AS/NZS ISO 26304:2013
ISO 26304:2011

AS/NZS ISO 26304:2013

Australian/New Zealand Standard™

Welding consumables—Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels—Classification

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The following are represented on Committee WD-002:

Australian Chamber of Commerce and Industry
Bureau of Steel Manufacturers of Australia
Business New Zealand
New Zealand Heavy Engineering Research Association
Welding Technology Institute of Australia

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This Standard was issued in draft form for comment as DR AS/NZS ISO 26304.

Australian/New Zealand Standard™

Welding consumables—Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels—Classification

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee WD-002, Welding Consumables, to supersede (in part), AS 1858.2—1989, *Electrodes and fluxes for submerged-arc welding*, Part 2: *Low and intermediate alloy steels*.

The objective of this Standard is to specify requirements for manufacturers and users on the classification of solid wire electrodes, tubular cored electrodes, and electrode-flux combinations (the all-weld metal deposits) in the as-welded condition and in the post-weld heat-treated condition for submerged arc welding of high strength steels with a minimum yield strength greater than 500 MPa or a minimum tensile strength greater than 570 MPa.

This Standard is identical with, and has been reproduced from ISO 26304:2011, *Welding consumables—Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels—Classification*.

As this Standard is reproduced from an International Standard, the following applies:

(a) Its number appears on the cover and title page while the International Standard number appears only on the cover.

(b) In the source text 'this International Standard' should read 'this Australian/New Zealand Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian or Australian/New Zealand Standard*	
ISO 14174	Welding consumables—Fluxes for submerged arc welding and electroslag welding—Classification	AS/NZS ISO 14174	Welding consumables—Fluxes for submerged arc welding and electroslag welding—Classification
13916	Welding—Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature	AS ISO 13916	Welding—Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature

Only international references that have been adopted as Australian or Australian/New Zealand Standards have been listed.

The term 'informative' has been used in this Standard to define the application of the annex to which it applies. An 'informative' annex is only for information and guidance.

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INTRODUCTION

This International Standard recognizes that there are two somewhat different approaches in the global market to classifying a given wire electrode, tubular cored electrode, and 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. The classification in accordance with system A is mainly based on EN 14295[3]. The classification in accordance with system B is mainly based upon standards used around the Pacific Rim. Future revisions aim to merge the two approaches into a single classification system.

This International Standard provides a classification 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, elongation, and impact properties 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 metal yield strength does not necessarily ensure that the weld metal tensile strength matches that of the parent material. Thus, where the application requires matching tensile strength, selection of the consumable should be made by reference to column 3 of Table 1A or Table 1B, as appropriate.

Although combinations of electrodes and fluxes supplied by individual companies may have the same classification, the combination of an electrode with a flux from one manufacturer versus the flux from another manufacturer, both fluxes having the same classification, may not be interchangeable unless verified in accordance with this International Standard. Two tubular cored wires of the same classification may likewise produce different results with the same flux.

The mechanical properties of the 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, width of weave, welding position, and material composition.

AUSTRALIAN/NEW ZEALAND STANDARD

Welding consumables—Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels—Classification

1 Scope

This International Standard specifies requirements for classification of solid wire electrodes, tubular cored electrodes, and electrode-flux combinations (the all-weld metal deposits) in the as-welded condition and in the post-weld heat-treated condition for submerged arc welding of high strength steels with a minimum yield strength greater than 500 MPa or a minimum tensile strength greater than 570 MPa. One flux can be tested and classified with different electrodes. One electrode can be tested and classified with different fluxes. The solid wire electrode is also classified separately based on its chemical composition.

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

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

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

For comparison purposes, some tables include requirements for electrodes classified in accordance with both systems, placing individual electrodes from the two systems, which are similar in composition and properties, on adjacent lines in the particular table. In a particular line of the table that is mandatory in one system, the symbol for the similar electrode from the other system is indicated in parentheses. By appropriate restriction of the formulation of a particular electrode, it is often, but not always, possible to produce an electrode that can be classified in both systems, in which case the electrode, or its packaging, may be marked with the classification in either or both systems.

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*