भारतीय मानक

Indian Standard

IS 18734 : 2024
ISO 6847 : 2020

वेल्डिंग उपभोग्य — रासायनिक विश्लेषण के लिए वेल्ड धातु पैड का निक्षेपण

Welding Consumables — Deposition of a Weld Metal Pad for Chemical Analysis

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

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Welding General and its Applications Sectional Committee, MTD 11

NATIONAL FOREWORD

This Indian Standard which is identical to ISO 6847 : 2020 'Welding consumables — Deposition of a weld metal pad for chemical analysis' issued by the International Organization for Standardization (ISO), was 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 6847 : 2020 standard under dual numbering system.

This document outlines the procedure for depositing a weld metal pad for chemical analysis. It applies to various welding methods and consumables, including covered electrodes, wire electrodes, tubular cored electrodes, solid rods, tubular cored rods, wire-flux combinations, and strip-flux combinations. It also encompasses a wide range of materials, including non-alloy and fine grain steels, high strength steels, creep-resisting steels, stainless and heat-resisting steels, nickel and nickel alloys, as well as copper and copper alloys.

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:

a) Wherever the words 'International Standard' appear referring to this standard, it should be read as 'Indian Standard'; and

b) 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:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 6947 Welding and allied processes — Welding positions	IS 18646 : 2024/ISO 6947 : 2019 Welding and allied processes — Welding positions	Identical
ISO 14175 Welding consumables — Gases and gas mixtures for fusion welding and allied processes	MTD/11/22962 Welding consumables — Gases and gas mixtures for fusion welding and allied processes	Identical

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.

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Introduction

The first edition of this document, ISO 6847:1985, addressed only the deposition of a weld metal pad for chemical analysis using covered electrodes for manual arc welding. This pad preparation was expensive to execute. IIW Commission II conducted testing of several methods of weld pad preparation that were less costly to execute than that of ISO 6847:1985 and yet produced equivalent results. Further, these methods were applicable to solid wires for gas shielded welding, to tubular cored wires for arc welding with or without gas shielding, and to wires and fluxes for submerged arc welding, as well as being applicable to covered electrodes. Accordingly, subsequent revisions (ISO 6847:2000 and ISO 6847:2013) simplified weld pad preparation and broadened the range of welding processes and filler metals. This document adds the use of strip with the submerged arc welding and electroslag welding processes.

Indian Standard

WELDING CONSUMABLES — DEPOSITION OF A WELD METAL PAD FOR CHEMICAL ANALYSIS

1 Scope

This document specifies the procedure to be used for deposition of a weld metal pad for chemical analysis.

This document applies to deposition of a weld metal pad by use of covered electrodes, wire electrodes for gas shielded metal arc welding, tubular cored electrodes for gas shielded metal arc welding and for non-gas shielded metal arc welding, solid rods and tubular cored rods for gas tungsten arc welding, and wire-flux and strip-flux combinations for submerged arc welding or electroslag welding and cladding.

This document is applicable to welding consumables for non-alloy and fine grain steels, high strength steels, creep-resisting steels, stainless and heat-resisting steels, nickel and nickel alloys, and copper and copper alloys.

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 6947, *Welding and allied processes — Welding positions*

ISO 14175, *Welding consumables — Gases and gas mixtures for fusion welding and allied processes*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
alloying flux
flux designed to modify the chemical composition of the weld using metals other than, or in addition to, manganese and silicon

4 Base metal

4.1 Type

The base metal (except for cladding) shall have a composition similar to that of the deposited metal or be a weldable carbon manganese structural steel with a carbon content of less than 0,2 %.

The base metal for cladding combinations shall be a weldable carbon manganese structural steel with a carbon content of less than 0,15 %, and with each of the following elements present at less than 0,10 % by weight: Cr, Mo, Nb, Ni.

4.2 Dimensions

The minimum dimensions of the base metal are given in Table 1.

4.3 Surface condition

The surface of the base metal on to which the weld metal is to be deposited shall be cleaned by grinding or other means in order to remove any rust, scale, grease, or paint.

