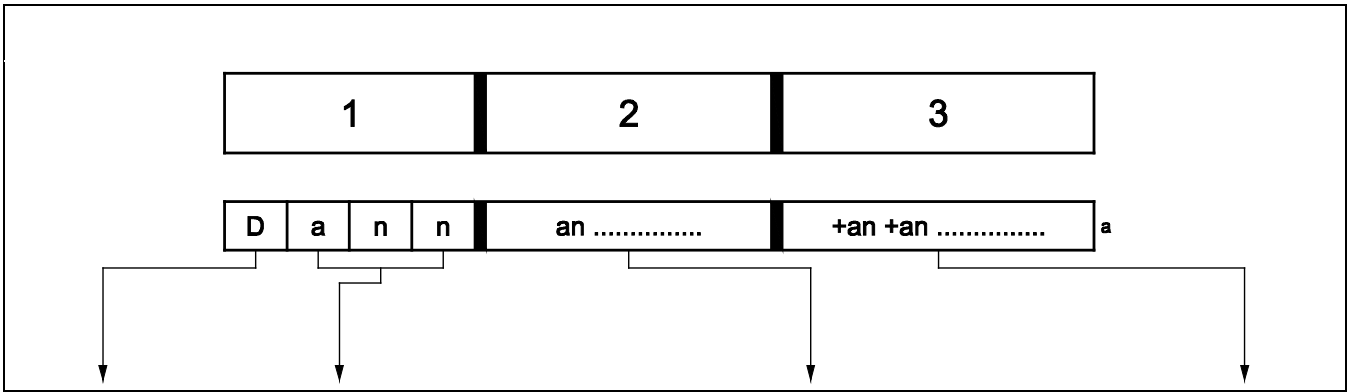
Key
1 = Principal symbols
2 = Additional symbols for steel

3 = Additional symbols for steel products
[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

Table 7 ***(continued)***

Examples of steel names	
Standard	Steel name according to EN 10027–1
EN 13674–1	R320Cr

Table 8 — Flat products for cold forming (except those in Table 9)



Principal symbols		Additional symbols		
Letter	Mechanical property	For steel		For steel products
		Group 1 [b]	Group 2	
D = flat products for cold forming	Cnn = cold rolled followed by 2 symbols [c] Dnn = hot rolled for direct cold forming followed by 2 symbols [c] Xnn = product where rolled condition are not specified followed by 2 symbols [c]	D = for hot dip coating ED = for direct enamelling EK = for conventional enamelling H = for hollow sections T = for tubes an = chemical symbol of special additional element, e.g. Cu, together, where necessary, with a single digit representing 10 × the average (rounded to 0,1 %) of that specified range of the content of that element G = other characteristics followed, where necessary, by 1 or 2 digits	-	Tables 17 and 18

Key

1 = Principal symbols

2 = Additional symbols for steel

3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

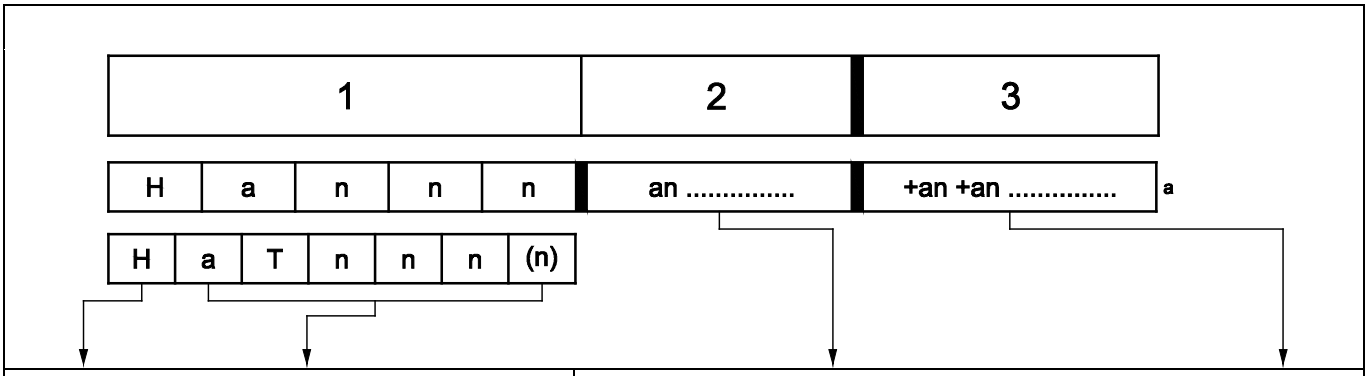
[b] Symbols of group 1, other than chemical symbols, may be suffixed by one or two digits in order to distinguish between qualities in accordance with the relevant product standard.

