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**Welding consumables — Test methods —**  
**Part 2:**  
**Preparation of single-run and two-run**  
**technique test specimens in steel**

*Produits consommables pour le soudage — Méthodes d'essai —*  
*Partie 2 : Préparation d'éprouvettes en une ou deux passes en acier*



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## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 15792 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 15792-2 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 3, *Welding consumables*.

ISO 15792 consists of the following parts, under the general title *Welding consumables — Test methods*:

- *Part 1: Test methods for all-weld metal test specimens in steel, nickel and nickel alloys*
- *Part 2: Preparation of single-run and two-run technique test specimens in steel*
- *Part 3: Classification testing of positional capacity and root penetration of welding consumables in a fillet weld*

## Introduction

Consumables for both submerged arc welding and metal arc welding with tubular cored electrodes can be suitable for welding by the single- or two-run technique and the methods for testing and classification are specified. When a welding consumable is offered for use by these techniques, it should be noted that all-weld metal test pieces may not be required by the consumable classification standard.

Test conditions prescribed and results required should not be considered to be requirements or expectations for a procedure qualification.

# Welding consumables — Test methods —

## Part 2:

# Preparation of single-run and two-run technique test specimens in steel

## 1 Scope

This part of ISO 15792 specifies the preparation of butt weld test pieces and specimens. The purpose is to define test methods in order to determine strength and impact strength of the welded joint when testing welding consumables with single-run and two-run technique, not suitable for electro-slag or electro-gas welding.

This part of ISO 15792 is applicable to welding consumables for arc welding of steel.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 15792. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 15792 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 4136:2000, *Fusion-welded butt joints in steel — Transverse tensile test*.

ISO 9016:2000, *Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination*.

ISO 13916, *Welding — Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature*.

## 3 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.

## 4 Test plate material

The material to be used shall be in accordance with the material defined in the appropriate consumable classification standard.

## 5 Preparation of the test piece

The plates of the test piece shall be preset 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. A suitable backing system for single-run technique may be used. Run-on and run-off plates may be used. See Table 1.

## 6 Welding conditions

The test piece shall be welded in the flat position. The welding shall be started at room temperature or after applying any preheating if required by the welding consumable standard. The interpass temperature shall be in accordance with the welding consumable standard.

The preheating and interpass temperatures shall be measured using temperature indicator crayons, surface thermometers or thermocouples, see ISO 13916.

The welding conditions used, such as current, voltage, travel speed, weld bead size, shall be within the range recommended by the manufacturer and where the test is performed for classification purposes in accordance with the limits specified in the relevant consumable standard.

## 7 Heat treatment

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

The heat treatments are specified in standards relating to welding consumables.

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.

## 8 Position of specimens, specimen dimensions and testing

Figures 1 and 2 show the position of the tensile test specimen and of the notched impact specimens. The test piece must 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.

The specimens for transverse tensile tests and testing shall be in accordance with ISO 4136. Table 2 of ISO 4136:2000 shall be used for specimen dimensions.

When applicable, the specimens for the impact test and testing shall be in accordance with ISO 9016. The impact specimen shall be in accordance with the designation VWT 0/b in ISO 9016:2000. The position of the impact specimens shall be at the midline of the plate thickness for types 2.1 and 2.2 and from the last welded run as shown in Figure 2 for type 2.5. Impact specimens are not applicable for type 2.3 and 2.4.

The size of impact specimens shall be 10 mm × 10 mm. If impact testing is required for types 2.3 and 2.4 subsize specimens 5 mm × 10 mm shall be used.

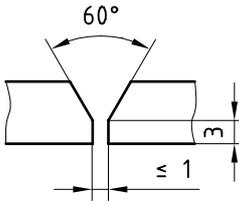
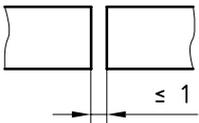
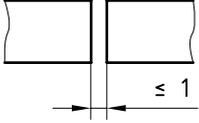
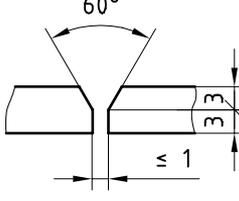
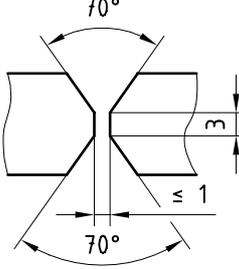
**NOTE** It is recommended that the test piece be subjected to radiographic and/or macrographic examination of the prepared and etched surface to ascertain if there are any defects in the weld prior to the preparation of test specimens.

