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Stainless Steel Specialists

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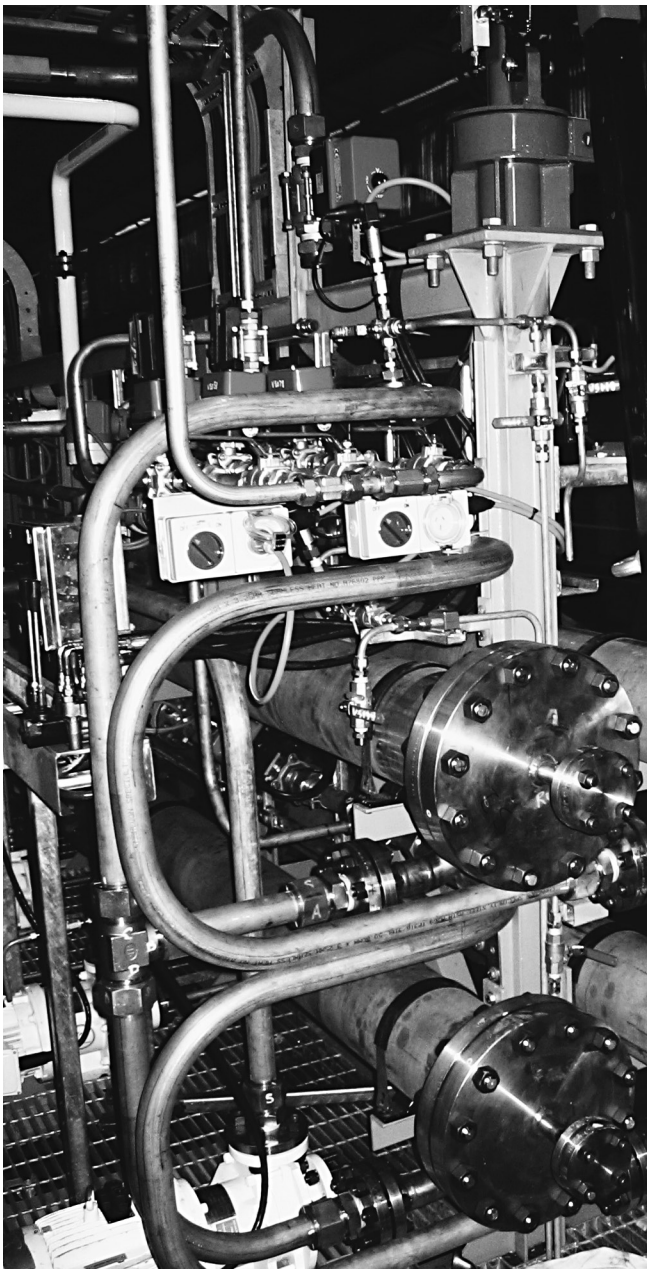
Stainless Steel Tube

Prochem leads the field in the supply of high quality instrument tube for offshore and onshore applications as well as general service. These grades are stocked throughout Australia, Singapore and Thailand.

Seamless Stainless Steel Tube

Prochem's stock of 3.2 (1/8") to 50.8 mm (2") OD is available in a variety of wall thickness ranging from 0.71 (22 SWG) up to 3.25 mm (10 SWG).
All tube from 4.76 mm (3/16") OD is available in 6 m lengths continuously marked along the length of the tube with size, wall thickness, standard, grade, heat number and manufactures name.

From general purpose through to the rigors of a heat exchanger application, Prochem has your tube requirements covered.



Seamless Duplex Tube
At elevated temperatures in a high chloride environment industry turns to Seamless Duplex tubes, to provide extra corrosion resistance.
Prochem stock tubes are supplied in Duplex – to ASTM A789 UNS S31803.
Available ex-stock in sizes 6.35 (1/4") to 12.70 mm (1/2") OD with other sizes available on request.
Super Duplex Tubes to ASTM A789 UNS S32750 and UNS S32760 are available on request.

