British Standard

BRITISH STANDARD

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1597-3 : 1997

Welding consumables — Test methods

Part 3. Testing of positional capability of welding consumables in a fillet weld

The European Standard EN 1597-3 : 1997 has the status of a British Standard

ICS 25.160.20

National foreword

This British Standard is the English language version of EN 1597-3 : 1997.

The UK participation in its preparation was entrusted to Technical Committee WEE/39 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.

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Summary of pages

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Welding consumables — Test methods — Part 3: Testing of positional capability of welding consumables in a fillet weld

Produits consommables pour le soudage — Méthodes d'essai — Partie 3: Evaluation de l'aptitude des produits consommables à la réalisation de soudures d'angle en position

Schweißzusätze — Prüfmethoden — Teil 3: Prüfung de Eignung für Schweißpositionen an Kehlnahtschweißungen

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CEN

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

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

Ref. No. EN 1597-3 : 1997 E

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of an identical text or by endorsement, at the latest by January 1998, and conflicting national standards shall be withdrawn at the latest by January 1998.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: *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

		Page
Foreword		2
Introduction		3
1	Scope	3
2	Normative references	3
3	General requirements	3
4	Test plate material	3
5	Preparation of the test piece	3
6	Examination of the fillet weld	3
7	Test report	4

Introduction

This standard describes preparation and assessment of a fillet weld test piece.

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

1 Scope

This standard specifies the preparation of the test piece and the evaluation of the test results. The purpose of this standard is to test positional capability of covered electrodes and tubular cored electrodes. Fillet welds can be made in horizontal, vertical up, vertical down and overhead position, as applicable.

NOTE. If results complying with the requirements of this standard have been achieved in a procedure qualification or type approval test, the welding consumable is regarded as tested in accordance with this standard.

This standard is applicable to 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 499	*Welding consumables — Covered electrodes for manual metal arc welding of non alloy and fine grain steels — Classification*
EN 758	*Welding consumables — Tubular cored electrodes for metal arc welding with and without a gas shield of non alloy and fine grain steels — Classification*
EN 970	*Non-destructive examination of fusion welds — Visual examination*
EN ISO 6947	*Welds — Working positions — Definitions of angles of slope and rotation* (ISO 6947 : 1993)
EN 25817	*Arc-welded joints in steel — Guidance on quality levels for imperfections* (ISO 5817 : 1992)

3 General requirements

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

4 Test plate material

The plate material shall be selected from the range of materials, for which the consumable is recommended by the manufacturer. The surface shall be free of scale, rust and other contaminants.

5 Preparation of the test piece

5.1 The test plates shall be assembled as shown in figure 1. As a minimum both ends of the plates shall be tack-welded. The length of the test piece shall be sufficient to allow at least the deposition of the entire length of one covered electrode.

5.2 The fillet welds shall be deposited as a single-run using the diameter of electrode and welding position shown in table 1.

6 Examination of the fillet weld

6.1 The completed fillet weld test piece shall be examined visually in accordance with EN 970 and the weld shall be free of cracks, undercut, overlap, trapped slag, and surface porosity. Throat thickness and leg length shall be measured by an appropriate gauge at a minimum of three points along the weld to demonstrate conformity with the requirements of table 1. One macrosection, approximately 25 mm wide, shall be removed from a point approximately in the centre of the weld. One surface of the macrosection shall be polished, etched and scribed as shown in figure 2. The throat thickness and convexity or concavity of the fillet weld shall be determined to the nearest 0,5 mm by actual measurement of the polished and etched macrosection, see figure 2, and shall fulfill the requirements of table 1.

6.2 To assess internal imperfections the remaining two joint sections shall be broken longitudinally through the fillet weld by a force exerted in the direction as shown in figure 3. The fractured surfaces shall be examined and shall meet the appropriate requirements of EN 25817 level B, except that a minor lack of root penetration should not be cause for rejection. If, during bending, the weld pulls out of the test plate, it shall not be considered as failure of the weld metal. The test shall be repeated without penalty.

6.3 If necessary to facilitate fracture, one or more of the following procedures can be used:

6.3.1 Reinforcing welds, as shown in figure 3a), can be added to each leg of the weld.

6.3.2 The position of the web on the flange can be changed as shown in figure 3b).

6.3.3 The face of the weld can be notched as shown in figure 3c).

6.3.4 The test piece can be cooled down below 0 °C.

7 Test report

The following data shall be reported:

a) test piece and welding consumable:

– test plate material;

– standard designation and trade name of the welding consumable including gas;

– redrying conditions for the welding consumable;

– heat or lot-number of the welding consumable;

– diameter of the welding consumable;

b) welding conditions as applicable:

– welding process;

– power source;

– current type and polarity;

– current (and/or wire feed speed), voltage, travel speed;

– type and flow rate of shielding gas;

– preheating temperature;

c) deviations from this standard;

d) test results:

