



**SLOVENSKI STANDARD**  
**SIST EN 12071:2000**

01-maj-2000

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8 cXUbj`a UHf]U]`nUj Uf`Yb`Y`!`Dc`b`Yb`Y`j]W`nUc`V`c bc`j Uf`Yb`Y`Y`\_Y`žcXdcfb]`  
dfc]`YnYb`f` žj`nUy` ]]b]`d`]b]`!`E`F`Unj`fgh]`h`j`

Welding consumables - Tubular cored electrodes for gas shielded metal arc welding of creep-resisting steels - Classification

Schweißzusätze - Fülldrahtelektroden zum Metall-Schutzgasschweißen von warmfesten Stählen - Einteilung

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Produits consommables pour le soudage - Fils fourrés pour le soudage a l'arc sous protection gazeuse des aciers résistant au fluage - Classification

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**Ta slovenski standard je istoveten z: EN 12071:1999**

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**ICS:**

25.160.20      Potrošni material pri varjenju      Welding consumables

**SIST EN 12071:2000**

**en**

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EUROPEAN STANDARD

EN 12071

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 1999

ICS 25.160.20

English version

## Welding consumables - Tubular cored electrodes for gas shielded metal arc welding of creep-resisting steels - Classification

Produits consommables pour le soudage - Fils fourrés pour le soudage à l'arc sous protection gazeuse des aciers résistant au fluage - Classification

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This European Standard was approved by CEN on 3 September 1999.

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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.

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

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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of an identical text or by endorsement, at the latest by April 2000, and conflicting national standards shall be withdrawn at the latest by April 2000.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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## Introduction

For creep-resisting steel welding consumables it should be noted that the mechanical properties of all-weld metal test specimens used for classification will vary from those obtained in production joints because of differences in welding conditions, material composition and shielding gas.

Although tubular cored electrodes supplied by individual companies can have the same grading, the individual electrodes from different companies are not interchangeable unless verified in accordance with this standard.

## 1 Scope

This standard specifies requirements for classification of tubular cored electrodes used in gas shielded metal arc welding of creep-resisting and low alloy elevated temperature steels. The classification is based on 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.

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## 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)

prEN ISO 3690	Welding and allied processes - Determination of hydrogen content in ferritic arc weld metal (ISO/DIS 3690:1998)
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 six 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 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;
- 6) the sixth part gives a symbol indicating the hydrogen content of deposited metal.

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

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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;

b) Optional section

This section includes the symbols for the welding positions for which the electrode is suitable, and the symbol for the hydrogen content, i.e. the symbols defined in 4.5 and 4.6.

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 gas shielded 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 in table 2.

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

Symbol	Chemical composition in % (m/m) <sup>1)2)3)</sup>							
	C	Si	Mn	P	S	Cr	Mo	V
Mo	0,07 to 0,12	0,80	0,60 to 1,30	0,020	0,020	-	0,40 to 0,65	-
MoL	0,07	0,80	0,60 to 1,70	0,020	0,020	-	0,40 to 0,65	-
MoV	0,07 to 0,12	0,80	0,40 to 1,00	0,020	0,020	0,30 to 0,60	0,50 to 0,80	0,25 to 0,45
CrMo1	0,05 to 0,12	0,80	0,40 to 1,30	0,020	0,020	0,90 to 1,40	0,40 to 0,65	-
CrMo1L	0,05	0,80	0,40 to 1,30	0,020	0,020	0,90 to 1,40	0,40 to 0,65	-
CrMo2	0,05 to 0,12	0,80	0,40 to 1,30	0,020	0,020	2,00 to 2,50	0,90 to 1,30	-
CrMo2L	0,05	0,80	0,40 to 1,30	0,020	0,020	2,00 to 2,50	0,90 to 1,30	-
CrMo5	0,03 to 0,12	0,80	0,40 to 1,30	0,020	0,025	4,00 to 6,00	0,40 to 0,70	-
Z	Any other agreed composition							
1) If not specified: Ni < 0,3, Cu < 0,3, V < 0,03, Nb < 0,01, Cr < 0,2. 2) Single values shown in the table are maximum values. 3) 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.								



**Table 2: Mechanical properties of all-weld metal**

Symbol	Minimum proof strength $R_{p0.2}$ N/mm <sup>2</sup>	Minimum tensile strength $R_m$ N/mm <sup>2</sup>	Minimum elongation $A$ %	Impact energy $K_V$ (J) at +20°C	Heat treatment of all-weld metal				
					Minimum average from three test specimens J	Minimum single value J	Preheat and interpass temperature °C	Post weld heat treatment of test assembly Temperature <sup>3)</sup> °C	Time <sup>4)</sup> in minutes
Mo/MoL	355	510	22	47	38	< 200	570 to 620	60	
MoV	355	510	18	47	38	200 to 300	690 to 730	60	
CrMo1	355	510	20	47	38	150 to 250	660 to 700	60	
CrMo1L	355	510	20	47	38	150 to 250	660 to 700	60	
CrMo2	400	500	18	47	38	200 to 300	690 to 750	60	
CrMo2L	400	500	18	47	38	200 to 300	690 to 750	60	
CrMo5	400	590	17	47	38	200 to 300	730 to 760	60	
Z	Any other agreed mechanical properties								

1) Gauge length is equal to five times the test specimen diameter.

2) Only one single value lower than minimum average is permitted.

3) The test piece shall be cooled in the furnace to 300°C at a rate not exceeding 200°C/h.

4) Tolerance ± 10 min.