

**Ministry of Defence  
Defence Procurement Agency, ADRP2  
Abbey Wood  
Bristol  
BS34 8JH**

## **OBSOLESCENCE NOTICE**

All DTD specifications were declared obsolescent from 1<sup>st</sup> April 1999. All DTD 900 series approvals also lapsed at that time. The standards will no longer be updated but will be retained as obsolescent documents to provide for the servicing of existing equipment.

### **Further Guidance**

The aim in declaring the specifications obsolescent is to recognise that the documents are not being updated and thus should be used with care by both purchaser and supplier. For example, a specification could contain valid technical information but may also contain type approval clauses that contradict procurement policy and/or use materials that do not comply with environmental legislation. The obsolescent specification can still be used as a basis for a purchase provided that the supplier and purchaser agree suitable changes to the specification within the purchase order/contract.

For the DTD 900 system, each specification has provided an MoD approved material and process. For these items, the declaration of obsolescence will constitute the termination of both the extant MoD approval and the continuing MoD assessment that had underpinned those approvals. Again, the technical content of the document remains valid and can be used by both purchaser and supplier as a basis for a contract but an acceptable (to the parties) approval/assessment procedure would be required.

**Aerospace Material Specification**

**17-7 CHROMIUM-NICKEL PRECIPITATION HARDENING  
STAINLESS STEEL ROD, WIRE AND SPRINGS**

*NOTE.* This specification is one of a series issued by the Ministry of Technology to meet a limited requirement not covered by any existing British Standard for aerospace material.

**1. Inspection and testing procedure**

1.1 This specification shall be used in conjunction with British Standard 3S.100, Sections One and Ten.

*NOTE.* Where the requirements of this specification and British Standard 3S.100 are incompatible this specification shall be overriding.

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

1.3 Billets and bars, for the production of rod for subsequent drawing, shall be subjected to ultrasonic examination to a standard to be agreed between the purchaser\* and the manufacturer.

**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 3S.100, Section One, 3.1.

**3. Chemical composition**

3.1 The steel shall contain:

Element	Per cent	
	min.	max.
Carbon	—	0.09
Silicon	—	1.0
Manganese	—	1.0
Phosphorus	—	0.035
Sulphur	—	0.025
Aluminium	0.75	1.50
Chromium	16.0	18.0
Nickel	6.50	7.75

**4. Surface dressing**

4.1 The steel from which the rods are rolled should be overall dressed in accordance with the requirements of British Standard 3S.100, Section One, 5.1.

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

## 5. Condition

5.1 The steel 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 steel is to be supplied shall be stated on the order.

Form	Condition of supply
Rod for the manufacture of wire	Solution annealed
Wire for the manufacture of springs	Cold drawn
Springs	Finally heat treated

## 6. Freedom from defects

6.1 Samples, selected and prepared for examination in accordance with British Standard 3S.100 Section Ten, 1.3.2 or 2.3.2 and 2.3.3, shall be immersed for approximately 2 seconds for every 0.025 mm (0.001 in) of diameter, but for not less than 2 minutes nor more than 10 minutes, in a solution containing 10% by volume of concentrated nitric acid and 3.5% by volume of hydrofluoric acid (HF 40%) in water at approximately 60°C. An alternative solution may be used if agreed by the Inspecting Authority.

6.2 Alternatively to 6.1, for wire less than 2.0 mm (0.079 in) diameter the deep etching test shall be replaced by a twisting test. The test samples selected shall have a test length of 100 diameters and shall be twisted at a speed not exceeding 60 rev/min until failure occurs. The wire shall be examined after 5 turns and after failure and shall show no evidence of defects likely to be detrimental to the end use.

6.3 A transverse section from each etched or twisted sample shall be mounted, in such a manner that the edge is adequately supported, and polished. The sections shall be microscopically examined at a magnification of 250 diameters. No surface defect shall exceed 0.025 mm (0.001 in) or 1.5% of the diameter, whichever is the smaller.

## 7. Heat treatment

7.1 *Solution annealing.* Heat at a temperature between 1050°C and 1100°C and cool in air.

7.2 *Final heat treatment.* The precipitation hardening treatment applied to test pieces and springs produced from cold drawn wire shall be heat at a temperature of 480°C ± 5°C for 1 hour and cool in air.

## 8. Mechanical properties

8.1 *Mechanical tests on wire in the cold drawn condition.*

8.1.1 *Tensile test.* The tensile properties of test pieces selected and prepared in accordance with British Standard 3S.100, Section Ten, 2.5 shall be:

SI Units				Imperial Units			
Nominal wire diameter		Tensile strength		Nominal wire diameter		Tensile strength	
Over	Up to and including	min.	max.	Over	Up to and including	min.	max.
mm	mm	hbar	hbar	in	in	tonf/in <sup>2</sup>	tonf/in <sup>2</sup>
—	0.710	180	—	—	0.030	117	—
0.710	1.25	175	205	0.030	0.052	114	133
1.25	2.24	165	195	0.052	0.086	107	126
2.24	3.55	150	180	0.086	0.136	97	117
3.55	5.0	135	170	0.136	0.202	88	110
5.0	6.3	130	165	0.202	0.264	85	107
6.3	10.0	125	155	0.264	0.400	81	100

8.1.2 *Reverse bend test (3 mm (0.119 in) diameter, or thickness, and greater).* The test pieces, selected in accordance with British Standard 3S.100, Section Ten, 2.5 shall be tested in accordance with British Standard 3S.100, Section Ten, 2.6.2.2. or 2.6.3. For round wire each test piece shall withstand without cracking being bent 3 times over a radius 3 times the diameter of the test piece.

8.1.3 *Wrapping test (less than 3 mm (0.119 in) diameter or thickness).* The test pieces, selected in accordance with British Standard 3S.100, Section Ten, 2.5, shall be tested in accordance with British Standard 3S.100, Section Ten, 2.6.2.4. or 2.6.3.

8.2 *Mechanical tests on testpieces representing wire or springs in the finally heat treated condition.*

8.2.1 *Tensile test.* The tensile properties of test pieces, selected and prepared in accordance with British Standard 3S.100, Section Ten, 2.5 and 3.6, and heat treated in accordance with 7.2 shall be:

SI Units				Imperial Units			
Nominal wire diameter		Tensile strength		Nominal wire diameter		Tensile strength	
Over	Up to and including	min.	max.	Over	Up to and including	min.	max.
mm	mm	hbar	hbar	in	in	tonf/in <sup>2</sup>	tonf/in <sup>2</sup>
—	0.710	225	—	—	0.030	145	—
0.710	1.25	215	245	0.30	0.052	140	160
1.25	2.24	200	230	0.052	0.086	130	150
2.24	3.55	185	215	0.086	0.136	120	140
3.55	5.0	170	200	0.136	0.202	110	130
5.0	6.3	165	190	0.202	0.264	105	125
6.3	10.0	155	185	0.264	0.400	100	120

8.3 The stress values in hectobars and the dimensions in metric units are to be regarded as mandatory.

*NOTE.* 1 hbar =  $10^7$  N/m<sup>2</sup> = 0.6475 tonf/in<sup>2</sup>. Information on SI units is given in BS.350 "Conversion factors and tables" and in PD 5686 "The use of SI units".

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Approved for issue,

E. W. RUSSELL,

Director of Materials Research and Development/Aviation.

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