EUROPEAN STANDARD NORME EUROPÉENNE **EUROPÄISCHE NORM**

EN 10027-1

August 2005

ICS 77.080.20

Supersedes CR 10260:1998, EN 10027-1:1992

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 27 June 2005.

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 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.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION COMITÉ EUROPÉEN DE NORMALISATION EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

© 2005 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

Ref. No. EN 10027-1:2005: E

Contents

	Pa	age		
Forewo	ord	4		
1	Scope	5		
2	Normative references	5		
3	Terms and definitions	5		
4 4.1 4.2 4.3 4.4	Principles A unique steel name Formulation of steel names Allocation of steel names Consultation	5 5 6		
5	Reference to product standards			
6	Classification of steel names			
7 7.1	Structure of steel names Principal symbols			
7.2	Additional symbols	7		
7.3 7.4	Steels designated according to their application and mechanical or physical properties Steels designated according to chemical composition			
Table 1	- Structural steels	8		
Table 1	(continued)	9		
Table 2	— Steels for pressure purposes	10		
Table 3	— Steels for line pipe	11		
Table 4	- — Steels for engineering	12		
Table 5	-Steels for reinforcing concrete	13		
Table 6	— Steels for prestressing concrete	14		
Table 7	— Steels for or in the form of rails	15		
Table 8	— Flat products for cold forming (except those in Table 9)	16		
Table 9	— High strength steel flat products for cold forming	17		
Table 1	0 — Tin mill products (steel products for packaging)	18		
Table 1	1 — Electrical steels	19		
Table 12 - Non-alloy steels (except free cutting steels) with an average manganese content < 1 %				

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 %. 21

Table 14 — Stainless steels and other alloy steels (except high speed steels) where the average con- of at least one alloying element is \geq 5 %	
Table 15 — High speed steels	23
Table 16 — Symbols for steel products indicating special requirements	24
Table 17 — Symbols for steel products indicating type of coating	24
Table 18 — Symbols for steel products indicating treatment condition	25

Foreword

This European Standard (EN 10027-1:2005) has been prepared by Technical Committee ECISS/TC 7 "Conventional designation of steel", the secretariat of which is held by UNI.

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 February 2006, and conflicting national standards shall be withdrawn at the latest by February 2006.

This European Standard supersedes CR 10260:1998 and EN 10027-1:1992.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and 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 referenced documents are indispensable for the application of this European Standard. 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 10079:1992, Definition of steel products

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 10020:2000 and EN 10079:1992 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/TC7 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 (+).

NOTE 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.

Principal symbols			Additional symbols for steel		nbols Additional symbols for steel products		
▼	G S	n n	n	an		+an +an a	
Principal s	symbols					Additional symbols	•
	Mechanical				F	For steel	For steel product
Letter	property		Gro	up 1 ^b		Group 2 ^{c d}	
casting r	nnn = specified minimum yield strength ^e in		oact prop rgy Joule		Test tempe- rature	C = Special cold forming D = Hot dip coating E = Enamelling	Tables 16, 17 and 18
necessary)	MPa ^f for the	27J	40J	60J	°C	F = Forgings	
S =structural t	smallest thickness range	JR	KR	LR	20	H = Hollow section	
steel		L = Low temperature					
		J2	K2	L2	-20	M = Thermomechanically rolled	
		J3	K3	L3	-30	N = Normalised or normalised rolled	
		J4	K4	L4	-40	P = Sheet piling Q = Quenched and tempered	
		J5	K5	L5	-50	S = Ship building	
		J6	K6	L6	-60	T = Tubes	
		A = Precipitation hardening W = Weather resistant					
			Thermor rolled Normalis normalis	nechan ed or	ically	an = Chemical symbol of specified additional elements, e.g. Cu, together, where necessary, with a single digit representing 10 x the average (rounded to 0,1%) of that execision represent	
		Q = Quenched and tempered				of that specified range of the content of that element	
			Other ch followed, necessa digits	where			

Table 1 — Structural steels

qualities in accordance with the relevant product standard. $^{\rm d}$ 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/mm².

