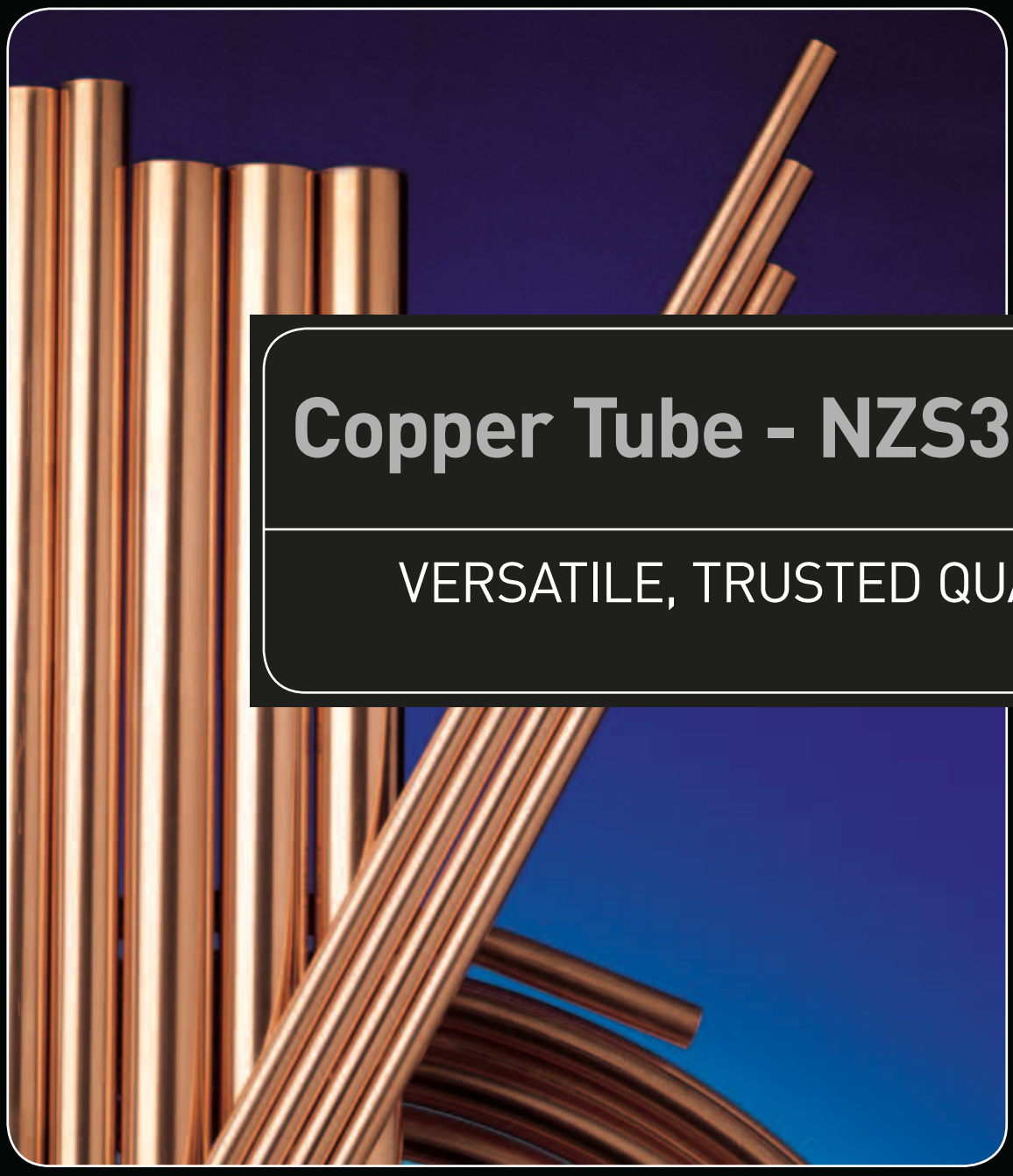
MICO Metals

Crane Copper Tube



Copper Tube - NZS3501

VERSATILE, TRUSTED QUALITY

COPPER TUBE → PLUMBING → GASFITTING → SANITATION

Made in Australia

Crane Copper Tube

Crane copper tube is manufactured to NZS3501 using the highest grade raw materials and modern drawing technology to provide superior products for water, gas and sanitation waste in domestic, commercial and industrial applications.