Table 1 — Minimum dimensions of the base metal

Dimensions in millimetres

Welding consumables	Size of welding consumables	Plate size[a]	
		Length	Thickness
Covered electrodes; solid rods and tubular cored rods for gas tungsten arc welding	≥1,6 but ≤4 >4 but ≤8	55 65	10
Wire electrodes for gas shielded arc welding	≥0,6 but ≤2,5	100	10
Tubular cored electrodes for gas shielded or non-gas shielded arc welding	≥0,6 but ≤4	100	10
Wire-flux combinations for submerged arc welding	≥1,2 but ≤4 >4 but ≤6,4	200 300	15
Cladding (both strip-flux and wire-flux for submerged arc and electroslag processes)	wire ≥2,4 strip width ≥15	300	25

[a] Plate width should be appropriate for the pass sequence method chosen (see Figure 1).

5 Method for preparing the weld metal pad

5.1 Drying of the welding consumables

Drying of the welding consumables (covered electrodes, fluxes for submerged arc welding or electroslag welding) shall be performed using conditions indicated by the manufacturer. Tubular cored electrodes on metal supports may be dried in accordance with the manufacturer's recommendations.

5.2 Welding position

The weld metal pad shall be welded in the flat position (PA position) in accordance with ISO 6947.

5.3 Type of current

The weld metal shall be deposited using the type of current (and, if appropriate, the polarity) indicated by the manufacturer. However, if both DC operation and AC operation are claimed, then the test shall be performed using AC.

