

वेल्डिंग उपभोग्य — परीक्षण पद्धतियाँ
भाग 1 इस्पात, निकल और निकल मिश्रधातु में
सभी-वेल्ड धातु परीक्षण के टुकड़े और नमूने तैयार
करना

Welding Consumables — Methods of Test

Part 1 Preparation of All-Weld Metal Test Pieces and Specimens in Steel, Nickel and Nickel Alloys

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NATIONAL FOREWORD

This Indian Standard (Part 1) which is identical to 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' 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 test pieces and specimens are used to determine the mechanical properties of all-weld metal, and this standard specifies the preparation of test pieces and specimens for all-weld metal tests in steel, nickel and nickel alloys.

The Committee decided to adopt ISO 15792-1 : 2020 standard under dual numbering system.

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

- Part 2 Preparation of single-run and two-run technique test pieces and specimens in steel
- Part 3 Classification testing of positional capacity and root penetration of welding consumables in a fillet weld

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 exist. The corresponding Indian Standards which are to be substituted in their place is given 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 5178 Destructive tests on welds in metallic materials — Longitudinal tensile test on weld metal in fusion welded joints	IS 3600 (Part 4) : 2024/ISO 5178 : 2019 Fusion welded joints and weld metal in steel — Method of test: Part 4 Destructive tests on welds in metallic materials — Longitudinal tensile test on weld metal in fusion welded joints (<i>third revision</i>)	Identical

The 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 9016 : 2012	Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination

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Introduction

It should be noted that the mechanical properties of all-weld metal test specimens used to classify welding consumables can vary from those obtained in production joints because of differences in welding procedure such as electrode diameter, width of weave, welding position and material composition.

Indian Standard

WELDING CONSUMABLES — METHODS OF TEST

**PART 1 PREPARATION OF ALL-WELD METAL TEST PIECES
AND SPECIMENS IN STEEL, NICKEL AND NICKEL ALLOYS**

1 Scope

This document specifies the preparation of test pieces and specimens for all-weld metal tests in steel, nickel and nickel alloys.

The test pieces and specimens are used to determine the mechanical properties of all-weld metal where required by consumable classification standards or for other purposes, in arc welding of steel, nickel and nickel alloys.

This document is not applicable to single- or two-run welding or fillet welding. For these cases, ISO 15792-2 and ISO 15792-3 apply.

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 5178, *Destructive tests on welds in metallic materials — Longitudinal tensile test on weld metal in fusion welded joints*

ISO 9016:2012, *Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination*

3 Terms and definitions

No terms and definitions are listed in this document.

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/>

4 General requirements

Welding consumables to be tested shall be representative of the manufacturer's products to be classified or tested. Test pieces shall be prepared as described below.

5 Test plate material

The material to be used for the test piece shall be compatible with the weld metal provided by the welding consumable tested. Alternatively, the groove edges and the backing strip shall be built up with at least two layers using the welding consumable being tested.

6 Preparation of test piece

The test piece shall be prepared in the form of a single V-groove on a backing strip. The backing strip shall be tack welded to the test piece on the reverse side (see [Figure 1](#) and [Table 1](#)).

The plates of the test piece shall be pre-set or restrained in such a way that a sufficiently flat test piece is produced for extraction of specimens. The welded test piece shall not be straightened.

The type of test piece defines the dimensions, see [Table 1](#). The type selected for classification purpose is specified in the relevant consumable standard.

