



SLOVENSKI STANDARD

SIST EN 14295:2004

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8 cXUbj'a UHf]U]nUj Uf'Yb'Y!'b]W'j]b'gfyYbg_Y'j]W'j]b'_ca V]bUW'Y'j]W]b'dfUy_cj
nUcV'c bc'j Uf'Yb'Y'j]gc_chXbcgfb] 'Y_Y'dc'9DD!'F Uj fgh]hYj

Welding consumables - Wire and tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels - Classification

Schweißzusätze - Draht- und Fülldrahtelektroden und Drahtpulver-Kombinationen für das Unterpulverschweißen von hochfesten Stählen - Einteilung

Produits consommables pour le soudage - Fils-électrodes pleins et fils-électrodes fourrés et couples fils-flux pour le soudage sous flux des aciers a haute résistance - Classification

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ICS:

25.160.20 Potrošni material pri varjenju Welding consumables

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en

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

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English version

Welding consumables - Wire and tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels - Classification

Produits consommables pour le soudage - Fils-électrodes pleins et fils-électrodes fourrés et couples fils-flux pour le soudage sous flux des aciers à haute résistance - Classification

Schweißzusätze - Draht- und Fülldrahtelektroden und Drahtpulver-Kombinationen für das Unterpulverschweißen von hochfesten Stählen - Einteilung

This European Standard was approved by CEN on 1 September 2003.

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 Management Centre 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 Management Centre 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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 14295:2003) 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 May 2004, and conflicting national standards shall be withdrawn at the latest by May 2004.

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

This standard proposes a classification in which solid wire electrodes are designated by the chemical composition of the wire and wire-flux combinations in terms of the yield strength, tensile strength and elongation of the all-weld metal. Tubular cored electrode-flux combinations are designated by the chemical composition, yield strength, tensile strength and elongation of the all-weld metal. The ratio of yield to tensile strength of weld metal is generally higher than that of parent metal. Users should note that matching weld metal yield strength to parent metal yield strength will not necessarily ensure that the weld metal tensile strength matches that of the parent material. Where the application requires matching tensile strength, therefore, selection of the consumable should be made by reference to column 3 of Table 1.

Although combinations of electrodes and fluxes supplied by individual companies may have the same grading, the individual electrodes and fluxes from different companies are not interchangeable unless verified according to this standard.

It should be noted that the mechanical properties of all-weld metal test specimens used to classify the electrode-flux combinations will vary from those obtained in production joints because of differences in welding procedures such as electrode size and material composition.

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1 Scope

This standard specifies requirements for classification of electrode-flux combinations and all-weld metal in the as welded or stress relieved condition for submerged arc welding of steels with a minimum yield strength higher than 500 MPa. One flux may be classified with different electrodes. The wire electrode is also classified separately based on its chemical composition.

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 (including amendments).

EN 760, *Welding consumables – Fluxes for submerged arc welding – Classification.*

EN 1597-1, *Welding consumables – Test methods – Part 1: Test piece for all-weld metal test specimens in steel, nickel and nickel alloys.*

EN ISO 544, *Welding consumables – Technical delivery conditions for welding filler metals – Type of product, dimensions, tolerances and markings (ISO 544:2003).*

EN ISO 6847, *Welding consumables – Deposition of a weld metal pad for chemical analysis (ISO 6847:2000).*

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 manufacturer's specific electrode-flux combination as given below. A wire electrode may be separately classified with the symbol for its chemical composition in Table 5.

The classification is divided into six parts:

- a) first part gives a symbol indicating the process to be identified;
- b) second part gives a symbol indicating the tensile properties of all-weld metal;
- c) third part gives a symbol indicating the impact properties of all-weld metal;
- d) fourth part gives a symbol indicating the type of flux used;
- e) fifth part gives a symbol indicating the chemical composition of the wire electrode used, or the chemical composition of the deposit in the case of tubular cored electrodes;
- f) sixth part gives a symbol indicating the stress relief treatment in case this is applied.

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4 Symbols and requirements

4.1 Symbol for the process

The symbol for a wire electrode and/or an electrode-flux combination used in the submerged arc welding process shall be the letter S.

4.2 Symbol for the tensile properties

The symbol in Table 1 indicates yield strength, tensile strength and elongation of the all-weld metal in the as-welded condition or after stress relief treatment as described in 4.6, determined in accordance with clause 5.

Table 1 – Symbol for the tensile properties

Symbol	Minimum ^a yield strength (Mpa)	Tensile strength (Mpa)	Minimum Elongation ^b (%)
55	550	640 to 820	18
62	620	700 to 890	18
69	690	770 to 940	17
79	790	880 to 1080	16
89	890	940 to 1180	15

^a For yield strength the lower yield (ReL) shall be used when yielding occurs, otherwise the 0,2 % proof strength (Rp 0,2) shall be used.

^b Gauge length is equal to five times the test specimen diameter.

4.3 Symbol for the impact properties of all-weld metal

The symbol in Table 2 indicates the temperature at which an average impact energy of 47 J is achieved under conditions given in clause 5 in the as welded condition or after stress relief treatment as described in 4.6. Three specimens shall be tested. Only one individual value may be lower than 47 J but not lower than 32 J. When an all-weld metal has been classified for a certain temperature, it automatically covers any higher temperature in Table 2.

Table 2 – Symbol for the impact properties of all-weld metal

Symbol	Temperature for minimum average impact energy 47 J (°C)
Z	No requirements
A	+ 20
0	0
2	- 20
3	- 30
4	- 40
5	- 50
6	- 60

4.4 Symbol for the type of welding flux

The symbol in Table 3 indicates the welding flux as described in EN 760.

Table 3 – Symbol for the type of welding flux

Type of flux	Symbol
Manganese-silicate	MS
Calcium-silicate	CS
Zirconium-silicate	ZS
Rutile-silicate	RS
Aluminate-rutile	AR
Aluminate-basic	AB
Aluminate-silicate	AS
Aluminate-fluoride basic	AF
Fluoride-basic	FB
Any other type	Z

NOTE For welding of high strength fine grain steels with solid wires preferably basic fluxes with the types AB, AF and FB should be used.

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