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4T.50, March, 1972
(Superseding British Standard 3T.50)

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BRITISH STANDARD : AEROSPACE SERIES
SPECIFICATION FOR
CHROMIUM-MOLYBDENUM STEEL TUBE (770 N/mm²)

1. INSPECTION AND TESTING PROCEDURE

1.1 This British Standard shall be used in conjunction with British Standard 2T.100, Sections 1 and 2.

1.2 Sulphur printing or deep etching tests. Samples shall be selected in accordance with British Standard 2T.100, 1.6.2.1.

1.3 Tubes 12.5 mm (0.5 in) outside diameter and greater shall be subjected to the proof bend test in accordance with British Standard 2T.100, 1.13.

1.4 The dimensions shall be in accordance with the requirements of British Standard 2T.100 Table 1 or Table 4 for tubes in the cold drawn and tempered condition and Table 2 or Table 5 for tubes in the hardened and tempered condition and the normalized and tempered condition.

2. PROCESS OF MANUFACTURE

2.1 The steel shall be manufactured by an electric process unless otherwise agreed between the manufacturer and the purchaser in accordance with British Standard 2T.100, 1.3.1.

2.2 Tubes shall be straightened before heat treatment. Any subsequent re-straightening required of tubes subject to proof bend testing, shall not be carried out until the tubes have been proof bend tested.

3. CHEMICAL COMPOSITION

The steel shall contain:

Element	%	
	min.	max.
Carbon	–	0.50
Silicon	0.15	0.35
Manganese	0.4	0.8
Phosphorus	–	0.040
Sulphur	–	0.040
Chromium	0.8	1.2
Molybdenum	0.15	0.25
Nickel	–	0.5

4. SURFACE DRESSING

The steel shall be overall dressed in accordance with the requirements of British Standard 2T.100, 1.5.1.

5. CONDITION

Tubes shall be supplied in the cold drawn and tempered or normalized and tempered or hardened and tempered condition at the option of the manufacturer unless one of these is stated on the order.

6. HEAT TREATMENT

6.1 Hardening. Heat at a temperature between 860 °C and 910 °C and quench in oil or water.

6.2 Normalizing. Heat at a temperature between 860 °C and 910 °C and cool in air.

6.3 Tempering. (*Applicable to the cold drawn and normalized and hardened conditions.*) Heat at a temperature not greater than 650 °C and cool in a suitable manner.

7. DECARBURIZATION

Unless otherwise agreed between the manufacturer and the purchaser* and stated on the order the decarburization determined in accordance with British Standard 2T.100, 2.8, shall not exceed 0.1 mm (0.004 in) at either the inner or outer surface.

8. MECHANICAL PROPERTIES

8.1 The mechanical properties obtained from test pieces selected, prepared and tested in accordance with the relevant requirements of British Standard 2T.100 shall comply with the following:

(1) *Tensile test.* The values in N/mm² are to be regarded as the standard.

0.2 % † proof stress		Tensile strength			
N/mm²	tonf/in²	N/mm²		tonf/in²	
min.	min.	min.	max.	min.	max.
700	45	770	970	50	63

NOTE. 1 N/mm² = 1 MN/m² = 0.102 kgf/mm² = 0.065 tonf/in². Information on SI units is given in BS 3763, 'The International System of units (SI)'; see also BS 350, 'Conversion factors and tables'.

*The purchaser is responsible for securing the concurrence of the parent design firm.

†Applicable only to tubes not subjected to the proof bend test.

(2) *Flattening test.* The distance between the inner surfaces of the test piece in the direction of flattening shall be not greater than $8T$ or 0.88 bore diameter, whichever is the smaller.

(3) *Bend test (alternative to (2)).* The test piece shall be bent cold over a former of radius $3T$.

(4) *Proof bend test.* The deflection and proof bending moment shall be based on a bending stress of 700 N/mm^2 (45 tonf/in^2).

8.2 Hardness test*. The hardness of the tubes shall be:
229 min./285 max. HB or
240 min./300 max. HV.

*Applicable only to tubes not subjected to the proof bend test.

This British Standard, having been approved by the Aerospace Industry Standards Committee was published under the authority of the Executive Board of the Institution on 31 March 1972.

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 BSI references relate to the work on this standard:
Committee reference ACE/15 Draft for comment 70/2630

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