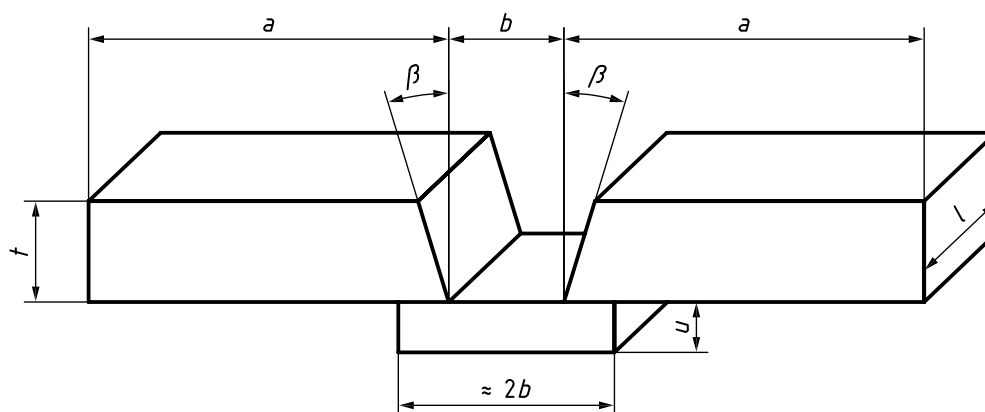


Figure 1 — Test piece dimensions

Table 1 — Type and dimensions of the test piece

Dimensions in millimetres

Type	t	a	b	u	β degree	l
1.0	12	≥ 80	10			
1.1	12	≥ 90	12			
1.2	16	≥ 100	14			
1.3	20	≥ 125	16			
1.4	25	≥ 125	20	≥ 6	$10^{+2,5}_{-0}$	≥ 150
1.5	30	≥ 200	25			
1.6	20	≥ 150	20			
1.7	25	≥ 150	24			

7 Welding conditions

The test piece shall be welded in the flat position except for consumables which are designed exclusively for welding in another position, in which case that position shall be used for welding. Welding shall be started after applying any preheating requirements given in the consumable classification standard being used. The interpass temperature shall also be in accordance with the consumable classification standard.

The preheat and interpass temperatures shall be measured using temperature indicator crayons, surface thermometers or thermocouples, for example in accordance with ISO 13916.

The welding conditions used, such as current, voltage, travel speed, weld run sequence, weld bead size, shall be in accordance with the limits specified in the consumable classification standard being used.

8 Heat treatment

All heat treatments required for the weld metal, except hydrogen removal treatment, shall be carried out on the test piece, or on sections thereof with a machining allowance.

Heat treatments shall be as specified in the welding consumable classification standard being used.

Hydrogen removal treatment may be carried out on the test piece for tensile testing before or after final machining. The test piece may be held at a temperature not exceeding 250 °C for up to 16 h.

9 Position of test specimens and test specimen dimensions

Figures 2 and 3 respectively show the position of the tensile test specimen and of the notched impact specimens. The test pieces shall be divided by cutting (machining) or by thermal cutting. In the case of thermal cutting, machining allowances of 10 mm at least on either side shall be provided for the subsequent machining of the specimens.

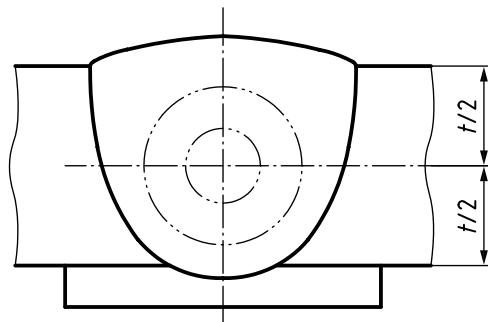


Figure 2 — Position of the tensile specimen in the test piece

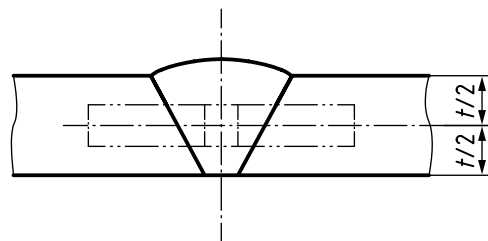


Figure 3 — Position of the notched bar impact specimen in the test pieces

The tensile test specimens shall be in accordance with ISO 5178. Apart from type 1.0 and 1.1 test pieces, for which the diameter shall be 8 mm, the specimens shall have a diameter of 10 mm in the gauge length.

The impact specimens shall be in accordance with the designation VWT 0/b in ISO 9016:2012. The position of the impact specimen shall be at the midline of the plate thickness.

The size of impact specimens shall be 10 mm × 10 mm.

Bibliography

- [1] ISO 13916, *Welding — Measurement of preheating temperature, interpass temperature and preheat maintenance temperature*

[\(Continued from second cover\)](#)

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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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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