

Method for bead-on-plate (BOP) test for welds

ICS 25.160.40

Confirmed January 2009

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Welding Standards Policy Committee (WEE/-) to Technical Committee WEE/2, upon which the following bodies were represented:

- Aluminium Federation
- Associated Offices Technical Committee
- Association of Consulting Scientists
- British Compressed Gases Association
- British Constructional Steelwork Association Ltd.
- British Railways Board
- British Steel Industry
- Electricity Supply Industry in England and Wales
- Health and Safety Executive
- Institution of Structural Engineers
- Ministry of Defence
- Power Generation Contractors' Association (BEAMA Ltd.)
- Welding Institute
- Welding Manufacturers' Association (BEAMA Ltd.)

This British Standard, having been prepared under the direction of the Welding Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 30 November 1990

© BSI 30 November 2004

Amendments issued since publication

Amd. No.	Date	Comments
9161	November 1996	
15295	30 November 2004	Indicated by a sideline in the margin

The following BSI references relate to the work on this standard:
Committee reference WEE/2
Draft for comment 89/75604 DC

ISBN 0 580 18963 5

Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
Section 1. General	
1.1 Scope	1
1.2 Definitions	1
1.3 Measurements	1
1.4 Material for test pieces	1
Section 2. <i>Deleted</i>	
Section 3. BOP test	
3.1 Application	5
3.2 Test piece form	5
3.3 Welding	5
3.4 Hardness testing	6
3.5 Recording of results	6
Appendix A <i>Deleted</i>	8
Appendix B Typical TRS for BOP test	9
Figure 1 — <i>Deleted</i>	
Figure 2 — <i>Deleted</i>	
Figure 3 — <i>Deleted</i>	
Figure 4 — <i>Deleted</i>	
Figure 5 — <i>Deleted</i>	
Figure 6 — <i>Deleted</i>	
Figure 7 — <i>Deleted</i>	
Figure 8 — Details of test plate and sectioning for BOP test	7
Figure 9 — Location of hardness impressions for BOP test	7
Table 1 — <i>Deleted</i>	
Table 2 — Welding conditions for the standardized BOP test	6
Publication(s) referred to	11

Foreword

This British Standard has been prepared under the direction of the Welding Standards Policy Committee. The BOP test is used to investigate weld HAZ hardening behaviour.

Tests are normally performed for the evaluation of parent material characteristics. Tests may also be used to investigate welding consumables and welding parameters.

The controlled thermal severity (CTS) test for welds is now described in BS EN ISO 17641-2:2004.

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.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its 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 11 and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

Section 1. General

1.1 Scope

This British Standard describes the bead-on-plate (BOP) test for welds. These are intended for investigating the welding of carbon, carbon-manganese and low-alloy steels.

Tests are normally performed for the evaluation of parent material characteristics. Tests may also be used to investigate welding consumables and welding parameters.

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

1.2 Definitions

For the purposes of this British Standard, the definitions given in BS 499-1 apply.

1.3 Measurements

Knowledge of the correct values of the variables involved in producing test welds is vital to the success of the tests and calibrated measurement devices shall be used. The values of these measured variables shall be noted on the test report sheet (TRS).

NOTE It is recommended that traceability to national standards of calibration is maintained.

An individual test involves many variables, particularly in relation to the materials used, and all the data characterizing the specific test shall therefore be recorded as failure to do this could result in misinterpretation of results.

A list of the required variables appears in the relevant TRS (see example given in Appendix B).

1.4 Material for test pieces

The material for the tests shall be in the metallurgical condition in which it will be welded.

Where the material to be used is identified by a cast number, this shall be noted in the TRS. Where the principal rolling direction can be determined, this shall be marked on the test material by hard stamping remote from the weld testing area.

The chemical composition of the material to be tested shall be available. When the test is being performed for material release purposes the product analysis certificate shall be acceptable. In all other circumstances the chemical analysis shall be performed on the material to be tested and the elements to be determined shall be as follows:

- carbon
- silicon
- manganese
- phosphorus
- sulfur
- chromium
- molybdenum
- nickel
- vanadium
- copper
- niobium
- calcium
- boron
- titanium
- aluminium
- nitrogen

In selecting the technique for analysis and the areas for sampling, care shall be taken to provide average values of elements and to avoid localized effects in the material caused by segregation and surface decarburization. The results and the analytical tolerances shall be entered on the TRS as mass percentages.

NOTE It is considered good practice to confirm the accuracy of the analytical technique against certified reference materials.