Examples of steel names for structural steels			
Standard	Steel name according to EN 10027-1		
	S235JR		
	S355JR		
EN 10025-2	S355J0		
LIN 10023-2	S355J2		
	S355K2		
	S450J0		
EN 10025-3	S355N		
EN 10025-5	S355NL		
EN 10025-4	S355M		
EN 10023-4	S355ML		
	S235J0W		
	S235J2W		
	S355J0WP		
EN 10025-5	S355J2WP		
	S355J0W		
	S355J2W		
	S355K2W		
	S460Q		
EN 10025-6	S460QL		
	S460QL1		
EN 10149-2	S355MC		
EN 10149-3	S355NC		
EN 10210-1	S355J2H		
EN 10248-1	S355GP		
EN 10326	S350GD		
	S350GD+Z		

Table 1 (continued)

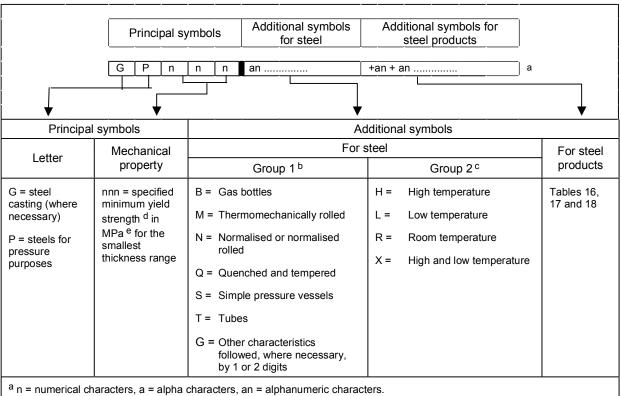


Table 2 — Steels for pressure purposes

^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.

 $e 1 MPa = 1 N/mm^{2}$

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 10213-2	GP240GR GP240GH		

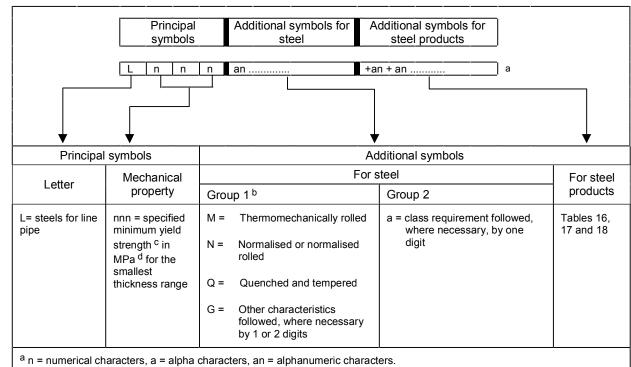


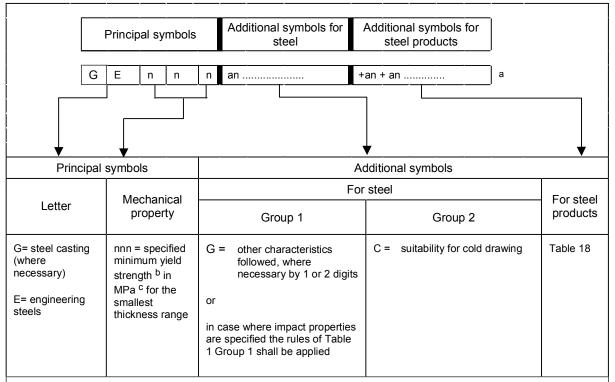
Table 3 — Steels for line pipe

^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/mm².

Examples of steel names		
Standard	Steel name according to EN 10027-1	
EN 10208-1	L360GA	
EN 10208-2	L360NB L360QB L360MB	





^a n = numerical characters, a = alpha characters, an = alphanumeric characters.

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

^c 1 MPa = 1 N/mm².

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	

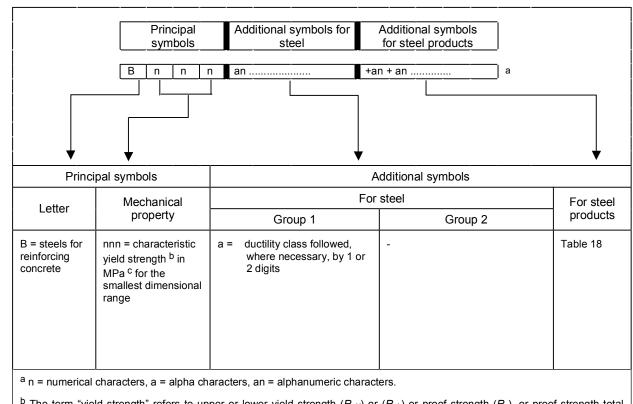


Table 5 — Steels for reinforcing concrete

^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/mm².