Crane Copper Tube – NZS3501

- **Certified**: Crane copper tube is certified by Bureau Veritas to comply with New Zealand Standard NZS3501 : 1976 Copper tubes for water, gas and sanitation.
- **Internal Surface Quality**: Crane Copper Tube uses special manufacturing processes to provide enhanced internal bore characteristics that offer improved corrosion resistance and levels of carbon residue well below the values set by the Standard.
- **Quality Manufacturing**: Crane copper tube is Australasian made, and is manufactured and inspected to the highest quality assurance standards.
- **Multi Applications**: Copper tube has great versatility for multiple uses including water, gas and sanitation drainage applications.
- **Inherent Strength**: Copper tube has inherent strength, providing good resistance to external damage, puncture, abrasion, vibration bumps, and has a wide operating range for pressure and vacuum.
- **Impervious**: Copper tube is impervious to oxygen, insecticide, solvents and toxins.
- **Non-Flammable**: Copper tube is non-flammable and does not emit toxic fumes during fire.
- **Full Flow Joints**: Copper tube jointing does not reduce the bore of the tube.
- **Low Friction Loss**: Copper tube provides high flow rates with minimal external dimensions.
- **U.V. Resistant**: Copper tube does not degrade from direct sunlight or become brittle with age.
- **Resists Rodent Attack**: Copper tube is not prone to damage due to rodent attack.
- **Multi Applications**: Copper tube is made to universal size not a unique brand size.
- **Stability**: Copper tube does not creep with age and has 7 to 15 times less lineal expansion than other materials with heat, and continues to perform at high temperatures.
- **Healthier & Non-tainting**: Copper tube does not adversely affect the taste of water, and *reduces the number of harmful micro-organisms in water.

  *Study conducted by INCRA under project N°348 – 1984 using water contaminated with coliforms.
- **Proven Track Record**: Crane copper tube is part of a superior system with a proven track record.
- **Add Value For Life**: Copper tube adds to a home's resale value.
- **Recyclable**: Copper tube is a valuable recyclable material.

Table 1 – NZS3501 Copper Tube for Water & Gas

Crane Item Number	Nominal Size	Max. Outside Diameter (mm)	Min. Outside Diameter (mm	Wall Thickness (mm)	Nominal Weight (kg/m)	Form	Temper	Safe Working Pressure (MPa)	Hydrostatic Test Pressure (MPa)	Softened State Safe Working Pressure (MPa)
50102940	15	14.73	14.65	1.02	0.393	15m Coil	Annealed	6.85	5.55	6.85
50102941	15	14.73	14.65	1.02	0.393	5m Straight	Half hard	8.95	5.55	6.85
50102942	15	14.73	14.65	1.02	0.393	5.8m Straight	Half hard	8.95	5.55	6.85
50103185	20	21.08	21.00	1.02	0.575	15m Coil	Annealed	4.70	3.90	4.70
50103186	20	21.08	21.00	1.02	0.575	5m Straight	Half hard	6.10	3.90	4.70
50103187	20	21.08	21.00	1.02	0.575	5.8m Straight	Half hard	6.10	3.90	4.70
50103234	25	27.43	27.35	1.02	0.757	5m Straight	Half hard	4.65	2.95	3.60
50103273	32	34.19	34.11	1.22	1.130	5m Straight	Half hard	4.45	2.85	3.40
50103296	40	40.54	40.46	1.22	1.347	5m Straight	Half hard	3.70	2.40	2.85
50103324	50	53.24	53.16	1.22	1.782	5m Straight	Half hard	2.80	1.85	2.16
50103349	65	65.94	65.79	1.22	2.218	5m Straight	As drawn	2.65	1.50	1.73

Polylag tube with plastic sleeve for thermal insulation, reduced noise transmission, reduced condensation and increased corrosion protection.

