

Specification for

Fusion welding of austenitic stainless steels

Committees responsible for this British Standard

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- Associated Offices Technical Committee
- British Nuclear Fuels Ltd.
- British Railways Board
- British Steel Industry
- Stainless Steel Fabricators' Association of Great Britain
- United Kingdom Atomic Energy Authority
- Welding Institute
- Welding Manufacturers' Association (BEAMA Ltd.)

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Foreword

This British Standard has been prepared under the direction of the Welding Standards Policy Committee.

It supersedes BS 3019-2:1960 which is withdrawn.

This standard expands and updates the recommendations given in BS 3019-2:1960 and presents them in the form of a specification. The standard is primarily intended for arc welding but it may be applied to other forms of welding, e.g. laser welding.

The austenitic stainless steels covered by this specification generally contain in excess of 16 % chromium, together with more than 8 % nickel or nickel plus manganese. Steels within this category may also contain additional alloying elements, such as molybdenum, titanium, niobium, carbon or nitrogen to provide particular properties. The combination of alloying additions in all of these steels is sufficient to give an almost entirely face centred cubic, "austenitic", crystal structure. However, a small amount of the magnetic ferrite phase may be present in some steels and further small amounts of ferrite may form during autogenous welding.

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

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 British Standard specifies requirements for the manual, semi-automatic, automatic and mechanized arc welding of austenitic stainless steel in all product forms including hollow sections.

In addition to the definitive requirements, this standard requires additional information and the requirements of the supplier and the purchaser to be documented.

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

Some details of metallurgical aspects are given in Appendix A.

Typical austenitic stainless steels covered by this specification are listed in Appendix B together with recommended filler wires and welding electrodes.

NOTE 1 This standard is primarily intended for arc welding but may be applied to other methods of welding, e.g. laser welding.

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

2 Definitions

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

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. The definitive requirements specified throughout the standard and these documented items shall be satisfied before a claim of compliance with the standard can be made and verified:

- a) the application standard to be used together with any supplementary requirements;
- b) specific requirements for materials;
- c) weld quality requirements including details of surface finish and cleanliness;
- d) the degree of oxidation tolerable on root beads or the maximum oxygen content in the purge gas;
- e) whether welds are to be identified to the individual welder performing the joint.

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) where no application standard exists, the weld profile (see 9.3.1);
- b) whether the use of reactive backing strips is acceptable [see 9.4 c)];
- c) when it is not appropriate to use part of the structure as backing material, the material to be used (see 9.5.2);
- d) methods for edge preparation for welding (see 11.2);
- e) alternative technique for inter-run cleaning (see clause 18);
- f) whether written welding procedures are not required (see clause 20);
- g) the need for welding procedure tests (see clause 20);
- h) if no application standard exists, the method and extent of inspection (see 23.2);
- i) if no application standard exists, acceptance requirements (see 24.2);
- j) if more than three attempts can be made to repair a weld (see clause 25);
- k) if no application standard exists, the heat treatment requirements (see clause 26).

4 Storage, handling and workshop requirements

4.1 General

When storing, handling or fabricating austenitic stainless steel, the environment shall be controlled to avoid permanent breakdown of the surface oxide layer, known as the passive film, which gives austenitic stainless steel its good corrosion resistance. Stainless steel used for manufacture or fabrication shall be protected from contamination during all stages of storage and work.

4.2 Contact materials

When using paints, dyes, tapes, glues, etc. care shall be taken that the residues do not contain substances causing permanent damage or marking.

NOTE 1 The advice of manufacturers of these substances should be sought to establish their suitability for use on stainless steel.

NOTE 2 Austenitic stainless steel may corrode as a consequence of being in contact or having its surface contaminated with other materials. This may be as a result of the contact material itself being corrosive or because a contact material enables a corrosion phenomenon such as crevice or galvanic corrosion to occur.