

British Standard: Aerospace Series  
 Specification for  
 100° countersunk head steel bolts  
 [160 000 lbf/in<sup>2</sup> (1100 MPa)  
 with Hi-torque speed drive recesses\*]

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## Foreword

British Standard A 230 was prepared to provide a range of 160 000 lbf/in<sup>2</sup> (1100 MPa) to 180 000 lbf/in<sup>2</sup> (1250 MPa) steel bolts with UNJ profile threads and close tolerance 100° countersunk heads and shanks for aircraft use. The lengths of the bolts are in fractional increments. This revision includes a speed-drive feature in the recess and also oversize dimensions for the bolts.

The heads have an undercut plunge milled slot and the bolts are similar in all respects except recess to those bolts specified in BS A 232 '100° countersunk head steel bolts (160 000 lbf/in<sup>2</sup> (110 hbar) with torq-set recesses)'.

\* Attention is drawn to the fact that the Hi-torque speed drive recess is claimed to be the subject of British and foreign patents.

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As in BS A 173\* the 'flushness tolerance' method is adopted for the dimensioning of the countersunk head. The basic principles and advantages of this method are outlined in Appendix A to this standard, together with the suggested methods of gauging. Details of the method gauging the screwdriver recesses are given in Appendix B. Screwdriver point dimensions are given in Appendix C.

This standard requires reference to the following British Standards:

- BS 4084 Unified screw threads of 'UNJ' basic profile.
- BS A 100 General requirements for bolts and nuts of tensile strength not exceeding 180 000 lbf/in<sup>2</sup> (1250 MPa).
- BS S 148 Low nickel-chromium steel (Bar for the manufacture of forged bolts).
- BS S 147 Nickel-chromium-molybdenum steel (Bar for the manufacture of forged bolts).

NOTE. The figures in inch units are to be regarded as the standard. A table is given in Appendix E to provide a ready means of calculating the approximate metric equivalents of the imperial dimensions. More accurate conversions should be based on the tables in BS 350 'Conversion factors and tables'.

## Specification

### 1. Scope

This British Standard specifies the materials, dimensions finish and inspection requirements for cadmium plated steel bolts with countersunk heads and Unified threads for aircraft use.

### 2. General requirement

The bolts shall be manufactured, inspected and tested in accordance with the requirements of BS A 100.

### 3. Material and manufacture

3.1 The bolts shall be forged from material which complies with the latest issue of one of the following British Standards:

- S 147
- S 148

3.2 In the finally heat-treated condition, the mechanical properties of the material used for forged bolts shall be as follows:

|                                |                                                      |
|--------------------------------|------------------------------------------------------|
| 0.2 % proof stress             | not less than 140 000 lbf/in <sup>2</sup> (96 MPa)   |
| tensile strength               | not less than 160 000 lbf/in <sup>2</sup> (1100 MPa) |
| elongation on $5.65\sqrt{S_0}$ | not less than 10 %                                   |

### 4. Dimensions

4.1 All bolts shall conform to the dimensions and tolerances given in Tables 1 and 2 and as designated in Figs. 1 and 2.

4.2 The run-out of the thread shall comply with the relevant requirements of BS A 100.

4.3 The nominal length of the bolt shall be the bearing length  $L$ .

4.4 Oversizes for bolts are designated as X and Y for first and second oversize respectively. Dimensions are given in Appendix D.

### 5. Screw threads

The screw threads shall conform to the basic thread form, diameter and related pitches specified in BS 4084, Class 3A.

### 6. Anti-corrosion treatment

All bolts shall be coated with cadmium, in accordance with the relevant requirements of BS A 100.

\* BS A 173 '100° countersunk head steel bolts (Unified threads) for aircraft'.

