

BS 3A 174:2012



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AEROSPACE SERIES

**100° Countersunk head,
D-slot recess,
corrosion-resisting steel
bolts (Unified threads),
Strength Class 880 MPa, for
aircraft**

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 16, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 November 2012. It was prepared by Technical Committee ACE/12, *Aerospace fasteners and fastening systems*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 2A 174:1962, which is withdrawn.

Information about this document

This revision of BS A 174 includes the addition of high expansion heat-resisting steel to BS HR 650, BS EN 2398 and BS EN 2399 and changes to take account of the mechanical properties of these steels. In addition, the revision introduces a part number code for bolts made from high expansion heat-resisting steels, to distinguish them from bolts made from the BS S 80 material. This code will also be marked on the bolt surface – see Clause 9.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

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 cannot confer immunity from legal obligations.

1 Scope

This British Standard specifies the materials, dimensions and inspection requirements for D-slot recess, corrosion-resisting steel bolts with 100° countersunk heads and unified threads for aircraft (Strength Class 880 MPa).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS S 80, *High chromium-nickel corrosion resisting steel forging stock, bars, forgings and parts (880 to 1 080 MPa: limiting ruling section 100 mm)*

BS 4A 100:2003, *Specification for general requirements for bolts and free running nuts of tensile strength not exceeding 1 249 MPa*

BS HR 650, *Specification for high expansion heat-resisting steel bar and wire for the manufacture of bolts, studs, set screws and nuts (Ni 25.5, Cr 15, Ti 2, Mn 1.5, Mo 1.25, Si 0.7, V 0.3) (Limiting ruling section 50 mm)*

BS EN 2398, *Aerospace series – Heat resisting steel FE-PA2601 (X6NiCrTiMoV26-15) – $R_m \geq 900$ MPa – Bars for machined bolts – $D \leq 25$ mm*

BS EN 2399, *Aerospace series – Heat resisting steel FE-PA2601 (X4NiCrTiMoV26-15) – $R_m \geq 900$ MPa – Bars for forged bolts – $D \leq 25$ mm*

3 General

The bolts shall conform to the relevant requirements of BS 4A 100:2003 in respect of manufacture, screw threads and identification and marking.

4 Material and manufacture

4.1 The bolts shall be manufactured by one of the following methods:

- a) machined from bright drawn bars which conform to one of the British Standards specified in Table 1;
- b) forged from material which conforms to one of the British Standards specified in Table 1.

4.2 The materials used for the manufacture of forged bolts shall have the following mechanical properties in the finally heat treated condition:

- a) 0.2% proof stress (min.): 590 MPa;
- b) tensile stress (min.): 880 MPa;
- c) elongation (min.): 12%;
- d) Izod impact (min.): 55 J (40 ft.lbf). Not applicable to the materials given in BS HR 650, BS EN 2398 and BS EN 2399.

Table 1 Materials for manufacture of bolts

BS No.	Material	Application
BS S 80	2½% nickel-chromium-molybdenum steel	For the manufacture of machined bolts
BS HR 650	High expansion heat-resisting steel	For the manufacture of forged bolts
BS EN 2398	High expansion heat-resisting steel	For the manufacture of machined bolts
BS EN 2399	High expansion heat-resisting steel	For the manufacture of forged bolts

5 Dimensions

5.1 All finished bolts shall conform to the dimensions and tolerances given in Figure 1, Figure 2 and Table 2.

5.2 The clamping length of the bolt shall conform to the dimensions and tolerances given in Table 3, and shall be such that, when a standard nut without countersink or a ring gauge without countersink has been screwed on as far as possible by hand, its leading face is within the distance M from the upper surface of the bolt head. The runout of thread shall not exceed twice the pitch.

5.3 The nominal length of the bolt shall be the minimum bearing length L , which is determined by the minimum clamping length M , less two thread pitches. See Figure 3.

6 Screw threads

The bolts shall have unified threads of the form and class of fit specified in the relevant requirements of BS 4A 100:2003, Clause 8.

7 Protective finish

None.

8 Hardness values

The hardness values of finished bolts shall be as follows:

- a) for machined components:
255 min./321 max. HB or 270 min./340 max. HV;
- b) for forged components:
248 min./341 max. HB or 260 min./360 max. HV.

9 Identification and marking

9.1 Identification

The British Standard identifier and part number (in accordance with Table 3) shall not be applied to the bolts, but shall be clearly marked on labels of parcels of bolts together with the batch identification code.

NOTE For example, A174-11D is a bolt with thread size 10-32 UNF and bearing length 1.1 inches manufactured in BS S 80 material and A174X11D is a bolt the same size manufactured in BS EN 2398 or BS EN 2399 material.

9.2 Marking

Bolts manufactured in BS HR 650, BS EN 2398 and BS EN 2399 material shall be marked with an "X" in accordance with BS 4A 100:2003, Clause 8.

10 Inspection procedure

The bolts shall be inspected in accordance with the relevant requirements of BS 4A 100:2003.

NOTE The requirements for gauging head dimensions are given in A.8.

Figure 1 Basic dimensions

