

Specification for

Flash welding of butt joints in ferrous metals (excluding pressure piping applications)

UDC 669.15 – 194.55/.56/.57:621.791.762:620.1

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



Document Sharing Hub

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Welding Standards Committee (WEE/-) to Technical Committee WEE/33, upon which the following bodies were represented:

- Associated Offices Technical Committee
- British Chain Manufacturers' Association
- British Railways Board
- British Steel Corporation
- Electricity Supply Industry in England and Wales
- Water-tube Boilermakers' Association
- Welding Institute
- Welding Manufacturers' Association (BEAMA Ltd.)

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 September 1988

© BSI 04-1999

The following BSI references relate to the work on this standard:
Committee reference WEE/33
Draft for comment 86/77824 DC

ISBN 0 580 16660 0

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

	Page
Committees responsible	Inside front cover
Foreword	iii
1 Scope	1
2 Definitions	1
3 Information and requirements to be agreed and to be documented	1
3.1 Information to be supplied by the purchaser	1
3.2 Requirements to be agreed	1
4 Welding equipment	2
5 Material to be welded	2
6 Process sequence: general	2
7 Process sequence: preparation	3
8 Process sequence: welding	3
8.1 Overhang	2
8.2 Clamping force	3
8.3 Alignment	3
8.4 Initial end squaring	3
8.5 Pre-heating	3
8.6 Flashing	3
8.7 Upsetting	3
8.8 Upset current time	3
8.9 Unclamping	3
9 Process sequence: finishing	3
9.1 Removal of upset metal	3
9.2 Post weld heat treatments	3
10 Procedure approval	3
10.1 General	3
10.2 Monitoring	4
10.3 Changes affecting approval	4
10.4 Heat treatment and finished condition	4
10.5 Sample preparation	5
10.6 Bend testing	5
10.7 Macro-examination	5
10.8 Tensile testing	6
10.9 Hardness testing	6
11 Statement of results of procedure approval	6
12 Production control	9
12.1 Visual inspection	9
12.2 Mechanical tests	9
13 Parameter monitoring	9
14 Non-destructive testing	9
15 Weld acceptance criteria	10
Appendix A Welding equipment	11
Appendix B Generalized diagram illustrating monitoring variables	11
Appendix C Types of weld features	12

	Page
Figure 1 — Typical information to appear on a flash welding procedure record sheet	7
Figure 2 — Typical information to appear on a flash welding procedure test report sheet	8
Figure 3 — Generalized diagram illustrating monitoring variables	11
Figure 4 — Flash welding features (diagrammatic only)	13
Publications referred to	Inside back cover

Foreword

This British Standard has been prepared under the direction of the Welding Standards Committee and is one of a series of British Standards concerned with the welding of metallic components of regular and irregular cross section.

This standard deals with the production of welds made by the flash welding process but excludes the flash welding of steel tubes for pressure applications which is covered in a separate standard (see BS 4204).

This standard follows the general pattern set by others in the series and is of the “process” type. It embodies the currently accepted practice of initial procedure approval tests followed by periodical production control tests.

This standard also details the various parameters specific to the flash welding process that are required to be determined in establishing the procedure. A list of the typical information to appear on a welding procedure sheet is given together with a typical test record sheet. An appendix gives guidance on typical flash welding imperfections.

As the acceptance level of certain requirements, e.g. the contour and form of the weld profile, is related to the service conditions of the joint, reference should be made for these details to the appropriate application standard, where such a standard exists. Where such guidance is not given, these aspects should be a matter of agreement between the contracting parties.

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 to iv, pages 1 to 14, 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 British Standard specifies requirements for the automatic flash welding of ferrous metal sections excluding tubes, pipes and pipe fittings for pressure applications, which are covered in BS 4204.

In addition to the definitive requirements, it also requires the items detailed in clause 3 to be documented. For compliance with this standard, both the definitive requirements and the documented items have to be satisfied.

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

2 Definitions

For the purposes of this British Standard the following definitions apply. For other terms the definitions in BS 499-1 apply.

2.1

manufacturer

the user of the welding equipment for the purposes of manufacturing welded products

2.2

automatic flash welding machine

a welding machine that has an automatic sequence of events

2.3

inspecting authority

the competent independent body or association that, where required, verifies compliance with this standard

2.4

upset current time

the time after the commencement of upsetting during which the current flows

2.5

pre-heating (flash welding)

the resistance heating of workpieces to facilitate the onset of flashing by a series of current pulses with a cool time in between each pulse. The pulsing is achieved by moving the workpieces together and apart

3 Information and requirements to be agreed and to be documented

3.1 Information to be supplied by the purchaser

The following information to be supplied by the purchaser shall be fully documented. Both the definitive requirements specified throughout the standard and the documented items shall be satisfied before a claim of compliance with the standard can be made and verified.

- a) Specification of the material to be welded (see clause 5) and of the required welded joint properties.
- b) Whether procedure approval tests are required and, if so, the necessary details (see clause 10).
- c) The dimensional tolerances and surface finish of the welded product.
- d) The number and title of the particular application standard; or where no application standard exists a statement of the quality and mechanical properties required.
- e) Whether production test specimens are to be retained for examination by the purchaser or his representative.

3.2 Requirements to be agreed

The following items to be agreed between the contracting parties, which are specified in the clauses referred to, shall be fully documented. Both the definitive requirements specified throughout the standard and the following documented items shall be satisfied before a claim of compliance with the standard can be made and verified.

- a) Extent of dressing to remove upset (see 9.1).
- b) Whether welded joints are to be subjected to any post weld heat treatment or controlled cooling (see 9.2).