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

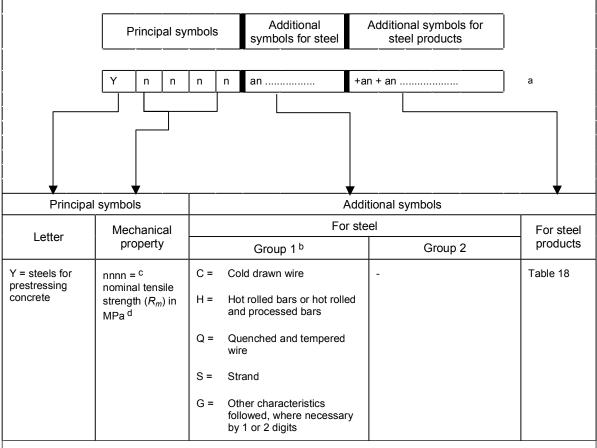


Table 6 — Steels for prestressing concrete

^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 = $1/Nmm^2$.

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

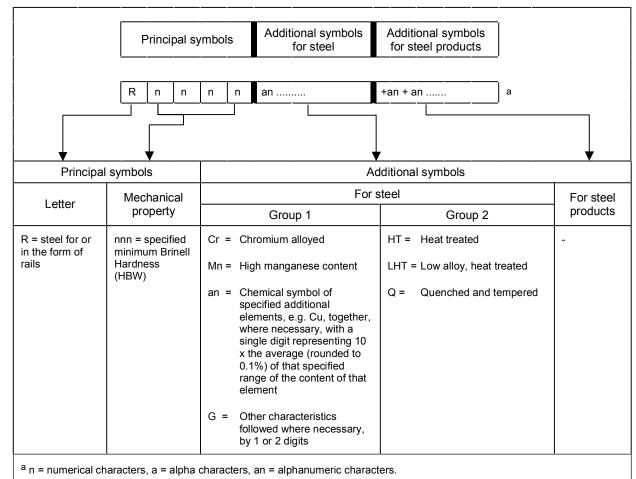


Table 7 — Steels for or in the form of rails

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

Principal symbols			tional symbols for steel products	
↓	Dann	an	+an + an	a
Principa	al symbols	Addit	ional symbols	
Letter	Mechanical	For steel		For steel
property		Group 1 ^b	Group 2	products
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, w single digit representing 10 x average (rounded to 0.1%) of specified range of the content that element G = other characteristics followed 	the that t of	Tables 17 and 18

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

^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.

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 10327	DX51D+Z		

	Principal symbols						Additional sy for stee		Ado	litional symbols for steel products]	
	H a n n n						an		+an	+ an] a	
Н	a	Т	n	n	n	(n)						
▼ Prir	cipal s	symbol	ls 🔻					Addit	tional	symbols		•
Letter	Med	chanica	al pror	hertv		For steel						For steel
			p. er				Group 1 ^b			Group 2 ^b		products
H = flat products of high strength for cold forming	follow minim in MF Dnnr direct follow minim in MF Xnnr the rc speci speci speci streng CTnr follow minim in MF DTnr direct follow minim in MF	h = hot rists cold for year by spheric cold for year by spheric cold for year by spheric cold for the spheric cold for the spheric cold for the spheric cold for the spheric cold for year by sphe	pecified d strend olled for ming pecified d strend uct whe d strend wed by imum y WPa d cold rol pecified sile strend hot roll ming pecified sile strend pecified sile strend sile strend pecified sile strend sile stre	gth ^C or gth ^C ere re re re re re re d angth d d ength d d d m d t d d m m m m d f f f f f f f f f f f f f	I = LA = M = P = T = X = Y =	Comp Isotro Low a Therr With TRIP Plasti Dual Inters Other	alloyed momechanically phosphorus (Transformatior	Induced		D = for hot dip coar	ting	Table 17

Table 9 — High strength steel flat products for cold forming

^a n = numerical characters, a = alpha characters, an = alphanumeric characters.

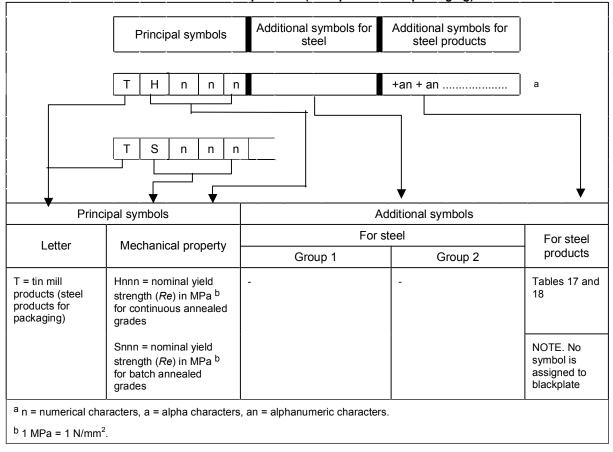
^b symbols of group 1 and 2, may be suffixed by one or two digits in order to distinguish between qualities in accordance with the relevant product standard.

