

वेल्डिंग उपभोग्य — परीक्षण पद्धतियाँ  
भाग 3 फ़िलेट वेल्ड में वेल्डिंग उपभोग्य सामग्रियों  
की स्थितिगत धारिता और मूल भेदन का वर्गीकरण  
परीक्षण

**Welding Consumables — Methods of  
Test**

**Part 3 Classification Testing of Positional  
Capacity and Root Penetration of  
Welding Consumables in a Fillet Weld**

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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](http://www.bis.gov.in) [www.standardsbis.in](http://www.standardsbis.in)

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## NATIONAL FOREWORD

This Indian Standard (Part 3) which is identical to ISO 15792-3 : 2011 'Welding consumables — Test methods — Part 3: Classification testing of positional capacity and root penetration of welding consumables in a fillet weld' 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.

This part of ISO 15792 specifies the preparation and assessment of fillet weld test pieces.

The Committee decided to adopt ISO 15792-3 : 2011 standard under dual numbering system.

This Indian Standard is published in three parts. The other parts in this series are:

- Part 1 Preparation of all-weld metal test pieces and specimens in steel, nickel and nickel alloys
- Part 2 Preparation of single-run and two-run technique test pieces and specimens in steel

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'.
- 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:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 6947 Welding and allied processes — Welding positions	IS 18646 : 2024 Welding and allied processes — Welding positions	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.

## Introduction

This part of ISO 15792 specifies the preparation and assessment of fillet weld test pieces.

The test conditions specified and results required should not be considered to be requirements or expectations for a procedure qualification.



*Indian Standard*

## WELDING CONSUMABLES — METHODS OF TEST

### **PART 3 CLASSIFICATION TESTING OF POSITIONAL CAPACITY AND ROOT PENETRATION OF WELDING CONSUMABLES IN A FILLET WELD**

#### **1 Scope**

This part of ISO 15792 specifies the preparation and assessment of fillet weld test pieces for conformity assessment of positional usability and root penetration requirements for consumables classification standards for welding non-alloy and fine grain steels, low alloy steels, stainless steels, and nickel base alloys.

This part of ISO 15792 does not specify acceptance requirements.

#### **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 6947, *Welding and allied processes — Welding positions*

#### **3 General requirements**

Samples of welding consumables (electrodes or wires) to be tested shall be representative of the manufacturer's products being classified. Test pieces shall be prepared and tested as specified in Clauses 5 and 6, as well as in the classification standard. The test results shall fulfil the requirements of the classification standard.

