

## **भारतीय मानक ब्यूरो**

**DRAFT FOR WIDE CIRCULATION**

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*भारतीय मानक मसौदा*

### **वेल्डिंग उपभोग्य — ठोस तार इलेक्ट्रोड, ट्यूबलर कोर्ड इलेक्ट्रोड और इलेक्ट्रोड- फ्लक्स संयोजन उच्च सामर्थ्य स्टील्स की जलमग्न आर्क वेल्डिंग के लिए — वर्गीकरण**

*Draft Indian Standard*

### **Welding Consumables — Solid Wire Electrodes, Tubular Cored Electrodes and Electrode-Flux Combinations for Submerged Arc Welding of High Strength Steels — Classification**

ICS 25.160.20

Welding General and its Applications  
Sectional Committee, MTD 11

Last date of comment:  
05/01/2024

#### **NATIONAL FOREWORD**

This draft standard is identical to ISO 26304 : 2017 'Welding consumables — Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels — Classification' issued by the International Organization for Standardization (ISO), and subject to its finalization, is to be adopted by the Bureau of Indian Standards on the recommendation of the Welding General and its Applications Sectional Committee and approval of the Metallurgical Engineering Division Council.

The committee decided to adopt ISO 26304 : 2017 standard under dual numbering system.

The text of ISO standard has been approved as suitable for publication as an Indian Standard without deviations. Certain terminologies and conventions are, however, not identical with those used in Indian Standard. Attention is especially drawn to the following:

- Wherever the words 'International Standard' appear referring to this standard, it should be read as 'Indian Standard'.
- Comma (,) has been used as a decimal marker, while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exists. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the edition indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 544 : 2017 Welding consumables — Technical delivery conditions for filler materials and fluxes — Type of product, dimensions, tolerances and markings	Doc : MTD/11/22952 Welding consumables — Technical delivery conditions for filler materials and fluxes — Type of product, dimensions, tolerances and markings	Identical
ISO 3690 : 2018 Welding and allied processes — Determination of hydrogen content in arc weld metal	Doc : MTD/11/23214 Welding and allied processes — Determination of hydrogen content in arc weld metal (First Revision)	Identical
ISO 6847 : 2020 Welding consumables — Deposition of a weld metal pad for chemical analysis	Doc : MTD/11/22954 Welding consumables — Deposition of a weld metal pad for chemical analysis	Identical
ISO 14344 : 2010 Welding consumables — Procurement of filler materials and fluxes	Doc : MTD/11/22964 Welding consumables — Procurement of filler materials and fluxes	Identical
ISO 15792 - 1 : 2020 Welding consumables — Test methods — Part 1: Preparation of all-weld metal test pieces and specimens in steel, nickel and nickel alloys	Doc : MTD/11/22966 Welding consumables — Test methods — Part 1: Preparation of all-weld metal test pieces and specimens in steel, nickel and nickel alloys	Identical
ISO 80000 - 1 : 2022 Quantities and units — Part 1 : General	IS / ISO 80000 - 1 : 2022 Quantities and units Part 1 General (First Revision)	Identical

The technical committee responsible for the preparation of this standard has reviewed the provisions of following International Standards referred in these adopted standards and decided their acceptability for use in conjunction with this standard.

<i>International Standard</i>	<i>Title</i>
ISO 13916 : 2017	Welding — Measurement of preheating temperature, interpass temperature and preheat maintenance temperature
ISO 14174 : 2019	Welding consumables — Fluxes for submerged arc welding and electroslag welding — Classification

This standard also makes a reference to the BIS Certification Marking of the product, details of which are given in National Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical-values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

The scope of the standard is as follows:

## **SCOPE**

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

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, can be marked with the classification in either or both systems.

**The complete document/text of ISO 26304 : 2017 ‘Welding consumables — Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels — Classification’ may be made available, on request to:**

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**National Annex A**  
*(National Foreword)*

**A-1 BIS CERTIFICATION MARKING**

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the standard mark.