Table 2 – NZS3501 Copper Tube for Sanitation

Crane Item Number	Nominal Size	Max. Outside Diameter (mm)	Min. Outside Diameter (mm	Wall Thickness (mm)	Nominal Weight (kg/m)	Form	Temper	Safe Working Pressure (MPa)	Hydrostatic Test Pressure (MPa)	Softened State Safe Working Pressure (MPa)
50103234	25	27.43	27.35	1.02	0.757	5m Straight	Half hard	-	2.95	-
50103273	32	34.19	34.11	1.22	1.130	5m Straight	Half hard	-	2.85	-
50103296	40	40.54	40.46	1.22	1.347	5m Straight	Half hard	-	2.40	-
50103324	50	53.24	53.16	1.22	1.782	5m Straight	Half hard	-	1.85	-
50103349	65	65.94	65.79	1.22	2.218	5m Straight	As drawn	-	1.50	-
50103366	80	79.04	78.89	1.42	3.096	5m Straight	As drawn	-	1.45	-
50103376	100	104.85	104.70	1.63	4.725	5m Straight	As drawn	-	1.25	-
50103387	150	156.06	155.76	1.83	7.927	5m Straight	As drawn	-	0.95	-

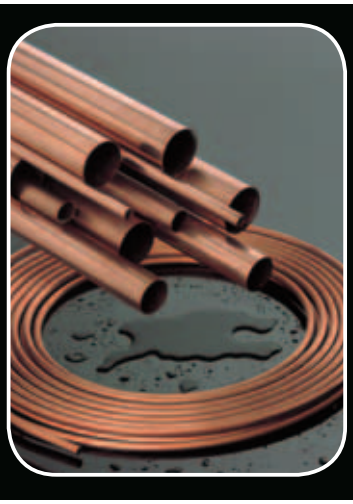


Table 3 – NZS3501 Light Gauge Copper Tube for Water & Gas

Crane Item Number	Nominal Size	Max. Outside Diameter (mm)	Min. Outside Diameter (mm	Wall Thickness (mm)	Nominal Weight (kg/m)	Form	Temper	Safe Working Pressure (MPa)	Hydrostatic Test Pressure (MPa)	Softened State Safe Working Pressure (MPa)
50103088	15	14.73	14.65	0.7	0.276	5m Straight	Half hard	6.00	3.80	4.60
50103184	20	21.08	21.00	0.9	0.510	5m Straight	Half hard	5.35	3.40	4.10

Safe Working Pressure

The safe working pressure at temperatures up to 65°C in Table 1 & 3 are calculated using the following formula:

$$P = \frac{2S \times t}{D - t}$$

where
P = working pressure (MPa)
t = wall thickness (mm)
D = outside diameter (mm)
S = stress (MPa)
annealed condition, S = 46 MPa
half hard condition, S = 60 MPa
as drawn condition, S = 70 MPa

Where heating softens the copper tube, including by brazing, the maximum working pressure of annealed temper must apply. These values are shown in Table 1 and 3 as the Softened State Safe Working Pressure.

Hydrostatic Test Pressure

$$P = \frac{80 \times t}{D}$$

where
P = working pressure (MPa)
t = wall thickness (mm)
D = outside diameter (mm)

