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S. 126, January, 1964
(Replacing in part British Standard S.108)

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**BRITISH STANDARD SPECIFICATION
FOR AIRCRAFT MATERIAL**

**23/14 CHROMIUM-NICKEL HEAT-RESISTING STEEL
(Niobium stabilized)**

(35 tonf/sq in; limiting ruling section 6 in)

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.

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1. Inspection and testing procedure.

1.1 This British Standard shall be used in conjunction with the relevant sections of British Standard 3 S.100 as follows:

Bars for machining delivered in other than the finally heat treated condition. (See Clause 5.1)

Sections One and Two.

Bars for machining delivered in the finally heat treated condition

Sections One and Three.

Billets and bars for forging

Sections One and Five.

Forgings

Sections One and Six.

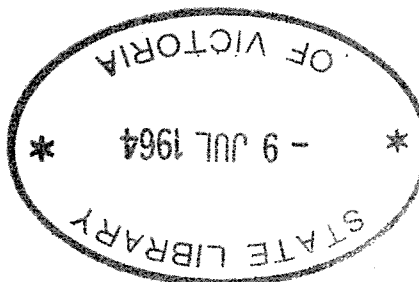
Parts heat treated after machining

Sections One and Seven.

1.2 *Sulphur printing or deep etching tests.* Samples shall be selected in accordance with British Standard 3 S.100, Section One, Clause 7.2.1.

2. Process of manufacture.

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



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3. Chemical composition.

The steel shall contain:

Element	Per cent	
	min.	max.
Carbon	—	0.15
Silicon	0.20	1.0
Manganese	0.5	2.0
Nickel	13.0	16.0
Chromium	22.0	25.0
Niobium	8 × carbon content	—
Sulphur	—	0.025
Phosphorus	—	0.035

4. Surface dressing.

The material shall be overall dressed in accordance with the requirements of British Standard 3 S.100, Section One, Clause 5.1.

5. Condition.

5.1 The material shall be supplied in the appropriate condition stated below unless otherwise agreed between the manufacturer and the purchaser in which case the condition in which the material is to be supplied shall be stated on the order.

Designation	Material	Condition of supply
S.126B	Black bars for machining	Finally heat treated
S.126D	Bright bars for machining	Finally heat treated and subsequently cold drawn, or cold rolled, or machined, or ground
S.126A	Billets and bars for forging	As rolled or forged
S.126C	Forgings	Finally heat treated

5.2 Parts shall be supplied finally heat treated.

6. Final heat treatment.

The final heat treatment shall be:

Soften by cooling freely in air or quenching in oil or water from a temperature between 950°C and 1100°C (1740°F and 2010°F).

7. Mechanical properties.

7.1 Mechanical tests. Except where they are required by British Standard 3 S.100 to be agreed between the manufacturer and the purchaser, the mechanical properties obtained from test pieces selected and prepared in accordance with the relevant requirements of British Standard 3 S.100 shall be not less than:

0.1 per cent proof stress		Tensile strength		Elongation per cent on gauge length		Impact
tonf/sq in	kgf/mm ²	tonf/sq in	kgf/mm ²	5.65 √S ₀	4 √S ₀	ft lbf
13	20	35	55	28	30	50

8. Weld decay test.

8.1 A bend test piece shall be selected by the inspector to represent each cast of steel and shall be tested after being finally heat treated in accordance with Clause 6. Each bend test piece shall be not larger than ½ inch diameter or thickness. It shall be heated for 30 minutes at a temperature of 650°C (1200°F) and cooled in air. It shall then be immersed for 72 hours in a boiling solution having the following composition:

111 grammes copper sulphate crystals (CuSO₄ 5 H₂O)
98 grammes concentrated sulphuric acid (sp. gr. 1.84)
made up to 1 litre with distilled water.

Precautions shall be taken during boiling to prevent concentration due to evaporation.

8.2 Each test piece shall then be dropped on a metal or stone surface and shall emit a clear metallic ring. The test pieces shall then be bent through 90° over a radius of three times the diameter or thickness of the test piece and shall withstand this treatment without cracking.

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.

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PD 6331

Amendment No. 1, published 31 January, 1968

to British Standard S.126 : 1964

23/14 chromium-nickel heat-resisting steel

(niobium stabilized)

(35 tonf/sq in: limiting ruling section 6 in)

Revision

7.1 Mechanical tests. In the table columns headed '0.1 per cent proof stress', delete '0.1' and substitute '0.2', delete '13' and substitute '14', and delete '20' and substitute '22'.

Delete also the column headed ' $4\sqrt{S_0}$ '.

Insert the following note below the table:

'NOTE. The 0.1 per cent proof stress is expected to be not less than 13 tonf/sq in (20 kgf/mm²).'