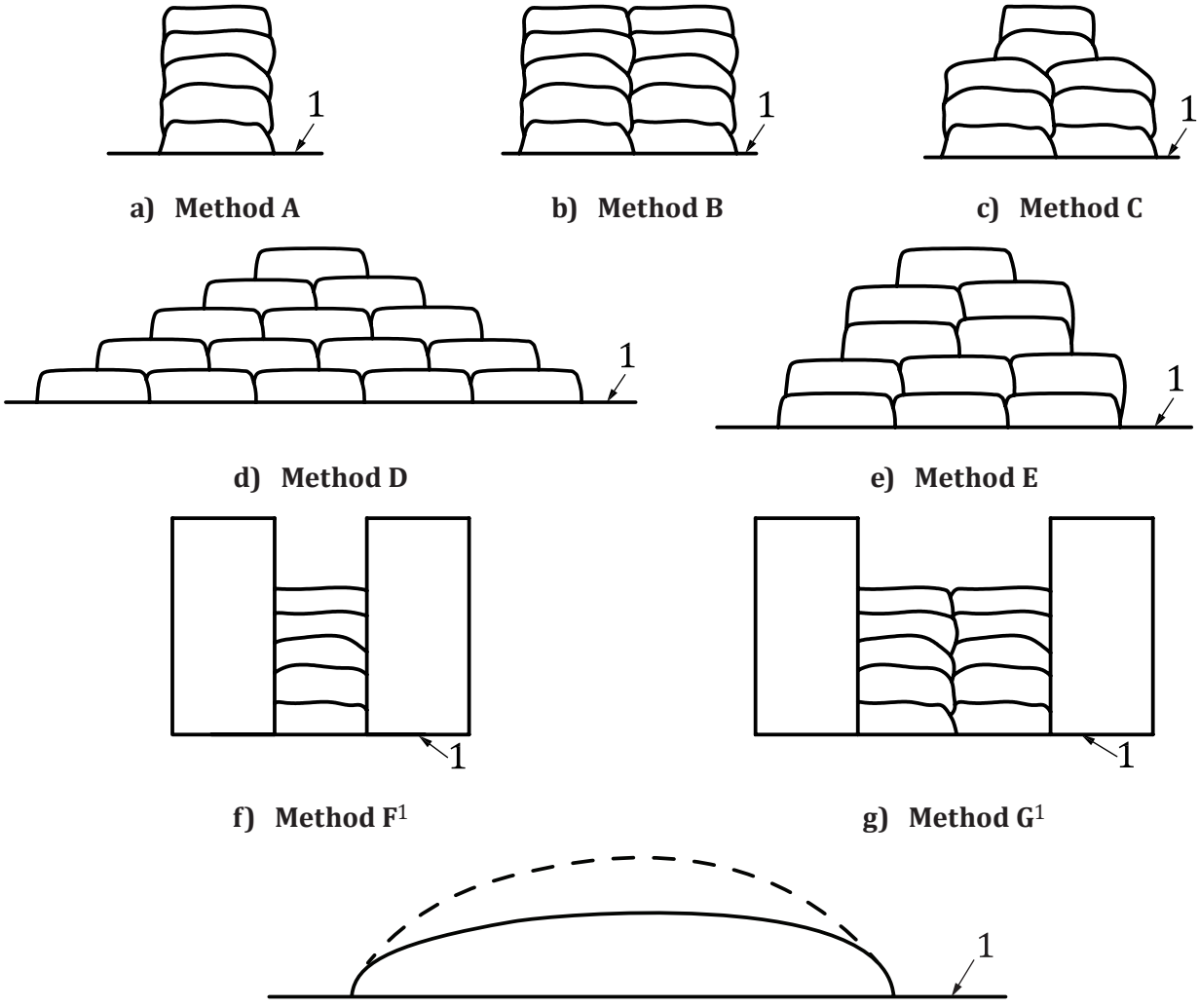
5.4 Welding conditions

The welding conditions used, such as current, voltage, welding speed, etc., shall be in accordance with the limits specified in the relevant standard. If the welding conditions are not specified in the relevant standard, each pass shall be welded with a welding current of 70 % to 90 % of the maximum current indicated by the manufacturer. The welding conditions used to produce the weld metal pad shall be reported.

5.5 Welding method

5.5.1 General

Various methods for building up a weld metal pad have been shown to be acceptable and the weld metal pad shall be prepared using one of the methods shown in Figure 1. After the welding of each pass, the test piece may be cooled in water for about 30 s, then dried sufficiently before proceeding with the next pass. The slag shall be removed from each pass. The welding shall be performed by alternating the direction of welding for each layer.



a) Method A

b) Method B

c) Method C

d) Method D

e) Method E

f) Method F[1]

g) Method G[1]

h) Method H[2]

Key

1 base metal

NOTE 1 The blocks on both sides of the weld deposits of methods F and G are copper.

NOTE 2 Method H is intended for use with consumables for cladding applications.

Figure 1 — Examples of pass sequence

5.5.2 Covered electrodes

The arc length shall be maintained as short as possible such that the arc remains stable. The maximum weave width shall be 2,5 times the diameter of the electrode core.

5.5.3 Solid wires and rods, strips, and tubular cored wires and rods

The number and size of the beads will vary according to the size of the electrodes (or rods) and the width of the weave as well as the amperage employed. The electrode extension shall be as indicated by the manufacturer ±3 mm. The weld metal pad shall be deposited using the type of shielding gas indicated by the manufacturer; otherwise, the type of shielding gas used shall be selected from those specified in ISO 14175. In the case of submerged arc welding and strip cladding (by submerged arc or electroslag welding), the appropriate flux shall be used.

6 Weld metal pad size

The minimum dimensions of the weld metal pad shall be as given in Table 2.

7 Sampling

The surface oxide on the sampling portion of the specimen for chemical analysis shall be removed by machining or grinding. When taking chips by a milling, a shaping, or a drilling machine, the use of cutting fluid shall be avoided. The specimen for chemical analysis shall be taken from the weld metal of the fifth layer or higher, except in the case of cladding applications per Method H in Figure 1. The specimen shall not include the start or the crater.

Table 2 — Minimum dimensions of the weld metal pad

Welding consumables	Size of welding consumables	Sampling portion		Minimum number of weld layers
		Width	Length	
	mm	mm	mm	
Covered electrodes; solid rods and tubular cored rods for gas tungsten arc welding	≥1,6 but ≤2,6 >2,6 but ≤5 >5 but ≤8	12 12 12	30 40 55	5 5 5
Wire electrodes for gas shielded arc welding	≥0,6 but ≤2,5	12	80	5
Tubular cored electrodes for gas shielded or non-gas shielded arc welding	≥0,6 but ≤4	12	80	5
Wire-flux combinations for submerged arc welding	≥1,2 but ≤6,4	12	150	5
Cladding (both strip-flux and wire-flux for submerged arc and electroslag processes)	wire ≥2,4 strip width ≥15	12	150	1 (for alloying fluxes) 2 (for non-alloying fluxes)