[c] These symbols are assigned by the responsible body (see 4.3) in order to characterize the steel.

Table 8 *(continued)*

Examples of steel names	
Standard	Steel name according to EN 10027–1
EN 10111	DD14
EN 10130	DC04
EN 10152	DC03+ZE
EN 10209	DC04EK
EN 10346	DX51D+Z

Table 9 — High strength steel flat products for cold forming



Principal symbols		Additional symbols		
Letter	Mechanical property	For steel		For steel products
		Group 1 [b]	Group 2 [b]	
H = flat products of high strength for cold forming	Cnnn = cold rolled followed by specified minimum yield strength [c] in MPa [d] Dnnn = hot rolled for direct cold forming followed by specified minimum yield strength [c] in MPa [d] Xnnn = product where the rolling condition is not specified followed by specified minimum yield strength [c] in MPa [d] CTnnn(n) = cold rolled followed by specified minimum tensile strength in MPa [d]	B = Bake hardening C = Complex-phase *F* = Ferritic-bainitic I = Isotropic LA = Low alloyed/micro alloyed MP = Multiphase MS = Martensitic T = TRIP (Transformation Induced Plasticity) X = Dual phase Y = Interstitial free G = Other characteristics followed, where necessary, by 1 or 2 digits	D = for hot dip coating	Table 17

	DTnnn(n) = hot rolled for direct cold forming followed by specified minimum tensile strength in MPa [d] XTnnn(n) = product where the rolling condition is not specified followed by specified minimum tensile strength in MPa [d]			

Key
1 = Principal symbols
2 = Additional symbols for steel
3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

[b] symbols of group 1 and 2, may be suffixed by one or two digits in order to distinguish between qualities in accordance with the relevant product standard.

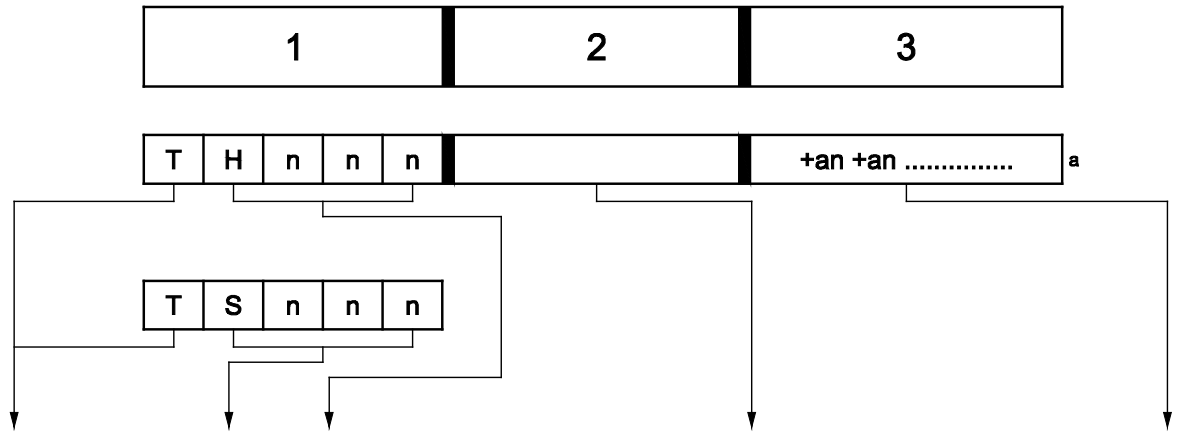
[c] The term "yield strength" refers to upper or lower yield strength (R_{eH}) or (R_{eL}) or proof strength (R_p), or proof strength total extension (R_t) depending on the requirement specified in the relevant product standard.

[d] 1 MPa = 1 N/mm^2.