^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/mm².

Examples of steel names						
Standard	Steel name according to EN 10027-1					
	HC400LA					
prEN 10336	HXT450X					

Licensed Copy: sheffieldun sheffieldun, na, Thu Sep 21 06:41:34 BST 2006, Uncontrolled Copy, (c) BSI



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

Licensed Copy: sheffieldun sheffieldun, na, Thu Sep 21 06:41:34 BST 2006, Uncontrolled Copy, (c) BSI

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

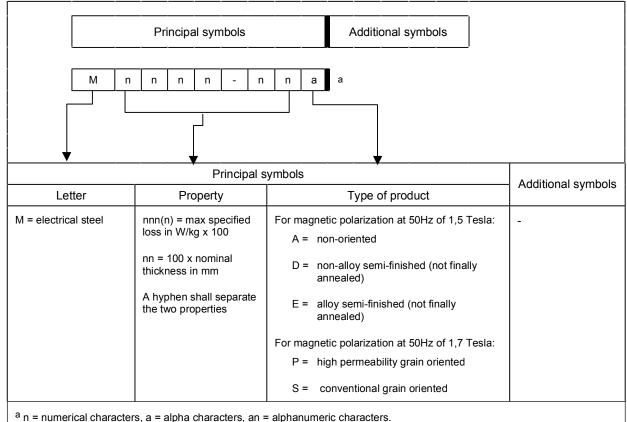


Table 11 — Electrical steels

Examples of steel names					
Standard	Steel name according to EN 10027-1				
EN 10106	M400-50A				
EN 10107	M140-30S				
EN 10126	M660-50D				
EN 10165	M390-50E				

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 syn				mbols		Additional symbols for steel	Additional symbols for steel products		
	GCn			n	n ana		а			
			▼				▼			•
Princ	cipal sy	/mbo	ols				Add	itional symbols		
Letter	etter Oarten enderteb					For st	eel		For steel	
Letter	Carbon content ^b			Group 1 ^{c d}			Group 2		products	
G = steel casting (where necessary) C = carbon	avera perce Whe conte spec a sui repre shall the re	nnn = 100 x 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)		D = E = R = S = U = W = G =	headi for wi with s conte with s range for sp for to for to for we other	specified sulphur content vrings ols elding rod characteristics followed e necessary by, 1 or 2	an =chemical symbol special additional element(s), e.g. Cu, together, where necess with a single digit representing 10 x the average (rounded to 0 of that specified range content of that element	sary, (,1%) of the	Table 18	

^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 x the maximum or average sulphur content rounded to the nearest 0,01 %.

Examples of steel names							
Standard	Steel name according to EN 10027-1						
EN 10016-2	C20D						
EN 10016-3	C2D1						
EN 10016-4	C20D2						
EN 10083-1	C35E C35R						
EN 10083-2	C35						
EN 10132-4	C85S						
EN 10263-2	C8C						

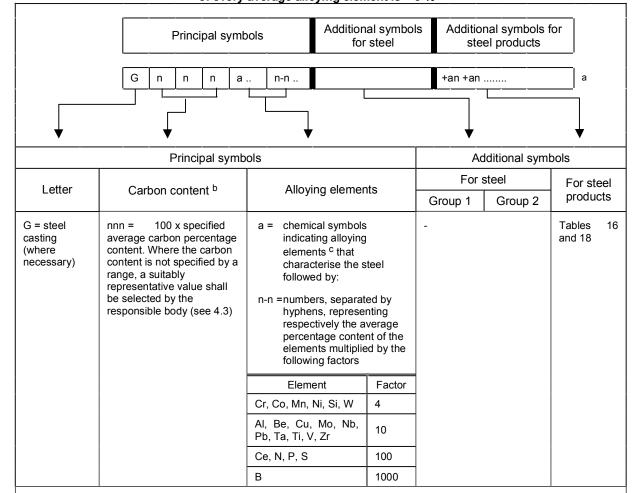


Table 13 — Non-alloy steels with an average manganese content ≥ 1 %, non-alloy free-cutting steels and alloy steels (except high speed steels) where the content, by weight, of every average alloying element is < 5 %

^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.