## 9 Retests

If any test fails, repeat tests shall be performed in accordance with relevant requirements.

Dimensions in millimetres

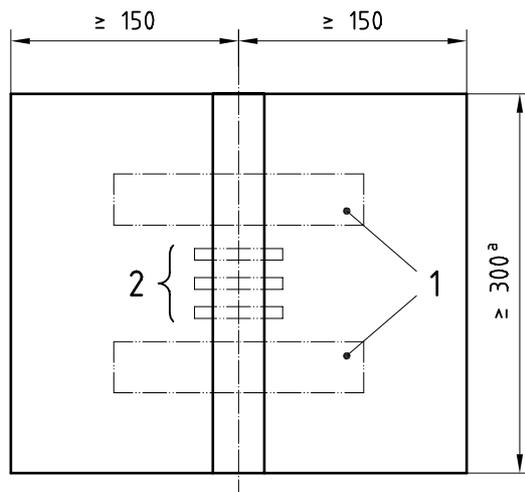
Table 1 — Butt weld test piece for single-run or two-run technique

Type	Plate thickness	Preparation	Diameter of wire electrode for submerged arc welding <sup>a</sup>	Diameter of tubular cored electrode <sup>a</sup>
2.1	12	single-run technique 	4	—
2.2	12	two-run technique 	4	—
2.3	6	single-run technique 	—	See classification standard
2.4	6	single-run technique 	—	1,6 <sup>b</sup>
2.5	20	two-run technique 	5 <sup>b</sup>	—

<sup>a</sup> Other diameters may be used for tests other than classification tests.

<sup>b</sup> Or largest diameter offered by the manufacturer for single run technique.

Dimensions in millimetres



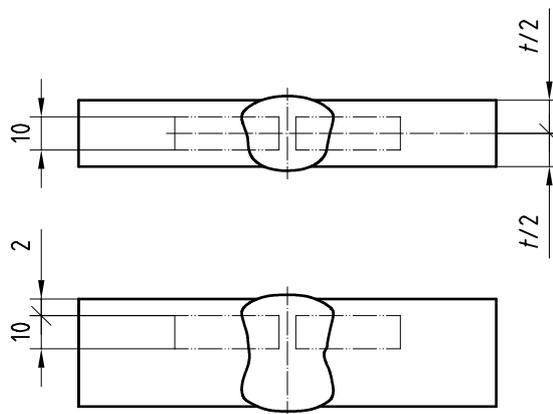
**Key**

- 1 Tensile specimens
- 2 Impact specimens
- a Effective weld length

**Figure 1 — Position of specimens**

[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=45422](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=45422)

Dimensions in millimetres



**Figure 2 — Position of impact specimens**

## 10 Test report

The following data shall be reported:

- a) test piece and welding consumables:
  - test piece type and unique identification;
  - test plate material and backing strip material, if applicable;
  - standard designation and trade name of the welding consumables;
  - redrying conditions for welding consumables;
  - heat or lot number of the welding consumables;
  - diameter of the welding electrode;
- b) welding conditions as applicable:
  - welding process;
  - power source;
  - current type and polarity;
  - current (and/or wire feed speed), voltage, travel speed;
  - distance from contact tube to surface of plate (stick-out);
  - type and flow rate of shielding gas;
  - preheating temperature;
  - interpass temperature;
- c) heat treatment (including hydrogen removal treatment):
  - temperature;
  - holding time;
  - cooling conditions;
- d) deviations from this part of ISO 15792;
- e) test results, as applicable:
  - testing temperatures;
  - radiographic and/or macrographic examination;
  - tensile strength;
  - impact strength;
  - location of fracture;
  - imperfections.

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