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

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NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 14171:2010 sisaldab Euroopa standardi EN ISO 14171:2010 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 14171:2010 consists of the English text of the European standard EN ISO 14171:2010.
Standard on kinnitatud Eesti Standardikeskuse 30.11.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 30.11.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 01.10.2010.	Date of Availability of the European standard text 01.10.2010.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 25.160.20

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 14171

October 2010

ICS 25.160.20

Supersedes EN 756:2004

English Version

Welding consumables - Solid wire electrodes, tubular cored electrodes and electrode/flux combinations for submerged arc welding of non alloy and fine grain steels - Classification (ISO 14171:2010)

Produits consommables pour le soudage - Fils-électrodes pleins, fils-électrodes fourrés et couples fils-flux pour le soudage à l'arc sous flux des aciers non alliés et à grains fins - Classification (ISO 14171:2010)

Schweißzusätze - Massivdrahtelektroden, Fülldrahtelektroden und Draht-Pulver-Kombinationen zum Unterpulverschweißen von unlegierten Stählen und Feinkornstählen - Einteilung (ISO 14171:2010)

This European Standard was approved by CEN on 30 September 2010.

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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 CEN Management Centre has the same status as the official versions.

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Ref. No. EN ISO 14171:2010: E

Foreword

The text of ISO 14171:2010 has been prepared by Technical Committee ISO/TC 44 “Welding and allied processes” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 14171:2010 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 April 2011, and conflicting national standards shall be withdrawn at the latest by April 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 14171:2010 has been approved by CEN as a EN ISO 14171:2010 without any modification.

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Introduction

This International Standard recognizes that there are two somewhat different approaches in the global market to classifying a given electrode/flux combination, and allows for either or both to be used, to suit a particular market need. Application of either type of classification designation (or of both where suitable) identifies a product as classified in accordance with this International Standard.

This International Standard provides a classification system for the designation of solid wire electrodes in terms of their chemical composition, tubular cored electrodes in terms of the deposit composition obtained with a particular submerged arc flux and, where required, electrode/flux combinations in terms of the yield strength, tensile strength and elongation of the all-weld metal deposit. The ratio of yield to tensile strength of weld metal is generally higher than that of parent material. Users should note that matching weld metal yield strength to parent material yield strength does not necessarily ensure that the weld metal tensile strength matches that of the parent material. Thus, where the application of the material requires matching tensile strengths, selection of the consumable should be made by reference to column 3 of Table 1A or 1B, as appropriate.

Although combinations of electrodes and fluxes supplied by individual companies may have the same classification, the individual wire electrodes and fluxes from different companies are not interchangeable unless verified in accordance with this International Standard.

The mechanical properties of all-weld metal test specimens used to classify the electrode/flux combinations vary from those obtained in production joints because of differences in welding procedures such as electrode size and parent material composition.

Welding consumables — Solid wire electrodes, tubular cored electrodes and electrode/flux combinations for submerged arc welding of non alloy and fine grain steels — Classification

1 Scope

This International Standard specifies requirements for the classification of electrode/flux combinations and weld metal in the as-welded condition and in the post-weld heat-treated condition for submerged arc welding of non alloy and fine grain steels with a minimum yield strength of up to 500 MPa or a minimum tensile strength of up to 570 MPa. One flux can be classified with different solid wire electrodes and tubular cored electrodes. The solid wire electrode is also classified separately based on chemical composition.

This International Standard is a combined specification providing for classification utilizing a system based upon the yield strength and the average impact energy for weld metal of 47 J, or utilizing a system based upon the tensile strength and the average impact energy for weld metal of 27 J.

a) Clauses, subclauses, and tables which carry the suffix letter “A” are applicable only to electrode/flux combinations and wire electrodes classified using the system based upon the yield strength and the average impact energy for weld metal of 47 J, in accordance with this International Standard.

b) Clauses, subclauses, and tables which carry the suffix letter “B” are applicable only to electrode/flux combinations and wire electrodes classified using the system based upon the tensile strength and the average impact energy for weld metal of 27 J, in accordance with this International Standard.

c) Clauses, subclauses, and tables which do not have either the suffix letter “A” or the suffix letter “B” are applicable to all electrode/flux combinations and wire electrodes classified in accordance with this International Standard.

Fluxes for the single-run and two-run techniques are classified on the basis of the two-run technique.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 544, *Welding consumables — Technical delivery conditions for filler materials and fluxes — Type of product, dimensions, tolerances and markings*

ISO 3690, *Welding and allied processes — Determination of hydrogen content in arc weld metal*

ISO 6847, *Welding consumables — Deposition of a weld metal pad for chemical analysis*

ISO 13916, *Welding — Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature*

ISO 14174, *Welding consumables — Fluxes for submerged arc welding and electroslag welding — Classification*

ISO 14344, *Welding consumables — Procurement of filler materials and fluxes*

ISO 15792-1:2000, *Welding consumables — Test methods — Part 1: Test methods for all-weld metal test specimens in steel, nickel and nickel alloys*

ISO 15792-2:2000, *Welding consumables — Test methods — Part 2: Preparation of single-run and two-run technique test specimens in steel*

ISO 80000-1:2009, *Quantities and units — Part 1:General*

3 Classification

Classification designations are based upon two approaches to indicate the tensile properties and the impact properties of the weld metal obtained with a given electrode/flux combination. The two designation approaches include additional symbols for some other classification requirements, but not all, as is clear from the following clauses. In most cases, a given commercial product can be classified in accordance with both systems. Then either or both classification designations can be used for the product.

A solid wire electrode shall be classified in accordance with its chemical composition as given in Table 4A or 4B.

An all-weld metal deposit from a tubular cored electrode shall be classified in accordance with the all-weld metal composition, as given in Table 5A or 5B, obtained with a particular flux.

When the solid wire electrode or tubular cored electrode is classified in combination with a flux for submerged arc welding, the classification shall be prefixed with a symbol in accordance with Clause 4 as appropriate.

The electrode/flux classification includes 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 4A or 4B.

3A Classification by yield strength and 47 J impact energy

The classification is divided into five mandatory parts and an optional sixth part:

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

2) the second part gives a symbol indicating the 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 (see Table 1A or 2A);

3B Classification by tensile strength and 27 J impact energy

The classification is divided into five mandatory parts and an optional sixth part:

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

2) the second part gives a symbol indicating the strength and elongation of all-weld metal in either the as-welded or post-weld heat-treated condition for a multi-run technique or the specified minimum tensile strength of the parent material or the weld metal used in classification for the two-run technique (see Table 1B or 2B);