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

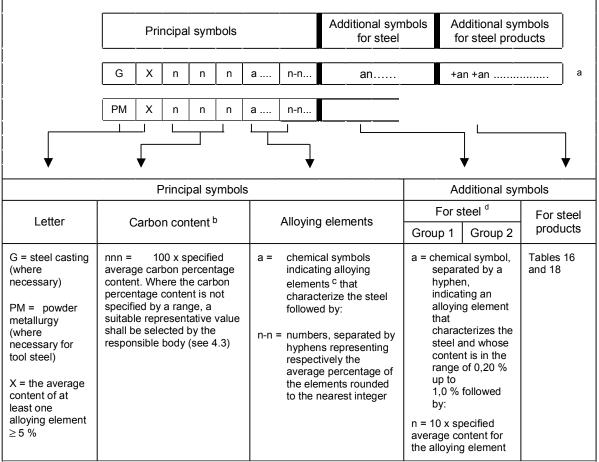


Table 14 — Stainless steels and other alloy steels (except high speed steels) where the average content by weight of at least one alloying element is ≥ 5 %

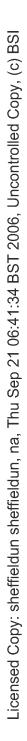
^a n = numerical characters, a = alpha characters, an = alphanumeric characters.

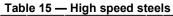
^b To distinguish between two similar steel grades, the number indicating carbon content may be increased by 1.

^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).

Examples of steel names					
Standard	Steel name according to EN 10027-1				
EN ISO 4957	X100CrMoV 5				
EN 130 4937	X38CrMoNb16				
	X10CrNi18-8				
EN 10088-2	X6CrMoNb17-1				
	X5CrNiCuNb16-4				
No standard available	X30NiCrN15-1-N5				





LetterAlloy element contentGroup 1Group 2productsPM = powder metallurgy (where necessary)n-n = numbers ^b , separated by hyphens, indicating percentage content of alloy elements in the following order:a (a) = chemical symbol(s) of the element(s) with higher content (in case of same steel-Table 18		Principal symb		al symbols steel				
LetterAlloy element contentFor steelFor steelPM = powder metallurgy (where hecessary)n-n = numbers ^b , separated by hyphens, indicating percentage 		1 HS n-n	a (a)		+an +an		a	
LetterAlloy element contentGroup 1Group 2PM = powder metallurgy (where necessary)n-n = numbers ^b , separated by hyphens, indicating percentage content of alloy elements in the following order:a (a) = chemical symbol(s) of the element(s) with higher content (in case of same steel grade)-Table 18	· · ·	Principal symbols	3		Additior	nal symbol	s	•
metallurgy (where necessary) hyphens, indicating percentage content of alloy elements in the following order: symbol(s) of the element(s) with higher content (in case of same steel grade) HS = high speed steel - tungsten (W) - molybdenum (Mo) - vanadium (V)	Letter	Alloy ele	ment content	G				For steel products
	PM = powder metallurgy (where necessary) HS = high speed steel	hyphens, indica content of alloy following order: - tungsten - molybdenu - vanadium	ting percentage elements in the (W) Im (Mo) (V)	syr ele hig cas	nbol(s) of the ment(s) with her content (in se of same steel	-		Table 18

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

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

SYMBOL ^a	MEANING						
+CH	core hardenability						
+H	hardenability						
+Z15	-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 16 — S	vmbols for steel	products indicating	special requirements
	j	p	

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 % AI) 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
+ZN	electrolytic zinc nickel alloy coating
^a Symbols are separated from preceding symbols by the plus sign (+). See 7.2.	

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
+	isothermically treated
+LC	skin passed (temper rolled or cold drawn)
+M	thermomechanically formed
+N	normalised or normalised formed
+NT	normalised and tempered
+P	precipitation hardened
+Q	quenched
+QA	air quenched
+Q0	oil quenched
+QT	quenched and tempered
+QW	water quenched
+RA	recrystallisation annealed
+S	treated for cold shearing
+SR	stress relieved
+T	tempered
+TH	treatment to hardness range
+U	untreated
+WW	warm worked
^a Symbols are se	eparated from preceded symbols by the plus sign (+). See 7.2.
^b 1 MPa = 1 N/m	m ² .

Table 18 — Symbols for steel products indicating treatment condition