



SLOVENSKI STANDARD SIST EN 12073:2000

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8 cXUbj'a UHf]U]nUj UfYbY!'Dc`bYbYj]W'nUcV'c bc`j UfYbY'bYfUj b] `]b
c[bYcXdcfb] `Y_Y`j `nUy]fb] `d]b] `U]VfYn'nUy]hY`!`FUhj fg]hYj

Welding consumables - Tubular cored electrodes for metal arc welding with or without a gas shield of stainless and heat-resisting steels - Classification

Schweißzusätze - Fülldrahtelektroden zum Metall-Lichtbogenschweißen mit oder ohne Gasschutz von nichtrostenden und hitzebeständigen Stählen - Einteilung

Produits consommables pour le soudage - Fils fourrés pour le soudage a l'arc avec ou sans protection gazeuse des aciers inoxydables et des aciers résistant aux températures élevées - Classification

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ICS:

25.160.20 Potrošni material pri varjenju Welding consumables

SIST EN 12073:2000

en

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EUROPEAN STANDARD

EN 12073

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 1999

ICS 25.160.20

English version

Welding consumables - Tubular cored electrodes for metal arc welding with or without a gas shield of stainless and heat-resisting steels - Classification

Produits consommables pour le soudage - Fils fourrés pour le soudage à l'arc avec ou sans protection gazeuse des aciers inoxydables et des aciers résistant aux températures élevées - Classification

Schweißzusätze - Fülldrahtelektroden zum Metall-Lichtbogenschweißen mit oder ohne Gasschutz von nichtrostenden und hitzebeständigen Stählen - Einteilung

This European Standard was approved by CEN on 4 September 1999.

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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS.

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 2000; and conflicting national standards shall be withdrawn at the latest by April 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This European Standard specifies requirements for classification in order to designate tubular cored electrodes with or without a gas shield for metal arc welding of steels, such as stainless and heat - resisting steels in terms of the chemical composition of the all-weld metal.

It is recognized that the operating characteristics of tubular cored electrodes can be modified by the use of pulsed current, but for the purposes of this standard, pulsed current is not used for determining the electrode classification.

2 Normative references

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

EN 439	Shielding gases for arc welding and cutting
EN 759	Welding consumables - Technical delivery conditions for welding filler metals - Type of product, dimensions, tolerances and marking
EN 1597-1	Welding consumables - Test methods - Part 1: Test piece for all-weld metal test specimens in steel, nickel and nickel alloys
EN 1597-3	Welding consumables - Test methods - Part 3: Testing of positional capability of welding consumables in a fillet weld
EN ISO 13916	Welding - Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature (ISO 13916:1996)
ISO 31-0:1992	Quantities and units - Part 0: General principles

3 Classification

The classification includes all-weld metal properties obtained with a tubular cored electrode and appropriate shielding gas combination as given below.

The classification is divided into five parts:

- 1) the first part gives a symbol indicating the product/process to be identified;
- 2) the second part gives a symbol indicating the chemical composition of the all-weld metal;
- 3) the third part gives a symbol indicating the type of electrode core;
- 4) the fourth part gives a symbol indicating the shielding gas;
- 5) the fifth part gives a symbol indicating the welding position.

In order to promote the use of this standard, the classification is split into two sections:

a) Compulsory section

This section includes the symbols for the type of product, the chemical composition, the type of electrode core and the shielding gas, i.e. the symbols defined in 4.1, 4.2, 4.3 and 4.4;

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b) Optional section

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This section includes the symbols for the welding positions for which the electrode is suitable, i.e. the symbol defined in 4.5.

The full identification (see clause 8) shall be used on packages and in the manufacturer's literature and data sheets.

4 Symbols and requirements

4.1 Symbol for the product/process

The symbol for the tubular cored electrode used in the metal arc welding process is the letter T.

4.2 Symbol for the chemical composition of all-weld metal

The symbol in table 1 indicates the chemical composition of all-weld metal determined in accordance with clause 6. The all-weld metal obtained with the tubular cored electrodes in table 1 under conditions given in clause 5 shall also fulfil the requirements given in table 2.

