

Specification for

Approval testing of welders working to approved welding procedures —

Part 3: Arc welding of tube to tube-plate
joints in metallic materials

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The preparation of this British Standard was entrusted by the Welding Standards Committee (WEE/-) to Technical Committee WEE/36, upon which the following bodies were represented:

- Aluminium Federation
- Associated Offices Technical Committee
- Association of Consulting Scientists
- British Constructional Steelwork Association
- British Gas Corporation
- British Railways Board
- Electricity Supply Industry in England and Wales
- Engineering Equipment and Materials Users' Association
- Heating and Ventilating Contractors' Association
- Ministry of Defence
- National Coal Board
- Power Generation Association (BEAMA Ltd.)
- Process Plant Association
- Society of Motor Manufacturers and Traders Limited
- Stainless Steel Fabricators' Association of Great Britain
- United Kingdom Atomic Energy Authority
- Water-tube Boilermakers' Association
- Welding Institute
- Welding Manufacturers' Association (BEAMA Ltd.)
- Coopted member

This British Standard, having been prepared under the direction of the Welding Standards Committee, was published under the authority of the Board of BSI and comes into effect on 29 March 1985

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Foreword

This Part of BS 4871 has been prepared under the direction of the Welding Standards Committee to cover the particular requirements for the approval testing of welders for tube to tube-plate joints. While there is no limitation on the metallic materials to be used, extra considerations not covered in this standard may need to be taken into account for some materials.

This Part of BS 4871 is one of a series of standards on the approval testing of welders and welding procedures, the latter having a bearing on the former for certain applications. This link has been used as a means of arranging the Parts of the standards for tube to tube-plate joints into:

- a) approval testing of welding procedures (see BS 4870-3);
- b) welder approval when approval of the welding procedure is required.

It should be appreciated that the acceptance levels given in this standard are for the purposes of approval testing of welders and as such are not necessarily the same as those which might be specified for work on which approved welders will be employed.

Depending upon the emphasis placed on quality control in the production of welded components, the approval of welding procedures covered in this series of standards may be administered in one of several ways which should be stipulated at the enquiry and/or order stage. The alternatives currently employed are the following:

- 1) each individual contractor (or sub-contractor) may have proved by actual test pieces every weld form he wishes to use, in every thickness and material; or
- 2) each individual contractor (or sub-contractor) may have proved by actual test pieces a set of welds representative on a group basis of all the various thicknesses and materials to be used in production; or
- 3) each individual contractor (or sub-contractor) need not make procedure test pieces provided he can prove by appropriate documentation of an independent nature that he has previously satisfactorily welded the type of joint and material in question.

In respect of (1) and (2) it should be appreciated that once the welding procedure tests have been approved, they need never be repeated unless there is a change in certain variables. As an extension beyond (3), it may be possible by agreement between the contracting parties for fully documented welding procedures, developed independently of the particular contractor, to be employed without the need for further approval tests.

It has been assumed in the drafting of this British Standard that the execution of its provisions is entrusted to appropriately qualified and experienced people.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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, pages i and ii, pages 1 to 10, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This Part of BS 4871 specifies requirements for the approval testing of welders to be engaged on the manual, semi-automatic, automatic or mechanized arc welding of those tube to tube-plate joints in metallic materials for which an approved welding procedure has to be employed.

The welder who successfully completes a welding procedure test in accordance with BS 4870-3 is approved to the extent given in clauses 5 and 6 of this standard without further testing.

NOTE 1 This Part of BS 4871 does not cover welding processes such as explosive welding, laser welding or electron-beam welding. The parameters to be recorded and the acceptance levels for such processes would, therefore, have to be agreed between the contracting parties, but this Part of BS 4871 may be used as the framework for such agreement.

NOTE 2 The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 4871, the following definitions apply.

2.1

welding procedure

a specific course of action followed in welding, including a list of materials and, where necessary, tools to be used¹⁾

2.2

welding procedure test

the making and testing of a welded joint representative of that to be used in production in order to prove the feasibility of a welding procedure

NOTE This term is not usually applied to any tests that may have been made during the development of a welding procedure.

2.3

approved welding procedure

a documented welding procedure that has been approved by an inspecting authority either by means of a welding procedure test or as a result of authentic documented experience gained with the welding of joints similar to that which the welding procedure applies

2.4

welder approval test

a documented test, which has been approved by an inspecting authority, carried out by a welder working to an approved welding procedure

2.5

test piece

components welded together in accordance with a specified welding procedure

2.6

test specimen

a portion detached from a test piece and prepared as required for testing

2.7

inspecting authority

that competent independent body or association which verifies compliance with this standard

3 Information to be given to the welder

The welder shall be provided with full written details according to clause 3 of BS 4870-3:1985 of the approved welding procedure (which may be modified as permitted by clause 5 of this standard) which he shall follow in making his test weld (see also clause 8 of this standard).

For mechanized or automatic processes, the welder shall be provided with full written details and training on how to operate the equipment and of the relevant checks that have to be made.

4 Items to be recorded

The items given in appendix A shall be recorded for each welder approval test.

NOTE Details of the welding procedure used should have been recorded previously by approval testing in accordance with BS 4870-3.

5 Changes not affecting approval (other than mechanized or automatic welding)

The following changes between the approved welding procedure and the procedure used for the welder approval test shall **not** entail re-approval of the welder for other than mechanized or automatic welding.

NOTE Clause 4 of BS 4870-3:1985 states the changes affecting an approved welding procedure, but for welder approval purposes more latitude is permitted as only the welder's ability is being tested.

a) A change in parent metal within one of the following ranges of steels (see also Table 1).

1) Carbon steels and low alloy steels with less than 6 % total alloy.

NOTE This range corresponds to groups A1, A2, B, C, D, E1, E2, F, G and K of Table 1 of BS 4870-3:1985.

2) When high alloy ferritic weld metal is specified, a change in parent metal within the range 11 % to 20 % chromium.

NOTE This range corresponds to groups M and N of Table 1 of BS 4870-3:1985.

¹⁾ This definition is taken from BS 499-1.