**Amendment Slip No.1, published 29 October 1976  
to British Standard 2A 230 : 1974  
(Aerospace Series)**

**100° countersunk head steel bolts  
[160 000 lbf/in<sup>2</sup> (1100 MPa) with Hi-torque  
speed drive recesses]**

**Revised text**

**AMD 2130  
October 1976**

**Contents**  
In the entry for Fig. 2 delete 'lead' and substitute 'head'.

**AMD 2130  
October 1976**

**Foreword**  
At the end of the list of reference standards insert the following:  
'S 149 1.75 per cent nickel-chromium-molybdenum steel  
S.... † 1 % chromium-molybdenum steel bars for the manufacture of forged  
bolts and forged nuts'  
At the bottom of the page insert the following footnote:  
'† In course of preparation.'

**AMD 2130  
October 1976**

**Clause 3.1**  
Delete 'S 147' and 'S 148' and substitute the following:  
'S 147 or  
S 148 or  
S 149 or  
S ...†'

**AMD 2130  
October 1976**

**Clause 3.2**  
In line 3 delete '(96 MPa)' and substitute '(960 MPa)'.

**AMD 2130  
October 1976**

**Table 1. Thread, head and recess dimensions**  
In column 10 delete the last entry '1.017' and substitute '1.007'.  
In column 15, for size  $\frac{3}{8}$ –24, delete '0.0246' and substitute '0.0426'.



**Amendment No. 2**  
**published and effective from 31 May 1990**  
**to British Standard 2A 230 : 1974**  
**(Aerospace series)**

**Specification for 100 ° countersunk head steel bolts**  
**[160 000 lbf/in<sup>2</sup> (1100 MPa) with Hi-torque speed**  
**drive recesses\*]**

## Revised text

AMD 6151  
 May 1990

### Title

In the title delete ' [160 000 lbf/in<sup>2</sup> (1100 MPa) with Hi-torque speed drive recesses\*]' and substitute ' [1100 MPa with Hi-torque speed drive recesses\*]'.

AMD 6151  
 May 1990

### Foreword (as amended by Amendment No. 1)

In paragraph 1, delete 'range of 160 000 lbf/in<sup>2</sup> (1100 MPa) to 180 000 lbf/in<sup>2</sup> (1250 MPa)' and substitute 'range of 1100 MPa to 1250 MPa'.

In paragraph 2, delete 'steel bolts (160 000 lbf/in<sup>2</sup> (110 hbar) with torq-set recesses)' and substitute '(1100 MPa with Torq-set recesses)'.

In the paragraph relating to standards referred to delete,

'BS A 100 General requirements for bolts and nuts of tensile strength not exceeding 180 000 lbf/in<sup>2</sup> (1250 MPa)'

and substitute the following:

'BS A 100 General requirements for bolts and nuts of tensile strength not exceeding 1250 MPa'.

AMD 6151  
 May 1990

### Clause 3.2 (as amended by Amendment No. 1)

In line 3 delete, '140 000 lbf/in<sup>2</sup> (960 MPa)' and substitute '960 MPa'.

In line 4 delete, '160 000 lbf/in<sup>2</sup> (1100 MPa)' and substitute '1100 MPa'.



## 7. Identification and marking

The bolts shall be marked on the top face of the head with the number of this standard and the relevant diameter/length code shown in Table 2 and Appendix D.

|           |                 |
|-----------|-----------------|
| A 230 E6  | Standard bolt   |
| A 230 E6X | First oversize  |
| A 230 E6Y | Second oversize |

## 8. Gauging

8.1 The method of head dimensioning shown in Table 1 defines maximum and minimum head envelopes which control flushness in the manner described in Appendix A.

8.2 The type of gauge shown in Figs. 4 and 5 is recommended as being suitable for flushness measurement, but the type of gauge to be used is not a mandatory requirement of this standard. The gauge shown in Figs. 4 and 5 does not control the head angle, which will require to be checked at intervals during production. An additional gauge will be necessary for the absolute minimum head diameter.