Table 1: Symbol for chemical composition of all-weld metal

Alloy symbols	Chemical composition in % (m/m) ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾											Other elements
	C	Si	Mn	P ⁽⁵⁾	S ⁽⁵⁾	Cr	Ni	Mo				
Martensitic/Ferritic	0,12	1,0	1,5	0,030	0,025	11,0 to 14,0	-	-	-	-	-	-
	0,10	1,0	0,80	0,030	0,030	10,5 to 13,0	-	-	-	-	-	Ti ⁽⁶⁾
	0,06	1,0	1,5	0,030	0,025	11,0 to 14,5	3,0 to 5,0	0,4 to 1,0	-	-	-	-
	0,12	1,0	1,5	0,030	0,025	16,0 to 18,0	-	-	-	-	-	-
Austenitic	0,04	1,2	2,0	0,030	0,025	18,0 to 21,0	9,0 to 11,0	-	-	-	-	-
	0,08	1,2	2,0	0,030	0,025	18,0 to 21,0	9,0 to 11,0	-	-	-	-	Nb ⁽⁷⁾
	0,04	1,2	2,0	0,030	0,025	17,0 to 20,0	10,0 to 13,0	2,5 to 3,0	-	-	-	-
	0,08	1,2	2,0	0,030	0,025	17,0 to 20,0	10,0 to 13,0	2,5 to 3,0	-	-	-	Nb ⁽⁷⁾
	0,04	1,2	1,0 to 5,0	0,030	0,025	17,0 to 20,0	12,0 to 15,0	3,0 to 4,5	-	-	-	N 0,08 to 0,20
Austenitic-ferritic. High corrosion resistance. 22 9 3 N L ⁽⁸⁾	0,04	1,2	2,5	0,030	0,025	21,0 to 24,0	7,5 to 10,5	2,5 to 4,0	-	-	-	N 0,08 to 0,20
	0,04	1,2	1,0 to 4,0	0,035	0,025	17,0 to 20,0	15,5 to 19,0	3,5 to 5,0	-	-	-	N 0,08 to 0,20
Fully Austenitic. High corrosion resistance. 18 16 5 N L ⁽⁹⁾	0,20	1,2	4,5 to 7,5	0,035	0,025	17,0 to 20,0	7,0 to 10,0	-	-	-	-	-
	0,08	1,2	2,5	0,035	0,025	19,5 to 22,0	9,0 to 11,0	2,0 to 4,0	-	-	-	-
	0,04	1,2	2,5	0,030	0,025	22,0 to 25,0	11,0 to 14,0	-	-	-	-	-
	0,04	1,2	2,5	0,030	0,025	22,0 to 25,0	11,0 to 14,0	2,0 to 3,0	-	-	-	-
	0,15	1,2	2,5	0,035	0,025	27,0 to 31,0	8,0 to 12,0	-	-	-	-	-
	0,15	1,2	2,5	0,030	0,025	20,0 to 23,0	10,0 to 13,0	-	-	-	-	-
Heat resisting types	0,06 to 0,20	1,2	1,0 to 5,0	0,030	0,025	23,0 to 27,0	18,0 to 22,0	-	-	-	-	-

1) If not specified: Mo < 0,75 %, Cu < 0,75 % and Ni < 0,60 %.

2) Single values shown in the table are maximum values.

3) Tubular cored electrodes not listed in the table shall be symbolized similarly and prefixed by the letter Z.

4) The results shall be rounded to the same number of significant figures as in the specified value using the rules in accordance with annex B, Rule A of ISO 31-0:1992.

5) The sum of P and S shall not exceed 0,050 %, except for 18 16 5 N L, 18 8 Mn and 29 9.

6) Ti min. 10 x % C, max. 1,5 %.

7) Nb min. 8 x % C, max. 1,1 %; up to 20 % of the amount of Nb can be replaced by Ta.

8) The all-weld metal is in most cases fully austenitic and therefore can be susceptible to microfissuring or hot cracking. The occurrence of fissuring/cracking is reduced by increasing the weld metal manganese level and in recognition of this the manganese range is extended for a number of the grades. 8g- 8

9) Electrodes under this symbol are usually selected for specific properties and may not be directly interchangeable.

Table 2: Tensile properties of all-weld metal

Alloy symbol	Minimum proof strength	Minimum tensile strength	Minimum ¹⁾ elongation A	Post weld heat treatment
	$R_{p0,2}$	R_m	%	
	N/mm ²	N/mm ²		
13	250	450	15	2)
13 Ti	250	450	15	2)
13 4	500	750	15	3)
17	300	450	15	4)
19 9 L	320	510	30	None
19 9 Nb	350	550	25	"
19 12 3 L	320	510	25	"
19 12 3 Nb	350	550	25	"
19 13 4 N L	350	550	25	"
22 9 3 N L	450	550	20	None
18 16 5 N L	300	480	25	"
18 8 Mn	350	500	25	None
20 10 3	400	620	20	"
23 12 L	320	510	25	"
23 12 2 L	350	550	25	"
29 9	450	650	15	"
22 12 H	350	550	25	"
25 20	350	550	20	"
<p>1) Gauge length is equal to five times the test specimen diameter.</p> <p>2) 840°C to 870°C for 2h - Furnace cooling down to 600°C then air cooling.</p> <p>3) 580°C to 620°C for 2h - Air cooling.</p> <p>4) 760°C to 790°C for 2h, furnace cooling down to 600°C then air cooling.</p> <p>NOTE: Weld metal can have elongation lower than that of the parent metal.</p>				