

**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.

**Aircraft Material Specification**  
**COPPER-NICKEL-SILICON ALLOY BARS**

*NOTE.—This specification is one of a series issued by the Ministry of Supply either to meet a limited requirement not covered by any existing British Standard or to serve as a basis for inspection of materials the properties and uses of which are not sufficiently developed to warrant submission to the British Standards Institution for standardisation.*

**1. Chemical Composition**

(a) The chemical composition of the alloy shall be:-

Nickel	..	..	..	..	not less than 2.0 nor more than 3.5 per cent.
Silicon	..	..	..	..	not less than 0.4 nor more than 0.8 per cent.

*Impurities :-*

Aluminium	..	..	..	..	not more than 0.02 per cent.
Iron	..	..	..	..	not more than 0.10 per cent.
Total other impurities	..	..	..	..	not more than 0.30 per cent.

Copper .. .. . the remainder.

(b) The manufacturer shall supply the complete analysis of each cast to the inspector.

(c) A "cast" shall be defined as :-

- (i) the product of one furnace melt ;
- (ii) the product of one crucible melt ;
- (iii) the product of a number of crucible or furnace melts where such are aggregated and mixed prior to casting ;
- (iv) where a continuous melting process is employed, a cast shall be taken as the amount of metal tapped from the furnace without any further additions of metal having been made to the charge ;
- (v) or as otherwise defined from time to time.

**2. Manufacture**

The bars shall be supplied in the cold-worked and heat-treated condition.

The cold working comprises cold drawing, cold rolling or cold forging, and may be applied to the bars either between the first and final heat treatments or after heat treatment is completed.

**3. Heat treatment**

All bars shall be heat treated by being heated uniformly at a temperature of not less than 800° C. nor more than 900° C. and quenched in water or oil at the option of the manufacturer. They shall then be heated for the requisite period at a temperature of not less than 450° C.

**4. Freedom from defects**

(a) The material shall be free from harmful defects.

(b) Any material may be rejected for faults in manufacture, although it has been passed previously on chemical composition and mechanical tests.

**5. Margins of manufacture**

The margins of manufacture shall be in accordance with those given in Tables I and II of the Appendix.

**6. Straightness**

All bars shall be straight.

## 7. Selection and preparation of mechanical test samples

(a) Bars from the same cast and heat treated together shall be grouped in a parcel, and the inspector shall select one test sample from the largest size of bar in the parcel for the tensile test specified in Clause 8.

(b) The test samples shall be marked as directed by the inspector, and shall then be removed from the bars by nicking and breaking off, or they may be sawn, and, after separation from the bar, fractured. The surfaces of the fractures must show freedom from pipe or other defect.

(c) For bars up to and including  $1\frac{1}{8}$  inches diameter or width across flats, the tensile test piece shall be machined concentrically from the test sample.

For bars over  $1\frac{1}{8}$  inches diameter or width across flats, the longitudinal axis of the tensile test piece shall be  $\frac{3}{16}$  inch from the surface of the test sample.

(d) The test samples shall not be further heat treated or mechanically worked before being tested.

(e) Each tensile test piece shall be turned to the dimensions of one of the British Standard tensile test pieces of British Standard A.4 (latest issue). The parallel portion of any test piece may be increased in length to accommodate the extensometer employed.

## 8. Tensile Test

(a) The mechanical properties of the test pieces machined from the samples as specified in Clause 7 must comply with the following requirements:-

0.1 per cent. proof stress	..	..	..	not less than 37 tons per square inch.
Ultimate tensile stress	..	..	..	not less than 42 tons per square inch.
Elongation	..	..	..	not less than 15 per cent.

The load shall be applied axially.

Should a tensile test piece break outside the middle half of its gauge length the test may be discarded and another test made.

(b) *Re-tests.*-If any test piece fails to pass the tensile test specified in paragraph (a) above the inspector shall select for test from the same parcel two further samples ; one of these must be from the bar from which the original test sample was taken, unless that bar has been withdrawn by the manufacturer. Test pieces prepared from these two further samples as specified in Clause 7 must pass the tensile test specified in paragraph (a) above.

## 9. Hardness test

(a) Hardness determinations shall be carried out according to British Standard 240 for the Brinell hardness or according to British Standard 427 for the diamond pyramid hardness or by any other approved method. In all Brinell tests the value  $P/D^2$  shall be 30 and the load and ball arranged accordingly.

All hardness determinations made on bars in a parcel shall be made under the same conditions of testing.

(b) Ten per cent of all bars in each parcel shall be submitted to the hardness test. The test shall be made at one end of each selected bar, but the inspector at his discretion may require the test to be made at both ends of each selected bar.

(c) The Brinell hardness number or the equivalent on the scale of the method adopted shall be not less than 174 nor more than 223.

(d) *Re-tests.*-If any bar fails to pass the hardness test specified in paragraph (b) above it may be rejected and all bars in the same parcel as that which failed shall be hardness tested in a similar manner.

## 10. Identification

(a) All bars  $\frac{3}{4}$  inch diameter or width across flats and under and from the same cast, passed by the inspector, shall be tied in bundles, which shall bear a tag stamped with the mark of the inspector and such other marking as will ensure full identification of the material.

(b) All bars over  $\frac{3}{4}$  inch diameter or width across flats, passed by the inspector, shall be stamped with the mark of the inspector and such other marking as will ensure full identification of the material. All stamping shall be done at one extreme end of each bar.

