

Procedure for

Inspection, testing and acceptance of steel sheet and strip

ICS 49.025.10

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The preparation of this British Standard was entrusted to Technical Committee ACE/61, Inspection and testing requirements for aerospace metallic materials, upon which the following bodies were represented:

- Aluminium Federation
- British Forging Industry Association
- British Investment Casting Trade Association
- British Iron and Steel Producers' Association
- Copper Development Association
- Light Metal Founders' Association
- Ministry of Defence
- Society of British Aerospace Companies

This British Standard, having been prepared under the direction of the Engineering Sector Board, was published under the authority of the Standards Board and comes into effect on 15 June 1996

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First published April 1956
Second edition August 1969
Third edition June 1996

The following BSI references relate to the work on this standard:
Committee reference ACE/61
Draft for comment 92/77503 DC

ISBN 0 580 25484 4

Amendments issued since publication

Amd. No.	Date	Comments
9327	February 1997	Indicated by a sideline in the margin

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Foreword

This British Standard has been prepared by Technical Committee ACE/61. It supersedes BS 2S 500:1969, which is withdrawn.

This procedure is primarily for use in conjunction with related material specifications in the “S” series of British Standards Aerospace Series and the Ministry of Defence DTD series; it may also be used with other material specifications by agreement between the purchaser and the supplier. The inspection, testing and acceptance procedures for wrought steels other than plate, sheet, strip and tube are contained in BS 5S 100:1993 and that for tube in BS 3T 100:1978.

In this revision the text has been brought into line with modern steel-making practices and current procedures required by the aerospace industry. In particular, section 1 has been extensively revised, much greater reference has been made to BS 5S 100:1993 for common requirements and a new section 9 has been added to replace the former Appendix A. The requirements for strip in the hardened and tempered condition, which were previously in section 5, have been included in section 4, which now covers sheet and strip. Section 5 is therefore now unallocated. Throughout the standard the tables have been renumbered.

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.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 18, 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.

Section 1. General requirements

1.1 Scope

This British Standard specifies the requirements for the inspection, testing and acceptance of wrought steel sheet and strip, or parts made from such products, to be used for aerospace purposes. The standard is applicable to material specifications in the British Standard Aerospace S series, and the Ministry of Defence (Procurement Executive) DTD series.

1.2 General

This standard details the basic requirements for the inspection and testing of British Standard Aerospace series and DTD series wrought steel sheet and strip.

Where product manufactured as coil is subsequently delivered as straight lengths, the testing requirements of strip shall prevail.

In addition to the definitive requirements, this standard also requires the items detailed in **1.5** to be documented. For compliance with this standard, both the definitive requirements and the documented items have to be satisfied.

If the purchaser wishes to specify an inspection, testing or acceptance procedure for any property of any product, which differs from that specified in this standard, this shall be agreed between the purchaser and the manufacturer and shall be fully documented on the order, drawing or inspection schedule, provided that the purchaser is also the quality assurance authority. If the purchaser is not also the quality assurance authority, deviations from the requirements of this standard shall only be agreed and documented after written approval has been obtained from the quality assurance authority.

1.3 References

1.3.1 Normative references

This British Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this standard only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

1.3.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

1.4 Definitions

For the purpose of this standard the definitions given in BS 5S 100:1993 apply, together with the following.

1.4.1 sheet

flat-rolled product of rectangular cross-section and uniform thickness between 0.2 mm and 6.35 mm supplied in straight lengths with slit or sheared edges

1.4.2 slab

cast or wrought product of rectangular cross-section of width greater than or equal to twice the thickness intended for the production of sheet or strip

1.4.3 strip

flat rolled product of rectangular cross-section and uniform thickness between 0.2 mm and 6.35 mm supplied in coils with slit edges

1.5 Information to be supplied by the purchaser

The following information to be supplied by the purchaser shall be fully documented on the order, drawing or inspection schedule along with the number of this British Standard. Clauses specifying a requirement for information are shown in brackets.

a) General

- 1) the identity of the material specification with which this standard is to be used;
- 2) whether sulfur printing and/or deep etching tests are required also on samples corresponding to the bottom of ingots (see **1.12**);
- 3) the required sampling frequency for sulfur printing and/or deep etching tests, if different from the material specification and BS 5S 100:1993 (see **1.12**);
- 4) the ultrasonic inspection procedure, test sensitivity, area to be evaluated and the standard of acceptance, if required (see **1.14**);

- 5) the heat treatment condition in which the material and parts are to be supplied, if different from the material specification (see 1.15);
 - 6) the required heat treatment temperature (and tolerance), if different from the material specification (see 1.15);
 - 7) the tests to determine mechanical properties, if different from the material specification (see 1.17);
 - 8) the orientation of mechanical test pieces, if different from Table 1 (see 1.18.4);
 - 9) the frequency of hardness testing, if different from 1.18 (see 1.21);
 - 10) the frequency of creep and creep rupture tests, if more than one per batch is required (see 1.22);
 - 11) the class of tolerance required, if Table 5 tolerances are specified (see item b of 1.25);
 - 12) the tolerance for flatness, if required (see item d of 1.25);
 - 13) the retest procedure for tests not covered in 1.24 (see 1.24.4);
- b) Finally heat treated parts
- 1) the mechanical tests and mechanical properties required, if different from the material specification (see 8.4);
 - 2) the location of hardness test impressions, if necessary (see 8.4).

1.6 Chemical composition

The chemical composition of the steel shall conform to the material specification and section 1 of BS 5S 100:1993.

1.7 Manufacture

The method of manufacture shall be in accordance with section 1 of BS 5S 100:1993, or, in the case of small quantities of steel, in accordance with section 9 of this standard.

Subclause 1.7.8 of BS 5S 100:1993 shall apply to slabs for the purposes of this standard.

1.8 Temporary identification up to the cast approval stage

Temporary identification shall be maintained in accordance with section 1 of BS 5S 100:1993.

1.9 Surface dressing of slabs and intermediate products

Where surface dressing is required by the material specification or order it shall be effected in accordance with section 1 of BS 5S 100:1993.

NOTE Where not specified, local dressing is acceptable.

1.10 Surface inspection of slabs and intermediate products

The surfaces of slabs and intermediate products shall be inspected by visual inspection for defects which may be detrimental to subsequent use. Slabs and intermediate products shall be descaled, if necessary, to enable the surface to be inspected.

The presence of any surface defect after dressing which is likely to be detrimental to the end use shall be cause for rejection.

1.11 Freedom from defects

All material shall be free from any defect detrimental to the end use.

Notwithstanding prior acceptance of material as conforming to this standard, any defect in the material, which is found at a later stage and which is detrimental to subsequent use, shall be a cause for rejection.

1.12 Sulfur printing and/or deep etching tests

Sulfur printing and/or deep etching shall be carried out in accordance with section 1 of BS 5S 100:1993.

1.13 Cleanness

Unless otherwise specified in the material specification or order, the material shall conform to the cleanness requirements specified in section 1 of BS 5S 100:1993.

1.14 Ultrasonic inspection

When required by the material specification, sheet and strip thicker than or equal to 3 mm shall be ultrasonically tested in the delivery condition. Products thinner than 3 mm shall be ultrasonically tested at an intermediate stage before rolling to the final size. The test procedure, test sensitivity and the area to be evaluated shall be stated on the order or the inspection schedule. The standard of acceptance shall be agreed between the purchaser and the manufacturer and stated on the order.