BRITISH STANDARD

BS EN
1597-2 : 1997

Welding consumables — Test methods

Part 2. Preparation of test piece for single-run and two-run technique test specimens in steel

The European Standard EN 1597-2 : 1997 has the status of a British Standard

ICS 25.160.20

National foreword

This British Standard is the English language version of EN 1597-2 : 1997.

The UK participation in its preparation was entrusted to Technical Committee WEE/39, Welding consumables, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled 'International Standards Correspondence Index', or by using the 'Find' facility of the BSI Standards Electronic Catalogue.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 6, an inside back cover and a back cover.

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EUROPEAN STANDARD

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Descriptors: Welding, arc welding, submerged arc welding, butt welds, steels, fillers, joining, preparation, test specimen, tests, determination, mechanical strength, flexural strength, classifications

English version

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

Produits consommables pour le soudage — Méthodes d'essai — Partie 2: Préparation de l'assemblage d'essai pour la réalisation d'éprouvettes de soudage en une ou deux passes, en acier

Schweißzusätze — Prüfmethoden — Teil 2: Vorbereitung eines Prüfstücks für die Prüfung von Einlagen- und Lage/Gegenlage-Proben an Stahl

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 121, Welding, the Secretariat of which is held by DS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 1998, and conflicting national standards shall be withdrawn at the latest by January 1998.

This standard consists of the following Parts:

Part 1: *Test piece for all-weld metal test specimens in steel, nickel and nickel alloys*;

Part 2: *Preparation of test piece for single-run and two-run technique test specimens in steel*;

Part 3: *Classification testing of positional capability of welding consumables in a fillet weld.*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Contents

Introduction

Consumables for both the 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.

1 Scope

This standard specifies preparation of butt weld test piece and specimens. The purpose is to define the test methods in order to determine strength and impact strength of the welded joint when testing welding consumables used for submerged arc welding and tubular cored arc welding with single-run and two-run techniques. This standard is applicable to welding consumables for arc welding of steel.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 875	*Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination*
EN 895 : 1995	*Destructive tests on welds in metallic materials — Transverse tensile test*
EN ISO 13916	*Welding — Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature* (ISO 13916 : 1996)

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 for the test piece 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, see table 1, 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.

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 EN 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.

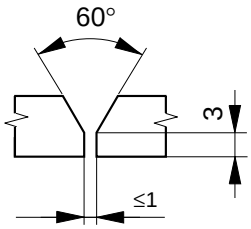
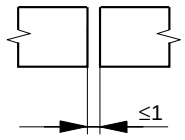
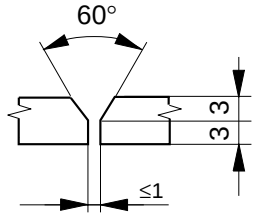
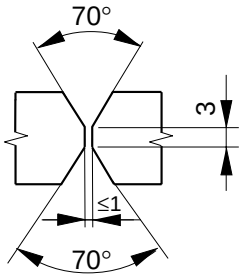
7 Heat treatment

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.

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

Type	Plate thickness mm	Preparation	Diameter of wire electrode for submerged arc welding[1)] mm	Diameter of tubular cored electrode[1)] mm
2.1	12	Single-run technique 	4	—
2.2	12	Two-run technique 	4	—
2.3	6	Single-run technique 	—	1,6[2)]
2.4	20	Two-run technique 	5[2)]	—

[1)] Other diameters may be used for tests other than classification tests.
[2)] Or largest diameter offered by the manufacturer for single-run technique.

8 Position of specimens, specimen dimensions and testing

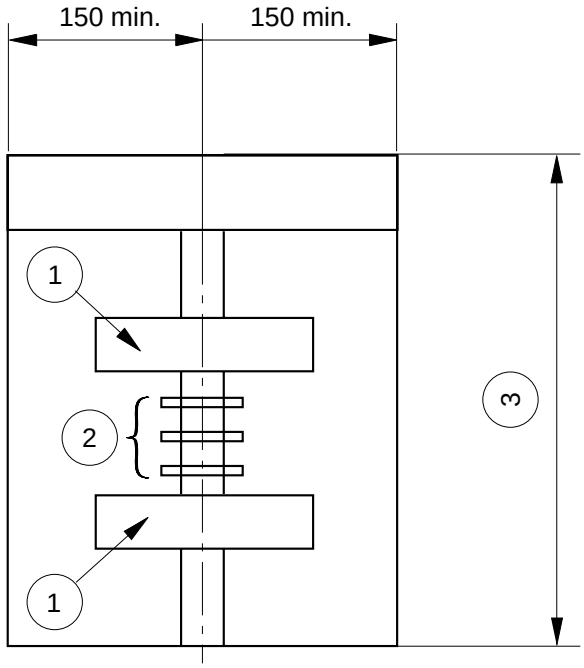
Figures 1 and 2 show the position of the tensile test specimen and of the notched impact specimens. The test piece shall be divided by cutting (machining) or by thermal cutting. In the case of thermal cutting, machining allowances of at least 10 mm on either side shall be provided for the subsequent machining of the specimens.

The specimens for transverse tensile tests and testing shall be in accordance with EN 895. Table 2 of EN 895 : 1995 shall be used for specimen dimensions.

When applicable, the specimens for the impact test and testing shall be in accordance with EN 875. The impact specimen shall be in accordance with the designation VWT 0/b in EN 875. The position of the impact specimens (see figure 2) shall be at the midline of the plate thickness for types 1 and 2 and from the last welded run, as shown in figure 2 for type 4. Impact specimens are not applicable for type 3.

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

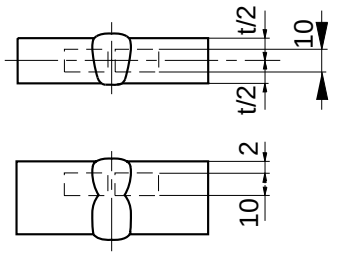
NOTE. It is recommended that the test piece be subjected to radiographic and/or macrographic examination to ascertain if there are any defects in the weld prior to the preparation of test specimens.



1. Specimen
2. Impact specimen
3. Effective weld length min. 300

Dimensions in millimetres

Figure 1. Position of specimens



Dimensions in millimetres

Figure 2. Position of impact specimens

9 Retests

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

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 standard;

e) test results, as applicable:
- – testing temperatures;
- – radiographic and/or macrographic examination;
- – tensile strength;
- – impact strength;
- – location of fracture;
- – imperfections.

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