Table 9 *(continued)*

Examples of steel names	
Standard	Steel name according to EN 10027–1
EN 10268	HC420LA
EN 10346	HCT450X

Table 10 — Tin mill products (steel products for packaging)



Principal symbols		Additional symbols		
Letter	Mechanical property	For steel		For steel products
		Group 1	Group 2	
T = tin mill products (steel products for packaging)	Hnnn = nominal yield strength (*Re*) in MPa [b] for continuous annealed grades Snnn = nominal yield strength (*Re*) in MPa [b] for batch annealed grades	-	-	Tables 17 and 18 NOTE. No symbol is assigned to blackplate

Key

1 = Principal symbols

2 = Additional symbols for steel

3 = Additional symbols for steel products

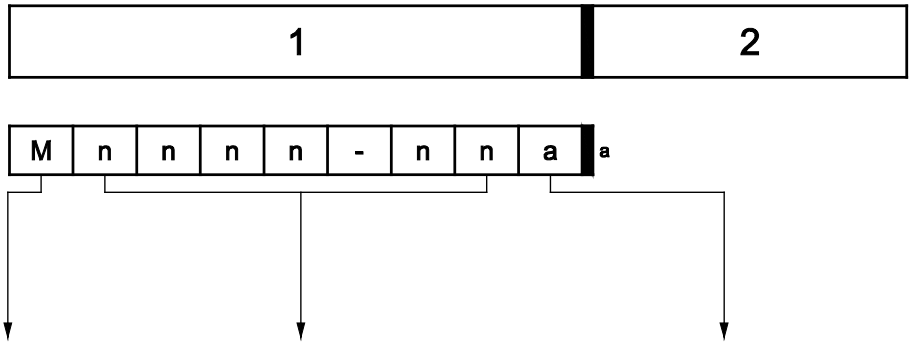
[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

[b] 1 MPa = 1 N/mm^2.

Table 10 *(continued)*

Examples of steel names	
Standard	Steel name according to EN 10027–1
EN 10202	TH550 TS550

Table 11 — Electrical steels



Principal symbols			Additional symbols
Letter	Property	Type of product	
M = electrical steel	nnn(n) = max specified loss in W/kg x 100 nn = 100 × nominal thickness in mm A hyphen shall separate the two properties	For magnetic polarization at 50Hz of 1,5 Tesla: A = non-oriented K = non-alloy and alloy electrical steel sheet/strip in the semi-processed stateFor magnetic polarization at 50Hz of 1,7 Tesla: *P* = high permeability grain oriented S = conventional grain oriented	-

Key

1 = Principal symbols

2 = Additional symbols for steel

3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

Table 11 *(continued)*

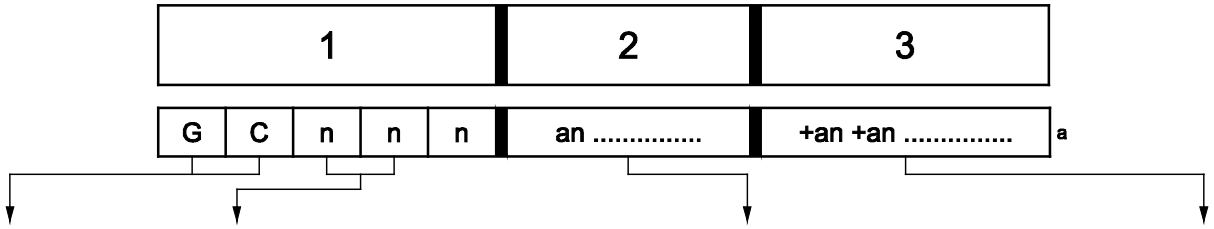
Examples of steel names	
Standard	Steel name according to EN 10027–1
EN 10106	M400–50A
EN 10107	M140–30S
EN 10341	M390–50K

7.4 Steels designated according to chemical composition

The designation of steel according to their chemical composition shall be made in accordance with Table 12 to Table 15.

In order to keep the steel names of alloy steels as short as practical, some digits or symbols may be omitted as long as there is no risk of confusion with a similar grade.