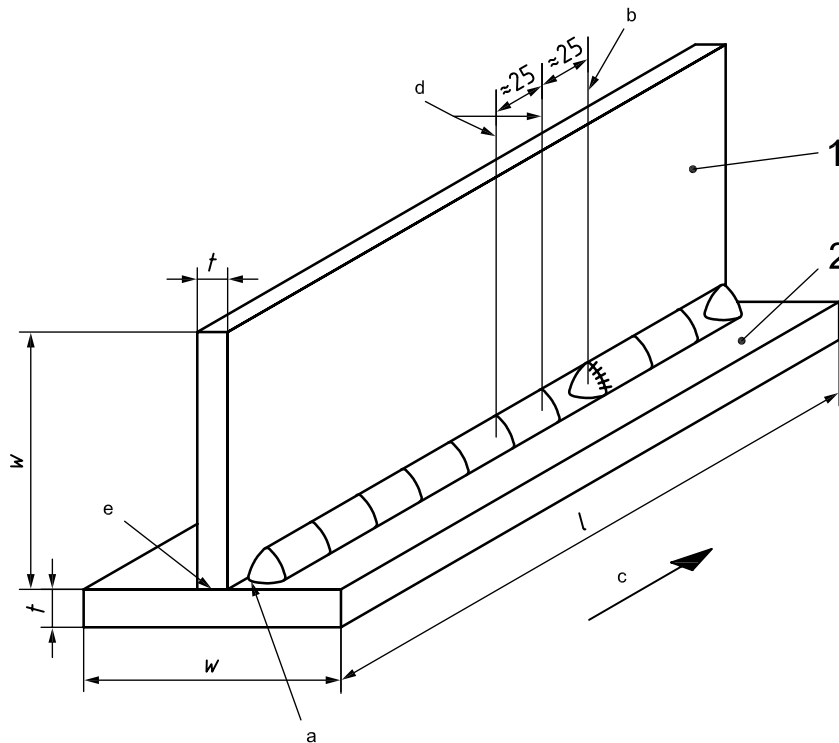
#### **4 Test plate material**

The plate material shall be selected from the range of materials and material thicknesses specified in the classification standard. The surfaces to be welded shall be free of scale, rust, and other contaminants.

#### **5 Preparation of the test piece**

**5.1** Before assembly, the web piece of the assembly shall have one edge of the web flat and square throughout its length so that, when the web is set on the flange, which shall be straight and smooth, there will be intimate contact along the entire length of the joint. The web and flange shall be assembled as shown in Figure 1. Both ends of the joint shall be secured by tack welds to maintain intimate contact along the length of the joint and to maintain the 90° angle between the web and flange. The web and flange dimensions shall be in accordance with those given in the electrode classification standard.

Dimensions in millimetres



**Key**

- 1 web
- 2 flange

If not specified in the classification standard, the following values can be used:

$t$ : 10 mm to 12 mm;

$w$ :  $\geq 75$  mm;

$l$ :  $\geq 300$  mm.

- a Start.
- b End of deposit made with first electrode.
- c Direction of welding.
- d Cut here for macrosection.
- e Flange to be straight and in intimate contact with the flat square edge of web member along entire length.

**Figure 1 — Preparation of fillet weld test piece**

**5.2** The position of welding and conditions of welding shall be as prescribed in the relevant standard for the classification and size of consumable under test, and as defined in ISO 6947. A single pass fillet weld shall be deposited on one side of the joint for approximately the full length of the test piece. The minimum temperature of the assembly shall be 5 °C. For covered electrodes, at least one electrode (and as many more as the weld permits) shall be continuously consumed to within the permissible stub length of 50 mm. For electrodes longer than 450 mm, designed specifically for use in gravity welding, the fillet weld may be made either manually or with a device designed specifically for gravity welding. For wire electrodes, tubular cored electrodes and wires, welding shall be continuous from start to finish of the fillet weld.

**5.3** The fillet shall be deposited using welding speeds compatible with the consumable classification and tested to provide the fillet weld size required by the electrode classification standard.

**5.4** If welding of the second side of the test piece is required by the consumable classification standard, the test piece shall be cooled to room temperature by any convenient means, before starting to weld the second side of the joint.

