

AS/NZS ISO 24598:2023
ISO 24598:2019



Australian/New Zealand Standard™

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



AS/NZS ISO 24598:2023

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee WD-002, Welding Consumables. It was approved on behalf of the Council of Standards Australia on 14 September 2023 and by the New Zealand Standards Approval Board on 06 September 2023.

This Standard was published on 20 October 2023.

The following are represented on Committee WD-002:

Australian Chamber of Commerce and Industry
Bureau of Steel Manufacturers of Australia
New Zealand Heavy Engineering Research Association
University of Auckland (New Zealand)
Weld Australia

This Standard was issued in draft form for comment as DR AS/NZS ISO 24598:2023.

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ISBN 978 1 76139 347 1

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Originated in Australia as part of AS 1858.2—1989.
Jointly revised in part and redesignated as AS/NZS ISO 24598:2013.
Second edition 2023.

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Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee WD-002, Welding Consumables, to supersede AS/NZS ISO 24598:2013.

The objective of this document is to specify requirements for classification of solid wire electrodes, tubular cored electrodes and electrode/flux combinations (all-weld metal deposits) for submerged arc welding of creep resisting and low-alloy elevated-temperature application steels. One electrode can be tested and classified with different fluxes. The solid wire electrode is also classified separately based on its chemical composition.

This document is a combined specification providing a classification system based on either:

- (a) the chemical composition of the solid wire electrode and all-weld metal deposit; or
- (b) the tensile strength of the all-weld metal deposit and the chemical composition of the solid wire electrode and all-weld metal deposit obtained with the electrode/flux combination.
 - (i) Clauses, subclauses and tables which carry the suffix letter “A” are applicable only to solid wire electrodes, tubular cored electrodes and all-weld metal deposits classified in accordance with the system based upon chemical composition.
 - (ii) Clauses, subclauses and tables which carry the suffix letter “B” are applicable only to solid wire electrodes, tubular cored electrodes and all-weld metal deposits classified in accordance with the system based upon the tensile strength of all-weld metal deposits and the chemical composition of solid wire electrodes and all-weld metal deposits.
 - (iii) 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 under this document.

This document is identical with, and has been reproduced from, ISO 24598:2019, *Welding consumables — Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of creep-resisting steels — Classification*.

As this document has been reproduced from an International document, a full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

Contents

Preface	ii
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Classification	2
4.1 General	2
5 Symbols and requirements	3
5.1 General	3
5.2 Symbol for the product/process	3
5.2.1 General	3
5.3 Symbols for the tensile properties of the all-weld metal deposit	4
5.4 Symbols for impact properties of all-weld metal deposits	4
5.5 Symbol for type of welding flux	6
5.6 Symbol for the chemical composition of solid wire electrodes and of all-weld metal deposits	6
6 Mechanical tests	9
6.1 General	9
6.2 Preheating, interpass and post-weld heat treatment temperatures	9
6.3 Welding conditions and pass sequence	11
6.3.1 General	11
7 Chemical analysis	14
8 Rounding procedure	14
9 Retests	14
10 Technical delivery conditions	15
11 Examples of designation	16
11.1 General	16
Bibliography	20

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes* Subcommittee SC 3, *Welding consumables*.

This third edition cancels and replaces the second edition (ISO 24598:2012), which has been technically revised. The main changes compared to the previous edition are as follows:

- US classifications have been added to [Table 3](#) and [Table 4](#);
- US classifications have been corrected;
- in [Table 3](#), footnote ^h has been revised;
- in [Table 4](#), footnote ^f has been revised;
- alloy symbols 2M3, 2M31, 3M3 and 4M32 have been removed from Table 5B;
- Tables 6A and 6B have been revised;
- Z-example has been added to [Clause 11](#).

Any feedback, question or request for official interpretation related to any aspect of this document should be directed to the Secretariat of ISO/TC 44/SC 3 via your national standards body. A complete listing of these bodies can be found at www.iso.org/members.html. Official interpretations, where they exist, are available from this page: <https://committee.iso.org/sites/tc44/home/interpretation.html>.

Introduction

This document recognizes that there are two somewhat different approaches in the global market to classifying a given wire electrode, tubular cored electrode or 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 document. The classification in accordance with system A was mainly based on EN 12070:1999. The classification in accordance with system B is mainly based upon standards used around the Pacific Rim.

This document provides a classification system for solid wire electrodes in terms of their chemical composition, solid wire electrodes and tubular cored electrodes in terms of the chemical composition of the deposit 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 metal. 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. 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 wire electrodes and fluxes supplied by individual companies can have the same classification, the individual wire electrodes and fluxes from different companies are not interchangeable unless verified in accordance with this document.

It should be noted that the mechanical properties of all-weld metal test pieces used to classify the wire electrodes vary from those obtained in production joints because of differences in welding procedure, such as electrode size, welding position and material composition.

NOTES

Australian/New Zealand Standard

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1 Scope

This document specifies requirements for classification of solid wire electrodes, tubular cored electrodes and electrode/flux combinations (all-weld metal deposits) for submerged arc welding of creep resisting and low-alloy elevated-temperature application steels. One electrode can be tested and classified with different fluxes. The solid wire electrode is also classified separately based on its chemical composition.

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 - b) Clauses, subclauses and tables which carry the suffix letter “B” are applicable only to solid wire electrodes, tubular cored electrodes and all-weld metal deposits classified in accordance with the system based upon the tensile strength of all-weld metal deposits and the chemical composition of solid wire electrodes and all-weld metal deposits.
 - 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 under this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 6847, *Welding consumables — Deposition of a weld metal pad for chemical analysis*

ISO 13916, *Welding — 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, *Welding consumables — Test methods — Part 1: Test methods for all-weld metal test specimens in steel, nickel and nickel alloys*

ISO 80000-1:2009, *Quantities and units — Part 1: General*. Corrected by ISO 80000-1:2009/Cor 1:2011