Table 12 — Non-alloy steels (except free cutting steels) with an average manganese content < 1 %



Principal symbols		Additional symbols		
Letter	Carbon content b	For steel		For steel products
		Group 1 c d	Group 2	
G = steel casting (where necessary) C = carbon	nnn = 100 × specified average carbon percentage content Where the carbon content is not specified by a range, a suitably representative value shall be selected by the responsible body (see 4.3)	C = for cold forming, e.g. cold heading, cold extrusion D = for wire drawing E = with specified max sulfur content R = with specified sulfur content range S = for springs U = for tools W = for welding rod G = other characteristics followed where necessary by, 1 or 2 digits	an = chemical symbol of special additional element(s), e.g. Cu, together, where necessary, with a single digit representing 10 × the average (rounded to 0,1 %) of that specified range of the content of that element	Table 18

Key

1 = Principal symbols

2 = Additional symbols for steel

3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

[b] To distinguish between two similar steel grades, the number indicating carbon content may be increased by 1.

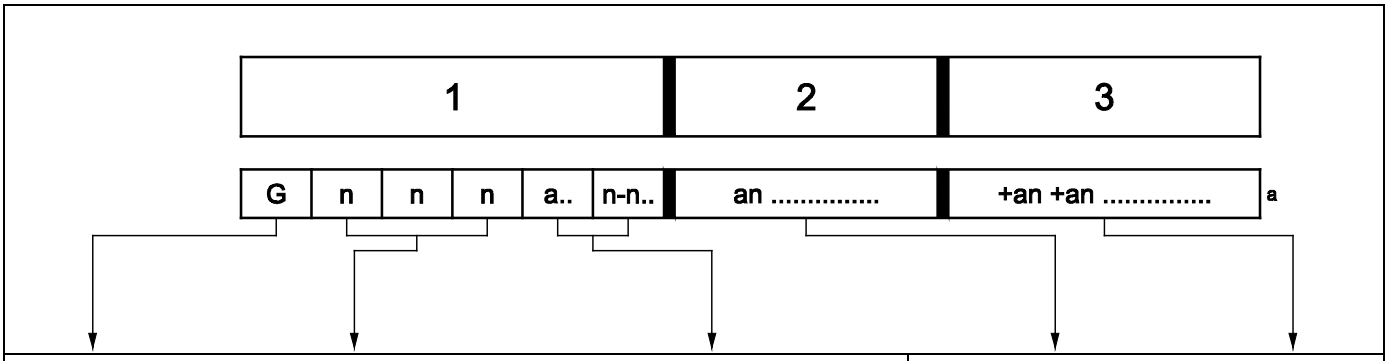
[c] Symbols of group 1, other than E and R, may be suffixed by one or two digits in order to distinguish between qualities in accordance with the relevant product standard.

[d] The symbols E and R of group 1 may be followed by 1 digit representing 100 × the maximum or average sulfur content rounded to the nearest 0,01 %.

Table 12 ***(continued)***

Examples of steel names	
Standard	Steel name according to EN 10027–1
EN ISO 16120-2	C20D
EN ISO 16120-3	C2D1
EN ISO 16120-4	C20D2
EN 10083–2	C35
	C35E
	C35R
EN 10132–4	C85S
EN 10263–2	C8C

Table 13 — Non-alloy steels with an average manganese content ≥ 1 %, non-alloy free-cutting steels and alloy steels (except high speed steels) where the content, by weight, of every average alloying element is < 5 %



Principal symbols				Additional symbols		
Letter	Carbon content [b]	Alloying elements		For steel		For steel products
				Group 1	Group 2	
G = steel casting (where necessary)	nnn = 100 × specified average carbon percentage content. Where the carbon content is not specified by a range, a suitably representative value shall be selected by the responsible body (see 4.3)	a = chemical symbols indicating alloying elements [c] that characterize the steel followed by: n-*n* = numbers, separated by hyphens, representing respectively the average percentage content of the elements multiplied by the following factors		-		Tables 16 and 18
		Element	Factor			
		Cr, Co, Mn, Ni, Si, W	4			
		Al, Be, Cu, Mo, Nb, Pb, Ta, Ti, V, Zr	10			
		Ce, N, P, S	100			
		B	1000			

Key
1 = Principal symbols
2 = Additional symbols for steel
3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

