

2 S. 116, January, 1964
(Replacing British Standard S.116)

BRITISH STANDARDS INSTITUTION
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BRITISH STANDARD SPECIFICATION
FOR AIRCRAFT MATERIAL
'40' CARBON STEEL
BRIGHT BARS FOR MACHINING

(55-65 tonf/sq in; limiting ruling section $\frac{3}{4}$ inch)
(Primarily intended for the manufacture of machined bolts)

NOTE 1. Where metric equivalents are stated the figures in British units are to be regarded as the standard. Where Fahrenheit equivalents are stated, the temperatures in degrees Celsius are to be regarded as the standard. The conversions are approximate. More accurate conversions should be based on the tables in B.S. 350, 'Conversion factors and tables'.

NOTE 2. In place of the customary, but incorrect use of the pound, ton or kilogramme as units of force, the units called pound-force (abbreviation lbf), ton-force (abbreviation tonf) or kilogramme-force (abbreviation kgf) have been used in this standard. These are the forces which, when acting on a body of mass one pound, one ton or one kilogramme respectively, give it an acceleration equal to that of standard gravity.

1. Inspection and testing procedure.

- 1.1 This British Standard shall be used in conjunction with British Standard 3 S.100, Sections One and Three.
- 1.2 *Sulphur printing or deep etching tests.* Samples shall be selected in accordance with British Standard 3 S.100, Section One, Clause 7.2.2.

2. Process of manufacture.

The material shall be manufactured by an open hearth or an electric process, unless otherwise agreed between the manufacturer and the purchaser in accordance with British Standard 3 S.100, Section One, Clause 3.1.

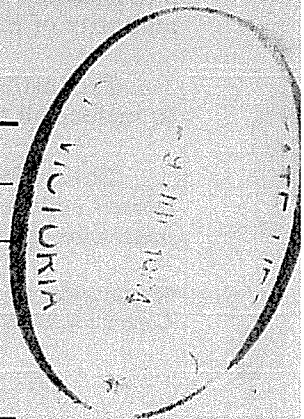
3. Chemical composition.

The steel shall contain:

Element	Per cent	
	min.	max.
Carbon	0.35	0.45
Silicon	0.10	0.35
Manganese	0.8	1.0
Sulphur	—	0.040
Phosphorus	—	0.040

4. Surface dressing.

The material shall be locally dressed in accordance with the requirements of British Standard 3 S.100, Section One, Clause 5.2.



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5. Condition.

The bars shall be supplied finally heat treated and cold drawn, cold rolled, machined or ground before or after final heat treatment.

6. Final heat treatment.

6.1 The final heat treatment shall be:

- a. Harden in oil from a temperature between 830°C and 860°C (1530°F and 1580°F).
- b. Temper at a suitable temperature between 550°C and 660°C (1020°F and 1220°F).

6.2 Hardened and tempered bars which have been subjected to a cold straightening or cold rolling operation shall be given a stress relieving treatment which shall be sufficient to restore the proof stress.

7. Mechanical properties.

7.1 *Tensile tests.* The mechanical properties obtained from test pieces selected and prepared in accordance with the relevant requirements of British Standard 3 S.100 shall be:

0.1 per cent proof stress		Tensile strength				Elongation per cent on gauge length	
tonf/sq in	kgf/mm ²	tonf/sq in		kgf/mm ²		5.65 $\sqrt{S_0}$	4 $\sqrt{S_0}$
min.	min.	min.	max.	min.	max.	min.	min.
43	68	55	65	87	102	13	18

7.2 *Hardness.* The hardness of finally heat treated material shall be not less than 248 HB nor more than 302 HB.

This British Standard, having been approved by the Aircraft Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council of the Institution on 31st January, 1964.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following B.S.I. references relate to the work on this standard:
Committee reference ACE/15. Draft for comment D62/3645.

D 11
8620-1
B 77

UDC 629.13 : 669.14.412 : 669.14.018.23

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PD 6325

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Amendment No. 1, published 31 January, 1968
to British Standard 2S.116 : 1964
'40' carbon steel bright bars for machining
(55/65 tonf/sq in: limiting ruling section $\frac{3}{4}$ inch)

Revision

7.1 Tensile tests. In the table columns headed '0.1 per cent proof stress', delete '0.1' and substitute '0.2', delete '43' and substitute '44', and delete '68' and substitute '69'.

Delete also the column headed '4√S₀'.

Insert the following note below the table:

'NOTE. The 0.1 per cent proof stress is expected to be not less than 43 tonf/sq in (68 kgf/mm²).'

7.2 Hardness. Delete the existing text and substitute the following:

'The hardness of finally heat treated material shall be:

248 min. / 302 max. HB
or 260 min. / 315 max. HV'

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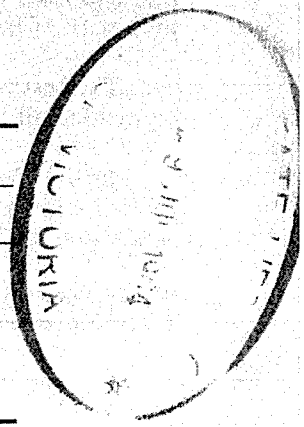
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