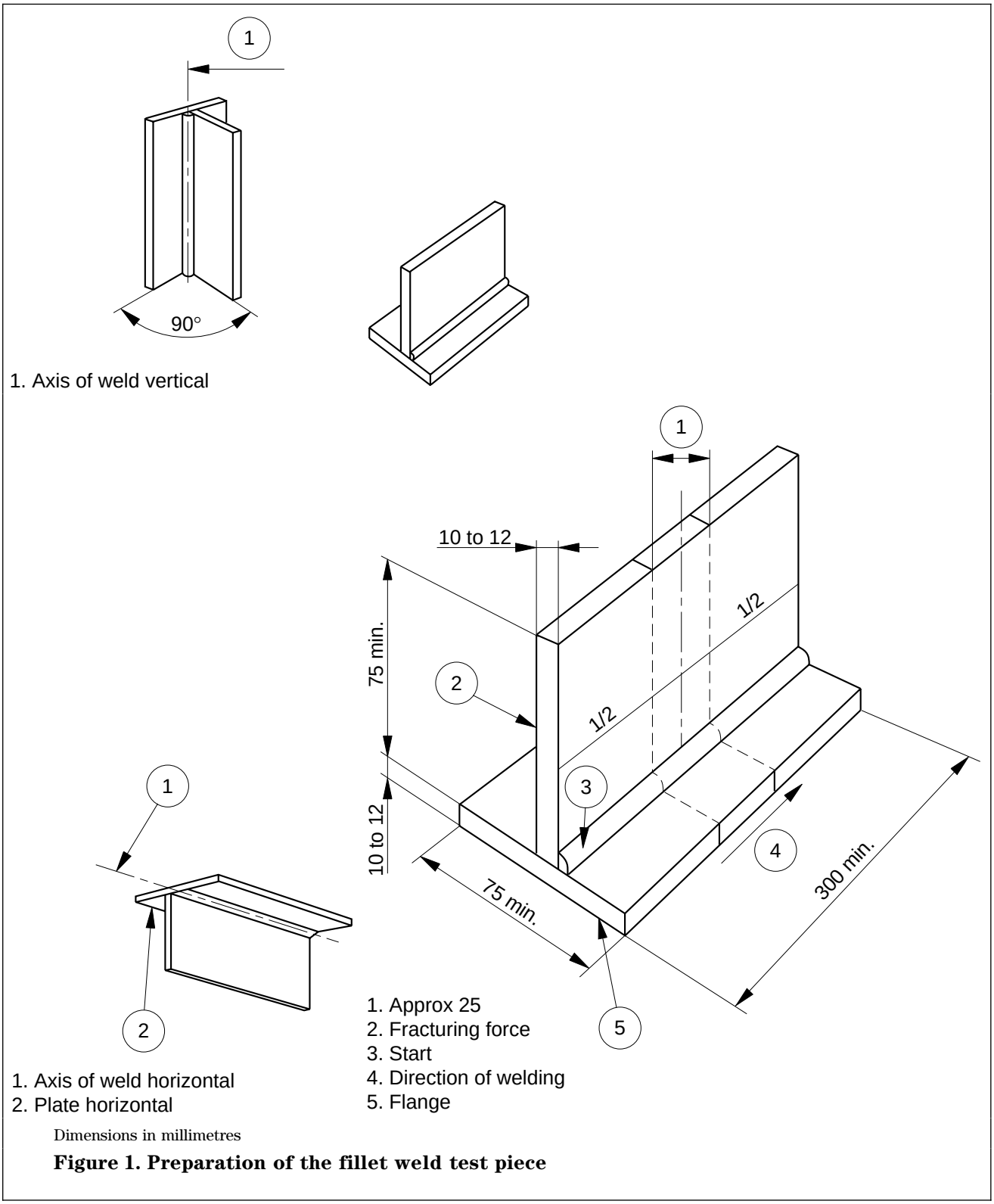
– visual examination;

– shape of the fillet weld;

– throat and leg length;

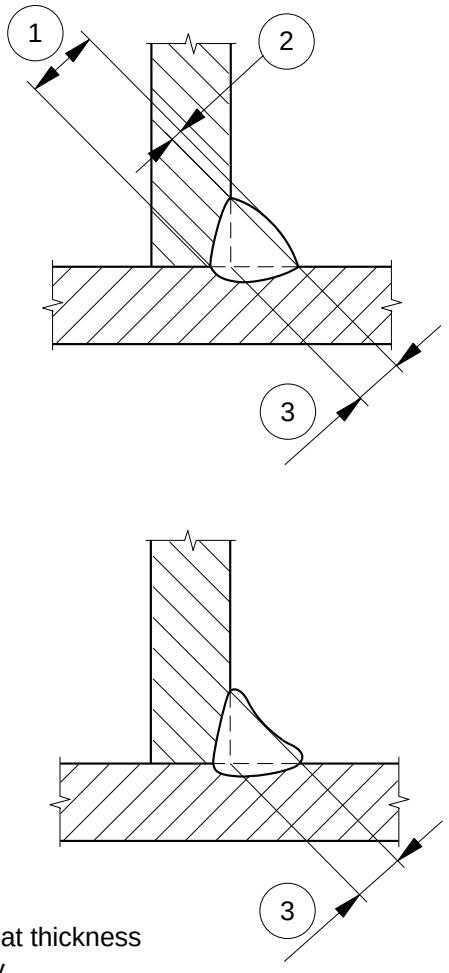
– convexity;

– result of fracture test.