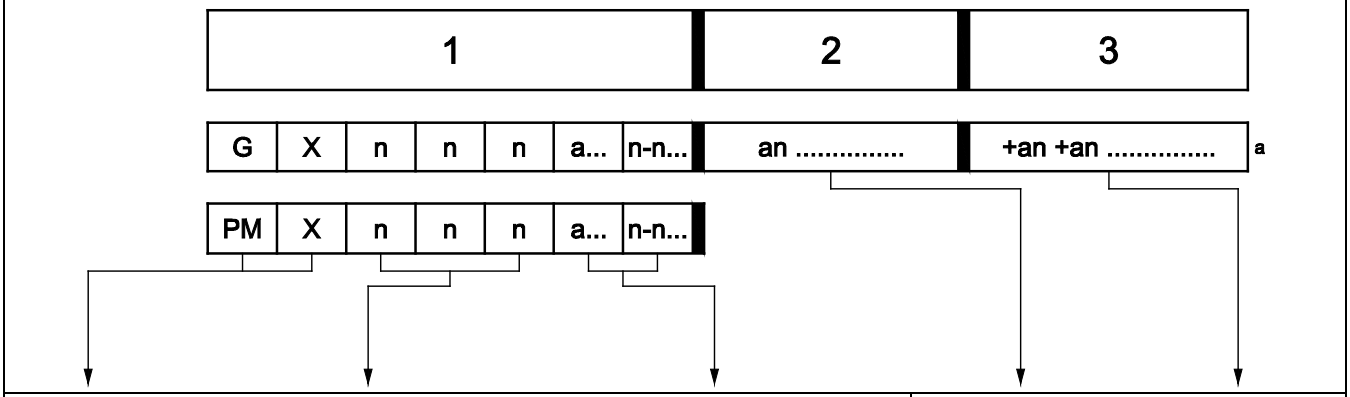
[b] To distinguish between two similar steel grades, the number indicating carbon content may be increased by 1.

[c] The sequence of symbols shall be in decreasing order of the values of the average percentage content; where the values of contents are the same for two or more elements, the corresponding symbols shall be indicated in alphabetical order.

Table 13 *(continued)*

Examples of steel names	
Standard	Steel name according to EN 10027–1
EN 10028–2	13CrMo4–5
EN 10028–4	13MnNi6–3
EN 10083–2	28Mn6
EN 10083–3	27MnCrB5–2
EN 10087	11SMnPb30

Table 14 — Stainless steels and other alloy steels (except high speed steels) where the average content by weight of at least one alloying element is ≥ 5 %



Principal symbols			Additional symbols		
Letter	Carbon content [b]	Alloying elements	For steel [d]		For steel products
			Group 1	Group 2	
G = steel casting (where necessary) PM = powder metallurgy (where necessary for tool steel) X = the average content of at least one alloying element ≥ 5 %	nnn = 100 × specified average carbon percentage content. Where the carbon percentage content is not specified by a range, a suitable representative value shall be selected by the responsible body (see 4.3)	a = chemical symbols indicating alloying elements [c] that characterize the steel followed by: n-*n* = numbers, separated by hyphens representing respectively the average percentage of the elements rounded to the nearest integer	a = chemical symbol, separated by a hyphen, indicating an alloying element that characterizes the steel and whose content is in the range of 0,20 % up to 1,0 % followed by: *n* = 10 × specified average content for the alloying element		Tables 16 and 18

Key

1 = Principal symbols

2 = Additional symbols for steel

3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

[b] To distinguish between two similar steel grades, the number indicating carbon content may be increased by 1.

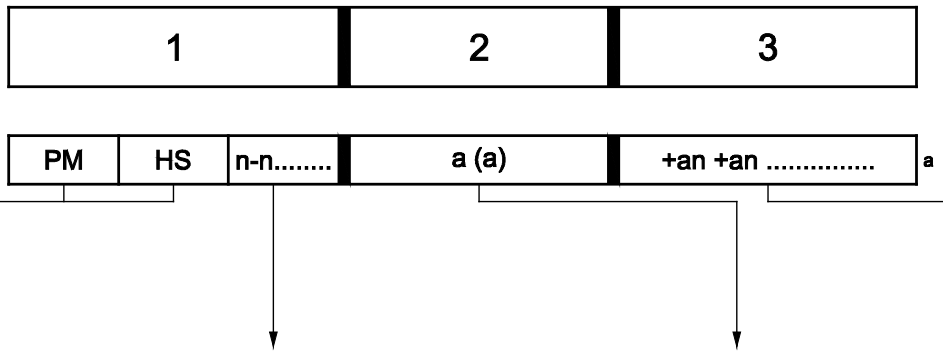
[c] The sequence of symbols shall be in decreasing order of the values of the average percentage content; where the values of contents are the same for two or more elements, the corresponding symbols shall be indicated in alphabetical order.

