SVENSK STANDARD
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SWEDISH STANDARDS INSTITUTE

Tillsatsmaterial för svetsning – Trådelektroder, rörelektroder och elektrod/pulver-kombinationer för pulverbågsvetsning av olegerade och finkornstål – Indelning (ISO 14171:2016)

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 14171:2016)

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Europastandarden EN ISO 14171:2016 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 14171:2016.

Denna standard ersätter SS-EN ISO 14171:2010, utgåva 1.

The European Standard EN ISO 14171:2016 has the status of a Swedish Standard. This document contains the official English version of EN ISO 14171:2016.

This standard supersedes the Swedish Standard SS-EN ISO 14171:2010, edition 1.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Tillsatsmaterial för svetsning, SIS/TK 134/AG 443.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 14171

July 2016

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Supersedes EN ISO 14171:2010

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 14171:2016)

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 14171:2016)

Schweißzusätze - Massivdrahtelektroden, Fülldrahtelektroden und Draht-Pulver-Kombinationen zum Unterpulverschweißen von unlegierten Stählen und Feinkornstählen - Einteilung (ISO 14171:2016)

This European Standard was approved by CEN on 5 May 2016.

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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-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN ISO 14171:2016) has been prepared by Technical Committee ISO/TC 44 “Welding and allied processes” in collaboration with Technical Committee CEN/TC 121 “Welding and allied processes” 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 January 2017, and conflicting national standards shall be withdrawn at the latest by January 2017.

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.

This document supersedes EN ISO 14171:2010.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 14171:2016 has been approved by CEN as EN ISO 14171:2016 without any modification.

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 are to 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 is intended to 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 the 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 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) Paragraphs 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 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 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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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*. Amended by ISO 15792-1:2000/Amd 1:2011

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*. Corrected by ISO 80000-1:2009/Cor 1:2011

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).

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

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).

3) The third part gives a symbol indicating the impact properties of all-weld metal or welded joint in the same condition as specified for the tensile strength (see Table 3). The letter "U" after this designator indicates that the deposit meets an average optional requirement of 47 J at the designated Charpy test temperature.

4) The fourth part gives a symbol indicating the type of flux used in accordance with ISO 14174 (see 4.4).

5) The fifth part gives a symbol indicating the chemical composition of the solid wire electrode used (see Table 4A) or the chemical composition of the all-weld metal obtained with a tubular cored electrode/flux combination (see Table 5A).

6) The sixth part gives an optional symbol indicating the diffusible hydrogen content of the weld metal obtained in accordance with ISO 3690 (see Table 6).

4) The fourth part gives a symbol indicating the type of flux used in accordance with ISO 14174 (see 4.4).

5) The fifth part gives a symbol indicating the chemical composition of the solid wire electrode used (see Table 4B) or the chemical composition of the all-weld metal obtained with a tubular cored electrode/flux combination (see Table 5B).

6) The sixth part gives an optional symbol indicating the diffusible hydrogen content of the weld metal obtained in accordance with ISO 3690 (see Table 6).

4 Symbols and requirements

4.1 Symbol for the process

The symbol for an electrode/flux combination used in the submerged arc welding process shall be the letter S at the beginning of the designation.

4.2 Symbol for tensile properties

4.2.1 Multi-run technique

4.2.1A Classification by yield strength and 47 J impact energy

For products suitable for multi-run welding, the symbols in Table 1A indicate yield strength, tensile strength and elongation of the all-weld metal in the as-welded condition determined in accordance with 5.1A.

4.2.1B Classification by tensile strength and 27 J impact energy

For products suitable for multi-run welding, the symbols in Table 1B indicate yield strength, tensile strength and elongation of the all-weld metal in the as-welded condition or in the post-weld heat-treated condition determined in accordance with 5.1B.