8.3 The penetration of the recess shall be gauged in accordance with the dimensions shown in Appendix B.

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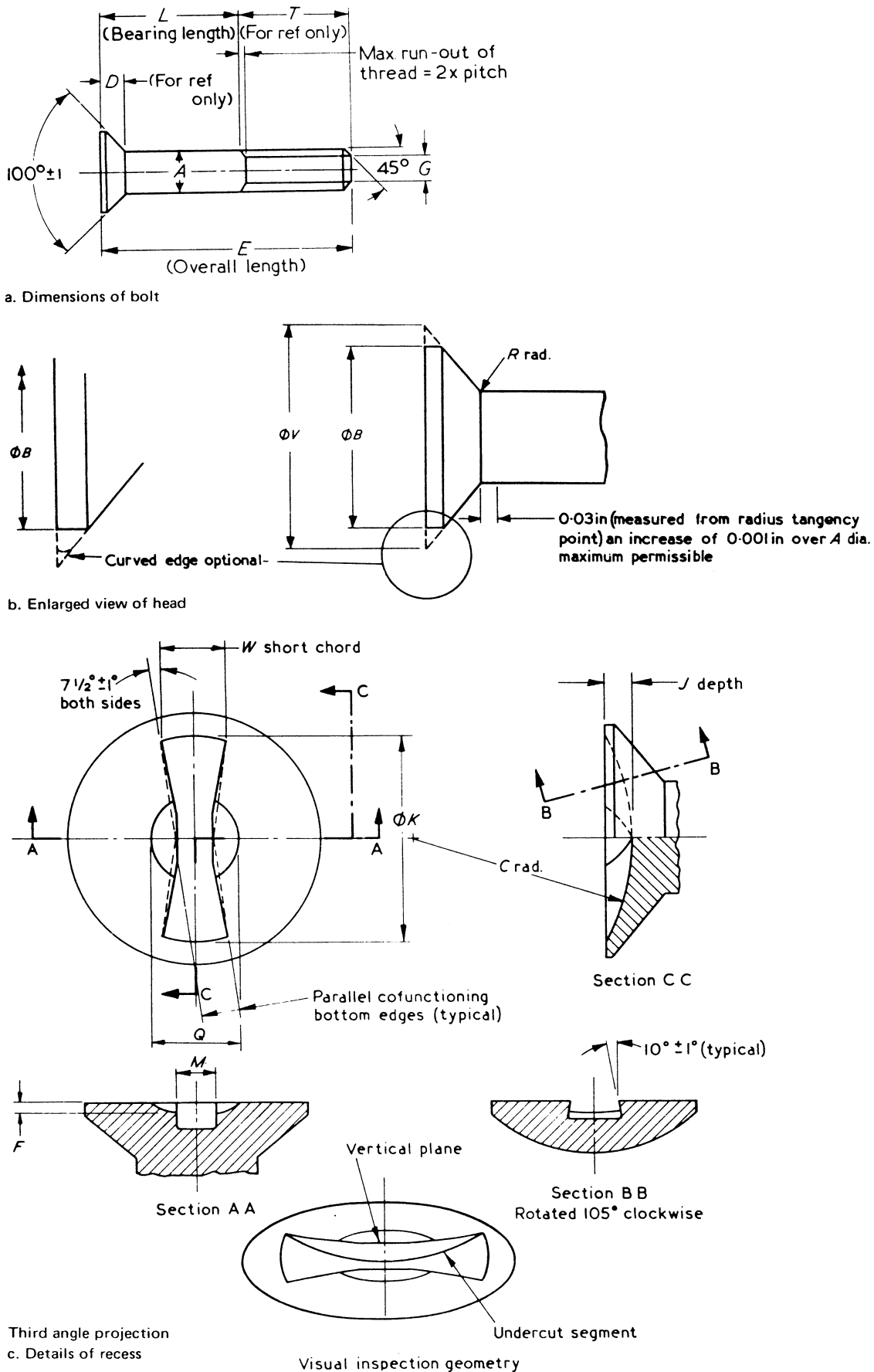


Fig. 1. Bolt dimensions