Irish Standard
I.S. EN ISO 24598:2019

Welding consumables - Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of creep-resisting steels - Classification (ISO 24598:2019)

I.S. EN ISO 24598:2019

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:	*Published:*
EN ISO 24598:2019	2019-05-15

This document was published under the authority of the NSAI and comes into effect on:	ICS number:
2019-06-02	25.160.20
	NOTE: If blank see CEN/CENELEC cover page

NSAI	T +353 1 807 3800	Sales:
1 Swift Square,	F +353 1 807 3838	T +353 1 857 6730
Northwood, Santry	E standards@nsai.ie	F +353 1 857 6729
Dublin 9	W NSAI.ie	W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN ISO 24598:2019 is the adopted Irish version of the European Document EN ISO 24598:2019, Welding consumables - Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of creep-resisting steels - Classification (ISO 24598:2019)

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This page is intentionally left blank

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 24598

May 2019

ICS 25.160.20

Supersedes EN ISO 24598:2012

English Version

Welding consumables - Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of creep-resisting steels - Classification (ISO 24598:2019)

Produits consommables pour le soudage - Fils-électrodes pleins, fils-électrodes fourrés et couples électrodes-flux pour le soudage à l'arc sous flux des aciers résistant au fluage - Classification (ISO 24598:2019)

Schweißzusätze - Drahtelektroden, Fülldrahtelektroden und Draht-Pulver-Kombinationen für das Unterpulverschweißen von warmfesten Stählen - Einteilung (ISO 24598:2019)

This European Standard was approved by CEN on 10 May 2019.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword

This document (EN ISO 24598:2019) 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 November 2019, and conflicting national standards shall be withdrawn at the latest by November 2019.

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

This document supersedes EN ISO 24598:2012.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 24598:2019 has been approved by CEN as EN ISO 24598:2019 without any modification.

This page is intentionally left blank

I.S. EN ISO 24598:2019

INTERNATIONAL STANDARD

ISO 24598

Third edition
2019-04

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

Produits consommables pour le soudage — Fils-électrodes pleins, fils-électrodes fourrés et couples électrodes-flux pour le soudage à l'arc sous flux des aciers résistant au fluage — Classification

Reference number
ISO 24598:2019(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

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.

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

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.

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

— the chemical composition of the solid wire electrode and all-weld metal deposit; or

— 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.

a) 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.

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*