

Specification for
COPPER TUBES FOR WATER, GAS, AND SANITATION

AMENDMENT No. 3

December 1987

EXPLANATORY NOTE - This amendment provides for tubes of 65 mm nominal bore and above to be supplied in the as drawn condition. Consequential amendments are made to the mechanical test requirements and the scope. Amendments arising from changes in reference documents have also been incorporated.

To ensure receiving the next amendment to NZS 3501:1976 please complete and return the amendment request form.

DECLARATION

Amendment No. 3 was declared on 18 December 1987 by the Standards Council to be an amendment to NZS 3501:1976 pursuant to the provisions of section 23 of the Standards Act 1965.

(Amendment No. 3, December 1987)

RELATED DOCUMENTS

Delete completely and substitute:

"BRITISH STANDARD

BS 18:1987 Method for tensile testing of metals (including aerospace materials)".

(Amendment No. 3, December 1987)

**1.
SCOPE**

Delete clauses 1.1, 1.2 and 1.3 and substitute:

1.1

This Standard applies to copper tubes of 10 mm to 300 mm nominal bore suitable for connection by compression fittings, by bronze or autogenous welding or by capillary fittings. Tubes are normally supplied in random straight lengths, those of 50 mm N.B. and under in the half-hard condition and those of 65 mm N.B. and above in the as-drawn condition. Tubes of 15 mm and 20 mm N.B. may also be supplied in coil form in the fully annealed condition. Tubes of 65 mm N.B. and above are not suitable for bending or expanding without local heating.

1.2

Maximum working pressures at temperatures up to 65 °C, calculated in accordance with the following formula are given in tables 1 and 3:

$$P = \frac{2Ft}{D-t}$$

where:

P = pressure (MPa)
 F = stress (MPa)
 t = thickness (mm)
 D = outside diameter (mm)

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The following values of stress (F) have been assumed:

annealed condition, $F = 46$ MPa
half-hard condition, $F = 60$ MPa
as drawn condition, $F = 70$ MPa "

(Amendment No. 3, December 1987)

Table 1

Delete and substitute the following:

COPPER TUBES FOR WATER AND GAS

Nominal bore*	Outside diameter		Thickness	Hydrostatic test pressure	Max. working pressure		
	Max.	Min.			Annealed coil	Half-hard	As drawn
mm	mm	mm	mm	MPa	MPa	MPa	MPa
10 (3/8)	11.35	11.27	0.91	6.45	-	10.50	-
15 (1/2)	14.73	14.65	1.02	5.55	6.85	8.95	-
20 (3/4)	21.08	21.00	1.02	3.90	4.70	6.10	-
25 (1)	27.43	27.35	1.02	2.95	-	4.65	-
32 (1 1/4)	34.19	34.11	1.22	2.85	-	4.45	-
40 (1 1/2)	40.54	40.46	1.22	2.40	-	3.70	-
50 (2)	53.24	53.16	1.22	1.85	-	2.80	-
65 (2 1/2)	65.94	65.79	1.22	1.50	-	-	2.65
80 (3)	79.45	79.30	1.63	1.65	-	-	2.95
90 (3 1/2)	92.56	92.41	1.83	1.60	-	-	2.80
100 (4)	105.66	105.51	2.03	1.55	-	-	2.75

* The figures in parenthesis are the inch dimensions by which the tubes were previously designated.

(Amendment No. 3, December 1987)

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MECHANICAL TESTS

Delete clauses 6.1, 6.2 and 6.3 and substitute:

"6.1

Tensile test

When tested in accordance with the requirements of BS 18:Part 1 tubes shall have a minimum tensile strength appropriate to their condition of supply as follows:

<u>Condition</u>	<u>Tensile strength</u>
Annealed	200 MPa
Half-hard	250 MPa
As drawn	280 MPa

6.2

Drift test

When expanded over a taper drift having a 45° included angle (see fig. 1) the tubes shall show neither crack nor flaw when the diameter of the drifted end exceeds the original diameter by not less than 25 % for test pieces tested in the as supplied condition and 30 % for test pieces annealed prior to testing.

6.3

All tensile tests shall be carried out on tubes in the as supplied condition. Drift tests shall be carried out on test pieces in the as supplied condition for tubes of 50 mm N.B. or less but for tubes of 65 mm N.B. and above the test piece shall be annealed before testing."

(Amendment No. 3, December 1987)

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INDEPENDENT TESTS

9.1

Delete the 2nd and 3rd sentences and **substitute:**

"The methods of sampling and analysis adopted for such independent tests shall be subject to agreement by the parties concerned".

(Amendment No. 3, December 1987)

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STANDARDS ASSOCIATION OF NEW ZEALAND
WELLINGTON TRADE CENTRE, 181-187 VICTORIA STREET, WELLINGTON 1

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NZS 3501:1976
Amendment No. 4

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