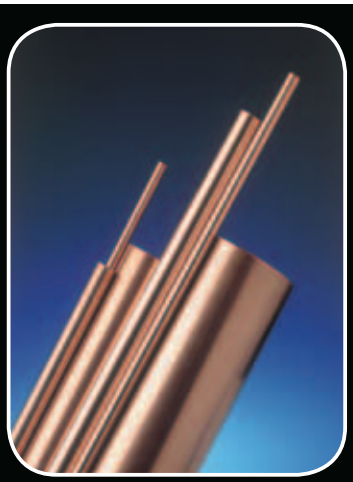


Table 4 - Copper Tube Flow & Friction Coefficients

Table	Nominal Size	Max. Outside Diameter (mm)	Wall Thickness (mm)	c (litres/metre)	F @ 15°C	F @ 65°C
1	10	11.35	0.91	0.0713	2524.36	2119.46
3	15	14.73	0.70	0.1396	400.208	336.134
1	15	14.73	1.02	0.1265	546.875	459.097
3	20	21.08	0.90	0.2919	80.6739	67.6599
1	20	21.08	1.02	0.2847	84.5755	70.9309
1 & 2	25	27.43	1.02	0.5063	20.1612	16.8973
1 & 2	32	34.19	1.22	0.7917	6.61590	5.55338
1 & 2	40	40.54	1.22	1.140	2.83052	2.37777
1 & 2	50	53.24	1.22	2.027	0.68157	0.57163
1 & 2	65	65.94	1.22	3.167	0.22769	0.19206
2	80	79.04	1.42	4.560	0.094847	0.079555
1	80	79.45	1.63	4.559	0.094893	0.079593
1	90	92.56	1.83	6.207	0.044758	0.037577
2	100	104.85	1.63	8.106	0.023916	0.020085
1	100	105.66	2.03	8.107	0.023936	0.020102
2	150	156.06	1.83	18.24	0.003431	0.002879
2	200	194.5	3.00	27.91	0.001446	0.001213

Table 5 – Fitting Friction Coefficients

Nominal Size	90° Elbow (Sharp)	90° Elbow (Long Rad.)	Tee (Branch Flow)	Tee (Line Flow)	Reducers	Stop Taps	Gate Valves	Swing Check Valves
10	0.118	0.064	0.125	0.046	0.051	0.714	0.019	0.300
15	0.105	0.057	0.118	0.046	0.051	0.714	0.017	0.253
20	0.083	0.046	0.104	0.046	0.051	0.714	0.013	0.177
25	0.074	0.038	0.095	0.046	0.051	0.714	0.012	0.147
32	0.067	0.031	0.088	0.046	0.051	0.714	0.010	0.124
40	0.059	0.026	0.081	0.046	0.051	0.714	0.009	0.102
50	0.050	0.020	0.075	0.046	0.051	0.714	0.009	0.102
65	0.045	0.017	0.069	0.046	0.051	0.714	0.008	0.102
80	0.040	0.015	0.060	0.046	0.051	0.714	0.007	0.102
90	0.038	0.013	0.058	0.046	0.051	0.714	0.007	0.102
100	0.036	0.012	0.056	0.046	0.051	0.714	0.007	0.102



Pressure Loss & Flow Rates for copper tube and fittings

Flow Rate

$Q = v \times c$

where:

Q = Flow rate (litres/sec)
v = flow velocity in (metres/sec)
c = tube flow co-efficient, refer table 4

Head or Pressure Loss due to friction of tube

$H = F \times Q^{1.8}$

$P = H \times 9.81$

where:

H = Head loss (metres/100 metres)
P = Pressure loss (kPa/100 metres)
F = friction co-efficient from table 4 below
Q = flow rate in (litres/sec)

Head or Pressure Loss due to friction of fitting

$$H = f \times \left[\frac{Q}{c}\right]^2$$

$P = H \times 9.81$

where:

f = Fitting friction co-efficient from table 5
Q = Flow rate (litres/sec)
c = tube flow co-efficient, refer table 4

Recommended Flow Velocity

Correct pipe sizing is essential to obtain acceptable water velocities and volumes. It is necessary to design all pipe work to have a minimum flow velocity greater than 0.5m/s, where velocities below this may allow suspended solids in the water to be deposited on the tube. Conversely flow rates greater than 3.0m/s can cause turbulence, which may destroy the protective surface film that is essential for the longevity of the system.

Physical Properties of Copper Tube

Composition	Alloy C12200 Copper = 99.90%min; Phosphorus=0.015-0.040%
Melting point	1083°C
Density	8.94 x 10^3kg/m^3
Thermal Expansion	0.177mm/10°C.m
Modulus of Elasticity	17,000 MPa

Tube Temper	Annealed	Bendable	As drawn
Hardness	70 max.	80-100	100 min.
Yield (0.2% proof), (MPa)	70	220	350
Ultimate (MPa)	220	280	380

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