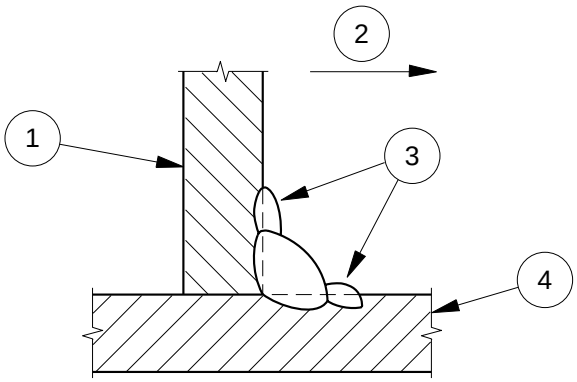
Dimensions in millimetres

Figure 1. Preparation of the fillet weld test piece

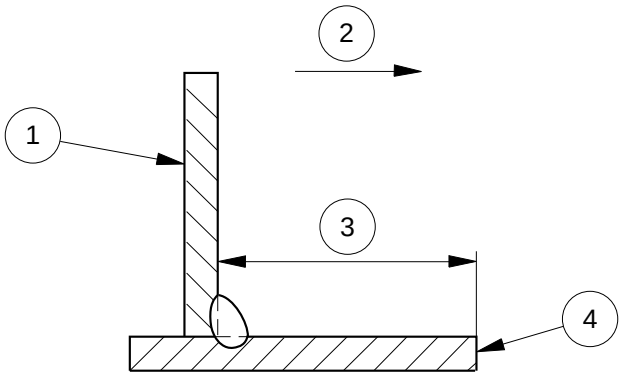


1. Total throat thickness
2. Convexity
3. Design throat thickness

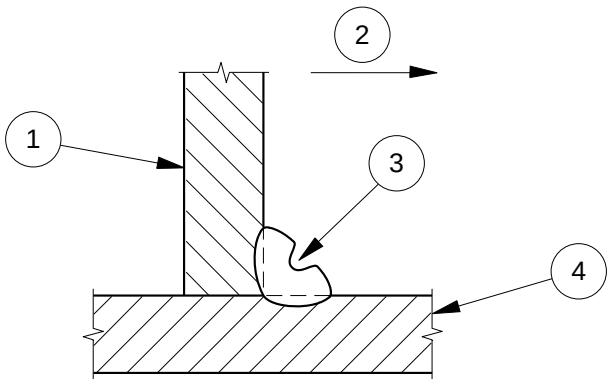
Figure 2. Dimensions of fillet welds



1. Web
2. Fracturing force
3. Reinforcing weld
4. Flange



1. Web
2. Fracturing force
3. 3/4 width of flange
4. Flange



1. Web
2. Fracturing force
3. Maximum depth of notch = 1/2 actual throat
4. Flange

Figure 3. Alternate methods for facilitating fillet weld fracture

Table 1. Test requirements for fillet welds

Symbol of position for classification	Covering in accordance with EN 499	Test position[1]	Electrode diameter[2] mm	Fillet size[3] mm	Leg length difference mm	Convexity mm
1,2	C	PB	6,0	4,5 min	1,5 max	2,5 max
	RX[4]		6,0	5,0 min	2,0 max	3,0 max
	B		6,0	5,0 min	2,0 max	3,0 max
	For all T[5]		2,4	5,5 min	2,0 max	3,0 max
3	A	PB	6,0	5,0 min	2,0 max	3,0 max
	RR		6,0	5,0 min	2,0 max	3,0 max
	For all T		2,4	5,5 min	2,0 max	3,0 max
5	R	PB	6,0	4,5 min	1,5 max	2,5 max
	B		5,0	4,5 min	1,5 max	2,5 max
	For all T		2,4 [6]	5,5 min	2,0 max	3,0 max
1,2	C	PF	4,0	4,5 max		2,0 max
	RX[4]		4,0	4,5 max		2,0 max
	B		4,0	5,5 max		2,0 max
	For all T		[7]	7,0 max		2,0 max
1,2,5	C	PD	4,0	4,5 max	1,5 max	2,5 max
	RX[4]		4,0	4,5 max	1,5 max	2,5 max
	B		4,0	5,5 max	2,0 max	3,0 max
	For all T		1,2 [8]	4,5 max	1,5 max	2,5 max
5	B	PG	5,0	5,0 min		1,5 max[9]
	For all T		1,2 [8]	4,5 min		1,5 max [9]

[1] See EN ISO 6947.
[2] Where the largest diameter claimed for positional welding is smaller than that specified in this table, use the largest size and adjust criteria pro rata.
[3] Fillet size is design throat thickness.
[4] RX includes types R, RC, RA and RB.
[5] T means tubular cored electrodes, see e.g. EN 758.
[6] Or largest diameter made up to 2,4 mm.
[7] Maximum diameter for which positional classification is given.
[8] Or as recommended by the manufacturer.
[9] Maximum concavity.

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