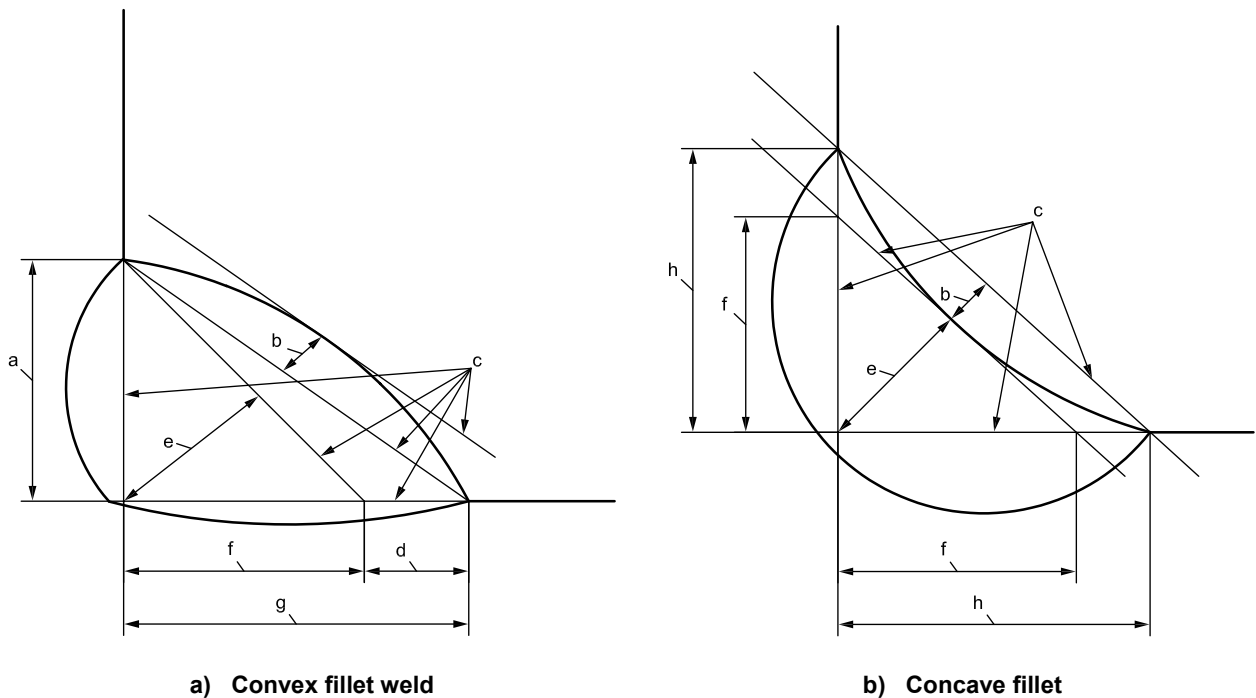
If water is used as the coolant, care shall be taken that all water has been thoroughly removed from the joint before beginning welding on the second side.

## 6 Examination of the test piece

**6.1** Throat thickness and leg length shall be measured at a minimum of three points along the length of the weld using an appropriate gauge to demonstrate conformity with the requirements of the classification standard. For covered electrodes, where two or more electrodes are used, a macrosection, approximately 25 mm wide, shall be removed from a point approximately 25 mm back from the crater end of the deposit made with the first electrode. For continuous consumables and covered electrodes where only one electrode is used, a macrosection, approximately 25 mm wide, shall be removed from approximately the midpoint of the weld length.

**6.2** One surface of the macrosection shall be polished, etched, and scribed as shown in Figure 2. The throat, convexity or concavity, and leg lengths of the fillet weld shall be determined to the nearest 0,5 mm by actual measurement of the polished and etched macrosection.

If fillet welds are required by the consumable classification standard on both sides of the test piece, then both fillet welds shall be measured on the same macrosection.



Size of fillet weld — leg length of largest inscribed isosceles right angle. Fillet weld size, convexity and leg lengths shall be determined by actual measurement (to nearest 0,5 mm) on a section laid out with scribe lines as shown.

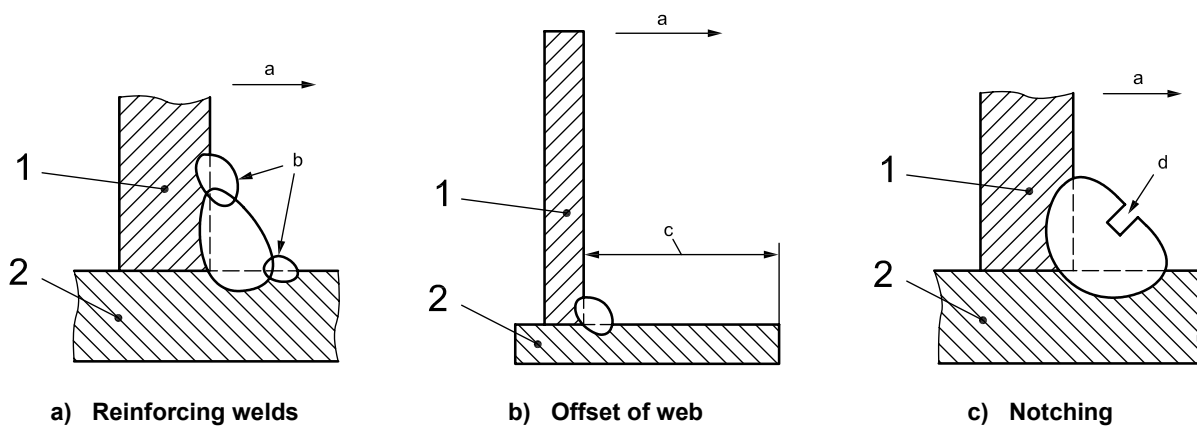
- |   |                                |   |                                     |
|---|--------------------------------|---|-------------------------------------|
| a | Leg length = fillet weld size. | e | Theoretical throat.                 |
| b | Convexity or concavity.        | f | Fillet weld size.                   |
| c | Scribe lines.                  | g | Leg length $\neq$ fillet weld size. |
| d | Difference in leg length.      | h | Leg of fillet.                      |

