SLOVENSKI STANDARD
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Definicija in razvrščanje jekel

Definition and classification of grades of steel

Begriffsbestimmung für die Einteilung der Stähle

Définition et classification des nuances d'acier

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English version

Definition and classification of grades of steel

Définition et classification des nuances d'acier

Begriffsbestimmung für die Einteilung der Stähle

This European Standard was accepted by CEN on 88-11-05 . CEN members are bound to comply with the requirements of the CEN/CENELEC Rules which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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CEN

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

Central Secretariat : Rue Bréderode 2, B-1000 Brussels

BRIEF HISTORY

This European Standard was prepared by the Technical Committee ECISS/TC 6a 'Definitions and classification of grades of steel', the Secretariat of which is allocated to the Association Francaise de Normalisation (AFNOR).

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

EUROPEAN STANDARD

DEFINITION AND CLASSIFICATION OF GRADES OF STEEL

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1 Object and field of application

This European Standard defines the term 'steel' (clause 3) and classifies steel grades into;

- non alloy and alloy steels by chemical composition (clause 4)
- main quality classes (clause 5) defined by main property or application characteristics for non alloy and alloy steels (see annex A and B)

Note Technical Committees responsible for steel quality standards shall classify each grade in those standards as non alloy or alloy as defined in clause 4 and into one of the main quality classes defined in clause 5 of this European Standard, and indicate this classification in the text of each standard. If the requirements specified in a quality standard are not compatible with the criteria of clause 5 to the extent that there are doubts about the allocation of grades to quality classes the Technical Committee responsible for EN 10020 shall advise as to their classification. If the Technical Committee responsible for the quality standard disputes the advice the matter shall be resolved by the ECISS Coordinating Commission (COCOR).

The classification given in the quality standard applies automatically regardless of the steel which is actually produced provided that the chemical composition complies with the requirement of the standard concerned.

2 References

See annex D

3 Definition of steel

A material which contains by weight more iron than any other single element, having a carbon content generally less than 2% and containing other elements. A limited number of chromium steels may contain more than 2% of carbon, but 2% is the usual dividing line between steel and cast iron.

4 Classification by chemical composition

4.1 Applicable alloy content

4.1.1 Classification is based on the ladle analysis specified in the standard or product specification, and is determined by the minimum value specified for each element.

Note Classification according to the conventions of the Customs Co-operation Council Harmonised System Nomenclature is on a different basis (See annex C at clause C.1)

4.1.2 Where for elements other than manganese a maximum value only is specified for the ladle analysis, a value of 70% of this maximum value shall be taken for classification. For manganese see Note 3 of table 1.

4.1.3 Where a standard or specification is based on product analysis an equivalent ladle analysis is calculated using the permitted deviations from ladle analysis specified in the standard, specification or corresponding European Standard or EURONORM.

4.1.4 In the absence of a standard or product specification or a precisely specified chemical composition, classification is based on the actual ladle analysis reported by the manufacturer.

4.1.5 The results of product analysis may deviate from those of the ladle analysis to an extent permitted by the appropriate product standard (such deviations do not effect the classification of the steel as non alloy or alloy). If the product analysis indicates a value which would place the steel in a class other than intended, then its inclusion in the class originally intended shall be separately and reliably substantiated.

4.1.6 Composite or coated products are classified according to the specified chemical composition of the product which has been coated or clad.

4.1.7 For each alloy element, the specified, calculated or actual ladle analysis value is expressed to the same number of decimal places as the corresponding limit value shown in table 1. For example in this European Standard a specified range of 0.3 - 0.5% corresponds to a range of 0.30 to 0.50%. Similarly a specified content of 2% is taken to mean a content of 2.00%.

4.2 Definition of classes

4.2.1 Non alloy steels
Steel grades in which none of the limit values in table 1 is reached by the contents as defined in 4.1 taking account of the notes to table 1 relating to certain alloy elements specified in combination.

4.2.2 Alloy steels
Steel grades in which at least one of the limit values given in table 1 is reached by the contents as defined in 4.1 taking account of the notes to table 1 relating to certain alloy elements specified in combination.

Table 1 Boundary between non alloy and alloy steel (see 4.2)

Specified element		Limit value (% by weight)
Al	Aluminium	0.10
B	Boron	0.0008
Bi	Bismuth	0.10
Co	Cobalt	0.10
Cr	Chromium (1)	0.30
Cu	Copper (1)	0.40
La	Lanthanides (each)	0.05
Mn	Manganese	1.65 (3)
Mo	Molybdenum (1)	0.08
Nb	Niobium (2)	0.06
Ni	Nickel (1)	0.30
Pb	Lead	0.40
Se	Selenium	0.10
Si	Silicon	0.50
Te	Tellurium	0.10
Ti	Titanium (2)	0.05
V	Vanadium (2)	0.10
W	Tungsten	0.10
Zr	Zirconium (2)	0.05
	Others (except carbon, phosphorus, sulphur, nitrogen) (each)	0.05

(1) Where elements are specified in combinations of two, three or four and have alloy contents (see 4.1) less than those given in the table, the limit value to be applied for classification is 70% of the sum of the individual limit values shown above for the two, three or four elements concerned.

(2) The rule in (1) above applies to this group of elements.

(3) Where manganese is specified only as a maximum the limit value is 1.80% and the 70% rule does not apply.

5 Classification of main quality classes

5.1 Main classes of non alloy steel

5.1.1 Non alloy base steel

5.1.1.1 General description
Base steels are those steels manufactured by normal steelmaking operations and which do not require special processing.

5.1.1.2 Definition
Base steels are non alloy steels which meet the following four conditions:

(a) no heat treatment is required, see note 1.

(b) the properties specified in the standard or product specification for products delivered in the as rolled or normalised condition comply with the limit values in table 2,

Table 2 Limit values for specified properties of base steel

Specified properties	Thickness mm	Test according to EU	Limit value
- minimum tensile strength	⩽ 16	2 or 11	⩽ 690 N/mm^2
- minimum yield strength	⩽ 16	2 or 11	⩽ 360 N/mm^2
- minimum elongation (1)	⩽ 16	2 or 11	⩽ 26%
- minimum diameter of bend test mandrel	⩾ 3	6	⩾ 1 e (2)
- minimum impact value at + 20°C on a longitudinal ISO V-notch test piece	⩾ 10 ⩽ 16	45	⩽ 27 J
- maximum carbon content			⩾ 0.10%
- maximum phosphorus content			⩾ 0.045%
- maximum sulphur content			⩾ 0.045%

(1) Where the standard or specification does not specify an original gauge length of $L_o = 5.65\sqrt{S_o}$ (S_o being the original cross section area of the test piece) the values specified shall be converted to this gauge length as described in ISO 2566.

(2) 'e' represents the thickness of the test piece.

(1) Throughout this European Standard annealing (eg, full annealing, sub critical annealing) or normalising is not regarded as heat treatment. See EURONORM 52