Seamless Monel® Tube
Available ex-stock in sizes 6.35 (1/4") to 12.70 mm (1/2"), OD with other sizes available on request.
Tube to ASTM B163/B165 UNS N04400.

Seamless 904L Tubing
Available ex-stock in sized 6.35 (1/4") to 12.70 mm (1/2") OD with other sizes available on request.
Tube to ASTM A269 UNS N80904

Seamless 6Mo (UNS S31254) Tubing
Available ex-stock in sized 6.35 (1/4") to 19.10 mm (3/4") OD with other sizes available on request.
Tube to ASTM A269 UNS S31254.

PVC Sheathed Copper Tube
Available in sizes 6.35 (1/4") to 12.70 mm (1/2") OD in 300m drum coils.
Copper Tube to ASTM B75-C12200.
316 or other exotic materials available with outer sheathing on request.

Coiled Tube
For applications where installation of compression fittings is difficult, or for where long continuous runs are required, Prochem have coiled tubing available to ASTM A269 TP316 stainless steel from 3.18 (1/8") to 25.4 mm (1") OD either from stock or through our world wide network.

Other special corrosion resistant alloys such as Hastelloy®, Inconel®, 317L and Titanium are available on request.

Monel, Hastelloy and Inconel are registered trademarks.

For use with Twin Ferrule Compression Fittings and Valves

Correct and successful compression fitting performance demands that the “Ferrule hardness” be significantly harder than the “tubing hardness” on which it is used to ensure that the ferrules are able to swage onto the tube.

Tubing with hardness at the higher end of the ASTM standard specified range may compromise make-up integrity and it is therefore important to limit the hardness of tube for use with twin ferrule compression fittings.

Prochem limits the hardness of all 316/316L seamless stainless steel tube up to and including 25.4 mm (1") OD to a maximum hardness level of Rockwell B (HRB) 80, offering a fully annealed tube to ensure make-up integrity.

The tube surface is a critical part of the sealing mechanism when using a compression fitting, hence a visual inspection of the tubing to ensure it is free from scratches and other damage is required. Severe scratches or damage to the tubing could affect the safe installation of the compression fitting and thus any tubing in poor condition should be disposed of. Finished tubes shall be scratch free, straight and smooth ends free of burrs.

Heat Exchanger

Tubes used for boiler, superheater and heat exchanger applications are controlled under the specification ASTM A213 which includes tighter dimensional tolerances (OD and Wall thickness), with the requirement for Tensile Testing and a Flattening Test though these are not a requirement of ASTM A269.
Prochem stock from 4.76 mm OD x 0.91 mm WT (3/16" OD x 20 SWG) to 25.4 mm OD x 2.1 mm WT (1" OD x 14 SWG) dual codified to ASTM A269/213, and minimum Molybdenum content of 2.5%.

316 with 2.5% Minimum Molybdenum Content

The demanding chloride environment found in coastal Australian industry, both onshore and offshore, puts much strain on the corrosion resistance of standard 316 stainless steels. In co-operation with leading petrochemical, refining and offshore Oil and Gas companies, Prochem developed the 2.5% minimum Molybdenum specification to enhance the corrosion resistance of seamless tubes used throughout Australian industries.

History has now identified the same problem in other parts of the world and subsequently tubing with a minimum 2.5% Molybdenum content is being specified in industries throughout Asia and the Middle East.

Prochem stock a range of tube sizes from 4.76 mm (3/16") to 25.4 mm (1") OD and wall thicknesses from 0.91 (20 SWG) to 2.1 mm (14 SWG). The range of wall thickness available varies with the OD of the tube. These tubes are dual codified to ASTM A269/A213, with minimum Molybdenum content of 2.5%.

Pickled & Passivated vs. Bright Annealed Tubing

Prochem stock Annealed and Pickled (AP) Seamless Tube which has a “matt” finish and a range of Bright Annealed (BA) Seamless Tube which has a “shiny” finish.

