

**COPPER - ANNEALED SEAMLESS TUBING  
ASTM B-75 OR EQUIVALENT**

**MAXIMUM ALLOWABLE WORKING PRESSURE (psi) FOR FRACTIONAL SIZES**

ALLOWABLE STRESS = 6,000 psi BETWEEN -20°F AND 100°F

TUBING O.D. (in.)	WALL THICKNESS (in.)												
	.010	.012	.016	.020	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/16	2,201	2,699	3,691	4,623									
1/8					3,198	3,690	4,056						
3/16					2,034	2,370	2,616	3,774					
1/4					1,476	1,710	1,890	2,760	3,750				
3/8						1,098	1,212	1,752	2,412	3,156			
1/2							888	1,276	1,740	2,298			
5/8							702	1,002	1,362	1,782	2,076		
3/4							582	828	1,116	1,458	1,692	1,974	
7/8							496	702	948	1,230	1,428	1,662	
1							432	612	822	1,068	1,236	1,434	1,590

Factor of Safety = 5, considering tensile strength to be 30,000 psi at room temperature

**CALCULATED BURST PRESSURE (psi) FOR FRACTIONAL SIZES**

TENSILE STRENGTH = 30,000 psi

TUBING O.D. (in.)	WALL THICKNESS (in.)												
	.010	.012	.016	.020	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/16	11,005	13,495	18,455	23,115									
1/8					15,985	18,460	20,270						
3/16					10,175	11,845	13,080	18,865					
1/4					7,380	8,555	9,460	13,805	18,750				
3/8						5,495	6,050	8,755	12,050	15,780			
1/2							4,450	6,380	8,705	11,485			
5/8							3,520	5,020	6,805	8,915	10,385		
3/4							2,910	4,135	5,585	7,285	8,455	9,870	
7/8							2,480	3,520	4,740	6,160	7,135	8,300	
1							2,160	3,060	4,115	5,335	6,170	7,165	7,950

Reference: ANSI B31.3, Table A-1 and Par. 304.1.2  
ASME Boiler and Pressure Vessels, Section VIII,

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**MAXIMUM ALLOWABLE WORKING PRESSURE (bar) FOR METRIC SIZES**

ALLOWABLE STRESS = 41.38 MPa BETWEEN -29°C AND 38°C

TUBING O.D. (mm)	WALL THICKNESS (mm)										
	7	.8	1.0	1.2	1.5	1.6	1.8	2.0	2.2	2.5	3.0
3	230	266									
4	168	195	248	300							
6	106	124	159	195	248	293					
8		90	115	141	179	195					
10		71	90	110	141	152	173	195			
12		58	74	90	115	124	141	159			
14			62	76	97	104	118	133	148	171	210
16			54	66	83	90	102	115	127	147	181
18			48	58	73	79	90	101	112	129	159
22			39	47	59	63	72	81	89	103	126
25			34	41	52	55	63	70	78	89	109

Factor of Safety = 5, considering tensile strength to be 206.9 MPa at room temperature

**CALCULATED BURST PRESSURE (bar) FOR METRIC SIZES**

TENSILE STRENGTH = 206.9 MPa

TUBING O.D. (mm)	WALL THICKNESS (mm)										
	.7	.8	1.0	1.2	1.5	1.6	1.8	2.0	2.2	2.5	3.0
3	1150	1330									
4	840	975	1240	1500							
6	530	620	795	975	1240	1465					
8		450	575	705	895	975					
10		355	450	550	705	760	865	975			
12		290	370	450	575	620	705	795			
14			310	380	485	520	590	665	740	855	1050
16			270	330	415	450	510	575	635	735	905
18			240	290	365	395	450	505	560	645	795
22			195	235	295	315	360	405	445	515	630
25			170	205	260	275	315	350	390	445	545

Reference: ANSI B31.3, Table A-1 and Par. 304.1.2  
ASME Boiler and Pressure Vessels, Section VIII  
Table UNF-23.2, Par UG-27 and Appendix 1, Par. 1-2

#### 5.1.7.9 CHIP RESISTANCE

- I. Tubing specified under ST01-E shall additionally be tested for chip resistance by the following methods:
  - A. **Gravelometer Test**
    - a. A test panel, comprising of 10 tubes approximately 250 mm long shall, after testing, be equal or greater than the approved standard sample.
  - B. **Falling Nuts Test**
    - a. A test panel, comprising of 20 tubes approximately 150 mm long shall, after testing in accordance with BS AU 148 : Part 15 (1969), have a rating of 2 maximum. After testing, the tube samples from this test shall be subjected to salt spray testing in accordance with ISO 9227 (BS7479), for 24 hours and shall no white corrosion.

#### 5.1.7.10 HYDROSTATIC TEST

- I. Minimum proof and burst pressures for tubes in the straight condition and of 0.71 mm nominal wall thickness shall be as shown below:

O.D.	Proof Pressure		Burst Pressure	
	Bar	lb/sq.in	Bar	lb/sq.in
4.76	450	6750	1100	16500
6.00	370	5550	900	13500
6.35	350	5250	800	12000
8.00	300	4500	725	10875
9.53	220	3270	545	8200

#### 5.1.7.11 SEALING TORQUE AND FLARE STRENGTH

**Note:** The Sealing Torque and Flare Strength tests are applicable to 4.76 mm nominal O.D. tubing only.

- I. **Sealing Torque Test**
  - A. Sample tube assemblies of suitable length are to be made with double and metric convex flares fitted with female and male tube nuts respectively, and assembled to suitable steel adaptors, using the torque values shown below:

<u>FLARE</u>	<u>TUBE NUT</u>	<u>TIGHTENING TORQUE</u>
Double	M10 x 1 Female	8.8 Nm (6.5 lbf.ft)
Metrix Convex	M10 x 1 Male	8.8 Nm (6.5 lbf.ft)

- B. Test assemblies are to withstand 34.5 MNm<sup>2</sup> (5000 psi) hydraulic pressure for 2 minutes without signs of leakage or flare failure. If leakage occurs, then the tightening torque may be increased by 25% after which no leakage is permitted.
  2. **Flare Strength**
    - A. Increase torque, on the female nut only, to 27 Nm (20 lbf.ft maximum. Assembly must withstand 34.5 MNm<sup>2</sup> (5000 psi) for 2 minutes with no signs of leakage.