## APPENDIX

TABLE I  
MARGINS OF MANUFACTURE

*Round and Square Bars*

1	2	3
Nominal Size of Bar (Diameter or width across flats)	Rolled	Drawn after Rolling
	Margin of Manufacture -0.000	Margin of Manufacture +0.000
Inch	Inch	Inch
$\frac{1}{8}$ (0.125) .. ..	—	- 0.0015
$\frac{1}{4}$ (0.1875) .. ..	—	- 0.0015
$\frac{3}{8}$ (0.25) .. ..	+0.010	- 0.002
$\frac{1}{2}$ (0.3125) .. ..	+0.010	- 0.002
$\frac{5}{8}$ (0.375) .. ..	+0.010	- 0.002
$\frac{3}{4}$ (0.4375) .. ..	+0.010	- 0.002
$\frac{7}{8}$ (0.5) .. ..	+0.010	- 0.002
$1\frac{1}{8}$ (0.5625) .. ..	+0.010	- 0.002
$1\frac{1}{4}$ (0.625) .. ..	+0.010	- 0.002
$1\frac{3}{8}$ (0.75) .. ..	+0.010	- 0.002
$1\frac{1}{2}$ (0.875) .. ..	+0.010	- 0.003
<b>1</b> .. ..	+0.015	- 0.003
$1\frac{1}{4}$ (1.125) .. ..	+0.015	- 0.003
$1\frac{1}{2}$ (1.25) .. ..	+0.015	- 0.003
$1\frac{3}{4}$ (1.375) .. ..	+0.020	- 0.003
$1\frac{1}{2}$ (1.5) .. ..	+0.020	- 0.004
$1\frac{3}{4}$ (1.625) .. ..	+0.020	- 0.004
$1\frac{1}{2}$ (1.75) .. ..	+0.020	- 0.004
$1\frac{3}{4}$ (1.875) .. ..	+0.025	- 0.004
<b>2</b> .. ..	+0.025	- 0.004
Over 2 and up to and including 3 .. ..	+ 1.5 per cent.	± 0.5 per cent
Over 3 .. ..	+ 2.0 per cent.	± 1.0 per cent

*Note.*-Bars intermediate between the sizes given in column 1 shall not be ordered.

TABLE II  
Hexagon Bars

Rolled Bars			Drawn Bars			Corresponding Sizes of Bright Hexagon Nuts and Bolt-heads				
Width across flats		Margin of Manufacture	Width across flats		Margin of Manufacture	Nominal Size			Width across flats	
Max.	Min.		Max.	Min.		B.S.W.	B.S.F.	B.A.	Max.	Min.
In.	In.	In.	In.	In.	In.	In.	In.	No.	In.	In.
0.117	0.114	0.003	0.117	0.115	0.002	—	—	10	0.117	0.115
0.152	0.149	0.003	0.152	0.150	0.002	—	—	8	0.152	0.150
0.193	0.189	0.004	0.193	0.191	0.002	—	—	6	0.193	0.190
0.248	0.244	0.004	0.248	0.246	0.002	—	—	4	0.248	0.245
0.282	0.278	0.004	0.282	0.280	0.002	—	—	3	0.282	0.279
0.324	0.320	0.004	0.324	0.322	0.002	—	—	2	0.324	0.321
0.365	0.361	0.004	0.365	0.363	0.002	—	—	1	0.365	0.362
0.413	0.409	0.004	0.413	0.411	0.002	—	—	0	0.413	0.410
0.445	0.441	0.004	0.445	0.443	0.002	—	—	—	0.445	0.440
0.525	0.521	0.004	0.525	0.523	0.002	—	—	—	0.525	0.520
0.565	0.561	0.004	0.565	0.563	0.002	—	—	—	0.565	0.560
0.600	0.596	0.004	0.600	0.597	0.003	—	—	—	0.600	0.595
0.655	0.651	0.004	0.655	0.652	0.003	—	—	—	0.655	0.650
0.710	0.706	0.004	0.710	0.707	0.003	—	—	—	0.710	0.705
0.765	0.760	0.005	0.765	0.762	0.003	—	—	—	0.765	0.760
0.820	0.815	0.005	0.820	0.817	0.003	—	—	—	0.820	0.815
0.920	0.915	0.005	0.920	0.917	0.003	—	—	—	0.920	0.915
1.010	1.005	0.005	1.010	1.006	0.004	—	—	—	1.010	1.002
1.100	1.095	0.005	1.100	1.096	0.004	—	—	—	1.100	1.092
1.200	1.195	0.005	1.200	1.196	0.004	—	—	—	1.200	1.192
1.300	1.295	0.005	1.300	1.296	0.004	—	—	—	1.300	1.292
1.390	1.384	0.006	1.390	1.386	0.004	—	—	—	1.390	1.382
1.480	1.474	0.006	1.480	1.476	0.004	—	—	—	1.480	1.468
1.670	1.664	0.006	1.670	1.666	0.004	—	—	—	1.670	1.656
1.860	1.854	0.006	1.860	1.856	0.004	—	—	—	1.860	1.845
2.050	2.042	0.008	2.050	2.046	0.004	—	—	—	2.050	2.035
2.220	2.212	0.008	—	—	—	—	—	—	2.220	2.200
2.410	2.402	0.008	—	—	—	—	—	—	2.410	2.390
2.580	2.570	0.010	—	—	—	—	—	—	2.580	2.555
2.760	2.750	0.010	—	—	—	—	—	—	2.760	2.735
3.150	3.140	0.010	—	—	—	—	—	—	3.150	3.125
Above 3.150	± 1.0 per cent.									

Note. — Bars intermediate between the sizes given in the above table shall not be ordered.

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