AP tube is used throughout industry where appearance is not important and is considered the standard for Refinery and Offshore Oil and Gas projects.

BA tube is used throughout industries where aesthetic appearance is important, such as by the OEM’s who manufacture panels and analyser houses.

BA should not be confused with polished tube whose surface is also “shiny” but may have been hardened during polishing to unacceptable levels for use with compression fittings.

There is a further risk when using “shiny” tube in that welded tube, whose distinction to Seamless BA tube is undetectable to the naked eye, may be substituted for Seamless tube. Welded tube has lower maximum allowable working pressures compared to that of seamless tube.

Caution should therefore be taken when using “shiny” tube.

THEORETICAL WORKING PRESSURE FOR SEAMLESS TUBE

Duplex UNS S31803 (Seamless) -51 to 38°C

			Wall Thickness			
Size		inch	0.035	0.049	0.065	0.083
mm	inch	mm	0.89	1.24	1.65	2.11
6.35	1/4"	psi	7,721	10,273	14,753	
		kPa	53,195	70,782	101,647	
9.53	3/8"	psi	5,011	7,208	8,925	
		kPa	34,527	49,666	61,492	
12.7	1/2"	psi	3,939	5,633	7,660	10,066
		kPa	27,141	38,812	52,780	69,358
19.05	3/4"	psi		3,676	4,956	6,447
		kPa		25,331	34,148	44,418
25.4	1"	psi		2,729	3,663	4,742
		kPa		18,800	25,239	32,670

Super Duplex UNS S32750 / S32760 (Seamless)
UNS S32750 -28 to 38°C, UNS S32760 -51 to 38°C

			Wall Thickness			
Size		inch	0.035	0.049	0.065	0.083
mm	inch	mm	0.89	1.24	1.65	2.11
6.35	1/4"	psi	9,342	12,430	17,851	
		kPa	64,366	85,646	122,993	
9.53	3/8"	psi	6,064	8,722	10,799	
		kPa	41,778	60,096	74,405	
12.7	1/2"	psi	4,766	6,816	9,269	12,180
		kPa	32,840	46,963	63,864	83,923
19.05	3/4"	psi		4,448	5,997	7,801
		kPa		30,650	41,320	53,745
25.4	1"	psi		3,302	4,432	5,737
		kPa		22,748	30,539	39,531

TUBE WORKING PRESSURE NOTES:

Tube working pressures have been calculated in accordance with ASME B31.3
Where Thickness < Diameter/6, the formula 304.1.2 3a has been used. Where Thickness ≥ Diameter/6, the formula K304.1.2 35c has been used.

For Duplex UNS S31803
- S = 30,000 psi
- Y = 0.4
- W = 1
- E = 1
- c0 has been neglected

For Super Duplex UNS S32750/S32760
- S = 36,300 psi
- Y = 0.4
- W = 1
- E = 1
- c0 has been neglected

Tube Outside Diameter and Wall Thickness Tolerances have been considered from ASTM A789 when calculating the working pressures.

The Allowable Working Pressures calculated are a guide only. As there are variables that will alter the Allowable Working Pressure of the tube, it is the ultimate responsibility of the customer to verify that the tube is suitable for the application.

This table does not advise suitability for use with compression fittings. The purchaser must refer to the compression fitting manufacturers tubing data charts for size and wall thickness suitability.

Monel® UNS N04400 (Seamless Annealed) -198 to 38°C Average Wall

Size			Wall Thickness			
		inch	0.035	0.049	0.065	0.083
mm	inch	mm	0.89	1.24	1.65	2.11
6.35	1/4"	psi	4,969	6,636	9,564	
		kPa	34,237	45,724	65,898	
9.53	3/8"	psi	3,320	4,785	5,958	
		kPa	22,878	32,966	41,053	
12.7	1/2"	psi	2,455	3,511	4,775	6,275
		kPa	16,918	24,193	32,900	43,233
19.05	3/4"	psi		2,292	3,089	4,018
		kPa		15,789	21,286	27,687
25.4	1"	psi		1,701	2,283	2,956
		kPa		11,719	15,732	20,364

Monel is a registered trademark.