**Figure 2 — Dimensions of fillet welds**

**6.3** For fillet weld test pieces welded from one side only, when required by the consumable classification standard, the remaining two joint sections shall be broken longitudinally through the fillet weld by a force exerted in the direction shown in Figure 3. If, during bending, the weld pulls out of the test plate, it shall be considered as a no test, and the test shall be repeated without penalty.

**6.4** If necessary to facilitate fracture through the throat of the fillet weld, one or more of the following procedures may be used:

- a) reinforcing welds, as shown in Figure 3 a), may be added to each leg of the weld;
- b) the position of the web on the flange may be changed as shown in Figure 3 b);
- c) the face of the weld may be notched as shown in Figure 3 c);
- d) the test piece may be cooled down below 0 °C.



**Key**

- 1 web
- 2 flange

- a Fracturing force.
- b Reinforcing welds.
- c 3/4 width of flange.
- d Maximum depth of notch = 1/2 actual throat.

**Figure 3 — Alternative methods for facilitating fillet weld fracture**

## 7 Test report

The test report shall include all of the following items which are applicable:

- a) welding consumable(s) and test assembly:
  - the classification standard to which the consumable(s) is (are) being tested,
  - base metal from which the test piece is made,
  - the trade name(s) and intended classification(s) of the consumable(s) being tested,
  - heat or lot number(s) of the consumable(s) being tested,
  - redrying conditions for the consumable(s);



b) welding conditions:

- welding process,
- power source,
- electrode diameter,
- electrode polarity,
- welding current,
- wire feed speed,
- arc voltage,
- travel speed,
- contact-tip-to-work distance,
- type and flow rate of shielding gas,
- preheat and interpass temperature,
- position of welding;

c) any deviations from this part of ISO 15792;

d) test results:

- visual examination,
- fillet leg lengths and difference(s) in leg lengths,
- convexity or concavity of the fillet,
- theoretical throat of the fillet,
- dimension(s) of any lack of root penetration along the length of fillet weld,
- any defects on the fracture surface.





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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-[www.bis.gov.in](http://www.bis.gov.in) or [www.standardsbis.in](http://www.standardsbis.in).

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### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

## BUREAU OF INDIAN STANDARDS

### Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

Website: [www.bis.gov.in](http://www.bis.gov.in)

### Regional Offices:

Central : 601/A, Konnectus Tower -1, 6<sup>th</sup> Floor,  
DMRC Building, Bhavbhuti Marg, New  
Delhi 110002

Telephones

{ 2323 7617

Eastern : 8<sup>th</sup> Floor, Plot No 7/7 & 7/8, CP Block, Sector V,  
Salt Lake, Kolkata, West Bengal 700091

{ 2367 0012  
2320 9474

Northern : Plot No. 4-A, Sector 27-B, Madhya Marg,  
Chandigarh 160019

{ 265 9930

Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113

{ 2254 1442  
2254 1216

Western : Manakalya, 4<sup>th</sup> Floor, NTH Complex (W Sector), F-10, MIDC, Andheri  
(East), Mumbai 400093

{ 283 25838

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