SLOVENSKI STANDARD

SIST EN 756:2004

01-junij-2004

Nadomeģļ a:

SIST EN 756:1996

Dodajni materiali za varjenje - Masivne ģice in kombinacije masivnih ģic in praģkov in cevnih strģenskih elektrod in praģkov za obloļ no varjenje nelegiranih in finozrnatih jekel pod praģkom - Razvrstitev

Welding consumables - Solid wires, solid wire-flux and tubular cored electrode-flux combinations for submerged arc welding of non alloy and fine grain steels - Classification

Schweißzusätze - Massivdrähte, Fülldrähte und Drahtpulver-Kombinationen zum Unterpulverschweißen von unlegierten Stählen und Feinkornbaustählen - Einteilung

Produits consommables pour le soudage - Fils pleins, couples fils pleins-flux et fils fourrés-flux pour le soudage a l'arc sous flux des aciers non alliés et a grains fins - Classification

Ta slovenski standard je istoveten z: EN 756:2004

ICS:

25.160.20 Potrošni material pri varjenju Welding consumables

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EUROPEAN STANDARD

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English version

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This European Standard was approved by CEN on 2 January 2004.

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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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COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Foreword

This document (EN 756:2004) has been prepared by Technical Committee CEN/TC 121 “Welding”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by September 2004, and conflicting national standards shall be withdrawn at the latest by September 2004.

This document supersedes EN 756:1995.

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.

Introduction

This standard proposes a classification in order to designate solid wire electrodes by chemical analyses and solid wire-flux combinations in terms of the yield strength, tensile strength and elongation and impact properties of the all-weld metal. Tubular cored electrode-flux combinations are designated by the chemical composition; yield strength, tensile strength and elongation and impact properties 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 parent metal chemical composition.

1 Scope

This standard specifies requirements for classification of electrode-flux combinations and all-weld metal in the as-welded condition for submerged arc welding of non alloy and fine grain steels with a minimum yield strength of up to 500 MPa. Classification can be made with solid wire electrodes or tubular cored electrodes. One flux may be classified with different electrodes. The solid wire electrode is also classified separately based on its chemical composition. Fluxes for the single and two run techniques are classified on the basis of the two run technique.

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 European Standards only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

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 1597-2, *Welding consumables - Test methods - Part 2: Preparation of test piece for single-run and two-run technique test specimens in steel.*

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 solid wire electrode may be separately classified with the symbol for its chemical composition in Table 5.

The classification is divided into five parts:

1) The first part gives a symbol indicating the process to be identified.

2) The second part gives a symbol indicating strength and elongation of all-weld metal for multi run technique or the strength of the parent material used in classification for the two run technique.

3) The third part gives a symbol indicating impact properties of the all-weld metal or the two run welded joint.

4) The fourth part gives a symbol indicating the type of flux used.

5) The fifth part gives a symbol indicating the chemical composition of the solid wire electrode used or the chemical composition of the all-weld metal deposited by a tubular cored electrode-flux combination.

4 Symbols and requirements

4.1 Symbol for the process

The symbol for a solid 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

4.2.1 Multi run technique

The symbol in Table 1 indicates yield strength, tensile strength and elongation of the all-weld metal in the as-welded condition determined in accordance with 5.1.

Table 1 — Symbol for tensile properties by multi run technique

Symbol	Minimum yield strength [a] MPa	Tensile strength MPa	Minimum elongation [b] %
35	355	440 to 570	22
38	380	470 to 600	20
42	420	500 to 640	20
46	460	530 to 680	20
50	500	560 to 720	18

[a] For yield strength the lower yield (R_{eL}) shall be used when yielding occurs, otherwise the 0,2 % proof strength ($R_{pO,2}$) shall be used.

[b] Gauge length is equal to five times the specimen diameter.

4.2.2 Two-run technique

The symbol indicates strength of the welded joint in relation to strength of the parent material used in two-run welding tests satisfactorily completed in accordance with 5.2.

Table 2 — Symbol for the tensile properties by two-run technique

Symbol	Minimum parent material yield strength MPa	Minimum tensile strength of the welded joint MPa
2T	275	370
3T	355	470
4T	420	520
5T	500	600

4.3 Symbol for the impact properties of all-weld metal or two-run weldment

The symbol in Table 3 indicates the temperature at which an average impact energy of 47 J is achieved under conditions given in clause 5. Three specimens shall be tested. Only one individual value may be lower than 47 J but not lower than 32 J. When an electrode-flux combination has been classified for a certain temperature, it automatically covers any higher temperature in Table 3.

Table 3 — Symbol for the impact properties of all-weld metal or two-run welded joint

Symbol	Temperature for minimum average impact energy of 47 J °C
Z	no requirements
A	+ 20
0	0
2	- 20
3	- 30
4	- 40
5	- 50
6	- 60
7	- 70
8	- 80

4.4 Symbol for the type of welding flux

The symbol in Table 4 indicates the welding flux as described in EN 760.

Table 4 — 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

4.5 Symbol for the chemical composition of solid wire electrodes or the all-weld metal deposited by a tubular cored electrode-flux combinations

The symbol in Table 5 indicates the chemical composition of the solid wire electrode and includes an indication of characteristic alloying elements.

The symbol in Table 6 indicates the chemical composition of the all-weld metal deposited by a tubular cored electrode-flux combination carried out according to Table 7.

The chemical composition of the weld metal is dependent on the chemical composition of the solid wire electrode or tubular cored electrode and the metallurgical behaviour of the flux (see EN 760).