[d] An example is given for a steel having high nitrogen content (see below).

Table 14 ***(continued)***

Examples of steel names	
Standard	Steel name according to EN 10027–1
EN ISO 4957	X100CrMoV 5
	X38CrMoNb16
EN 10088–2	X10CrNi18–8
	X6CrMoNb17–1
	X5CrNiCuNb16–4
No standard available	X30NiCrN15–1-N5

Table 15 — High speed steels



Principal symbols		Additional symbols		
Letter	Alloy element content	For steel		For steel products
		Group 1	Group 2	
PM = powder metallurgy (where necessary) HS = high speed steel	n-*n* = numbers [b], separated by hyphens, indicating percentage content of alloy elements in the following order: - tungsten (W) - molybdenum (Mo) - vanadium (V) - cobalt (Co)	a (a) = chemical symbol(s) of the element(s) with higher content (in case of same steel grade)	-	Table 18

Key

1 = Principal symbols

2 = Additional symbols for steel

3 = Additional symbols for steel products

[a] *n* = numerical characters, a = alpha characters, an = alphanumeric characters.

[b] Each number represents the average percentage content of the respective element rounded to the nearest integer.

Table 15 *(continued)*

Examples of steel names	
Standard	Steel name according to EN 10027–1
EN ISO 4957	HS2–9–1–8 HS6–5–2 HS6–5–2C

Table 16 — Symbols for steel products indicating special requirements

SYMBOL [a]	MEANING
+CH	core hardenability
+H	hardenability
+Z15	through thickness property; minimum reduction of area = 15 %
+Z25	through thickness property; minimum reduction of area = 25 %
+Z35	through thickness property; minimum reduction of area = 35 %
[a] Symbols are separated from preceding symbols by the plus sign (+). See 7.2 These symbols indicate special requirements which are normally characteristics of steel. However, for practical reasons they are dealt with as symbols for steel products.	

Table 17 — Symbols for steel products indicating type of coating

SYMBOL [a]	MEANING
+A	hot dip aluminium coating
+AS	aluminium silicon alloy coating
+AZ	aluminium zinc alloy (>50 % Al) coating
+CE	electrolytic chromium/chromium oxide coating (ECCS)
+CU	copper coating
+IC	inorganic coating
+OC	organic coating
+S	hot dip tin coating
+SE	electrolytic tin coating
+T	hot dip lead tin alloy (terne) coating
+TE	electrolytic lead tin alloy (terne) coating
+Z	hot dip zinc (galvanised) coating
+ZA	hot dip zinc aluminium (>50 % Zn) coating
+ZE	electrolytic zinc coating
+ZF	hot dip zinc iron (galvannealed) coating
+ZM	hot dip zinc magnesium coating
+ZN	electrolytic zinc nickel alloy coating
[a] Symbols are separated from preceding symbols by the plus sign (+). See 7.2.	

Table 18 — Symbols for steel products indicating treatment condition

SYMBOL [a]	MEANING
+A	soft annealed
+AC	annealed to achieve spheriodised carbides
+AR	as rolled (without any special rolling and/or heat treatment conditions)
+AT	solution annealed
+C	cold work hardened
+Cnnn	cold work hardened with a minimum tensile strength of nnn MPa [b]
+CPnnn	cold work hardened with a minimum 0,2 % proof strength of nnn MPa [b]
+CR	cold rolled
+DC	delivery condition at manufacturer's discretion
+FP	treated to ferritic-pearlite structure and hardness range
+HC	hot rolled followed by cold hardening
+I	isothermically treated
+LC	skin passed (temper rolled or cold drawn)
+M	thermomechanically formed
+N	normalized or normalized formed
+NT	normalized and tempered
+P	precipitation hardened
+Q	quenched
+QA	air quenched
+QO	oil quenched
+QT	quenched and tempered
+QW	water quenched
+RA	recrystallization annealed
+S	treated for cold shearing
+SR	stress relieved
+T	tempered
+TH	treatment to hardness range
+U	untreated
+WW	warm worked

[a] Symbols are separated from preceded symbols by the plus sign (+). See 7.2.

[b] 1 MPa = 1 N/mm^2.

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