904L UNS N08904 (Seamless) -28 to 38°C

Size			Wall Thickness			
		inch	0.035	0.049	0.065	0.083
mm	inch	mm	0.89	1.24	1.65	2.11
6.35	1/4"	psi	5,319	7,077	10,163	
		kPa	36,646	48,762	70,025	
9.53	3/8"	psi	3,452	4,966	6,148	
		kPa	23,786	34,215	42,362	
12.7	1/2"	psi	2,714	3,881	5,277	6,935
		kPa	18,697	26,738	36,360	47,781
19.05	3/4"	psi		2,533	3,414	4,441
		kPa		17,450	23,525	30,599
25.4	1"	psi		1,880	2,524	3,267
		kPa		12,951	17,387	22,506

6Mo UNS S31254 (Seamless) -28 to 38°C

Size			Wall Thickness			
		inch	0.035	0.049	0.065	0.083
mm	inch	mm	0.89	1.24	1.65	2.11
6.35	1/4"	psi	6,974	9,280	13,327	
		kPa	48,053	63,940	91,821	
9.53	3/8"	psi	4,527	6,512	8,062	
		kPa	31,190	44,865	55,547	
12.7	1/2"	psi	3,558	5,089	6,920	9,093
		kPa	24,517	35,060	47,678	62,653
19.05	3/4"	psi		3,321	4,477	5,824
		kPa		22,882	30,847	40,124
25.4	1"	psi		2,465	3,309	4,283
		kPa		16,983	22,799	29,512

TUBE WORKING PRESSURE NOTES:

Tube working pressures have been calculated in accordance with ASME B31.3

Where Thickness < Diameter/6, the formula 304.1.2 3a has been used. Where Thickness ≥ Diameter/6, the formula K304.1.2 35c has been used.

For Monel® 400 UNS N04400
- S = 18,700 psi
- Y = 0.4
- W = 1
- E = 1
- c0 has been neglected.

For 904L UNS N08904
- S = 20,667 psi
- Y = 0.4
- W = 1
- E = 1
- c0 has been neglected

For 6Mo UNS S31254
- S = 27,100 psi
- Y = 0.4
- W = 1
- E = 1
- c0 has been neglected.

For Monel® 400 UNS N04400 Tube Outside Diameter and Wall Thickness Tolerances have been considered from ASTM B163/B165 when calculating the working pressures. Tolerances on tubes less than 1/2" OD (12.7 mm) have been assumed to be the same as 1/2" OD (12.7 mm)

For 904L UNS N08904 and 6Mo UNS S31254 Tube Outside Diameter and Wall Thickness Tolerances have been considered from ASTM A269 when calculating the working pressures.

The Allowable Working Pressures calculated are a guide only. As there are variables that will alter the Allowable Working Pressure of the tube, it is the ultimate responsibility of the customer to verify that the tube is suitable for the application.

This table does not advise suitability for use with compression fittings. The purchaser must refer to the compression fitting manufacturers tubing data charts for size and wall thickness suitability.

THEORETICAL WORKING PRESSURE FOR SEAMLESS TUBE TP316/316L

316 (Seamless) -253 to 38°C

			Wall Thickness						
Size		inch	0.028	0.036	0.048	0.064	0.083	0.109	0.128
mm	inch	mm	0.71	0.91	1.22	1.63	2.11	2.77	3.25
3.18	1/8"	psi	8,579	12,083	19,185				
		kPa	59,110	83,254	132,188				
4.76	3/16"	psi	5,883	7,153	10,389				
		kPa	40,534	49,282	71,581				
6.35	1/4"	psi	4,311	5,682	7,199	10,464	15,363		
		kPa	29,700	39,150	49,603	72,097	105,848		
7.94	5/16"	psi	3,401	4,460	6,129	7,836	11,060		
		kPa	23,436	30,730	42,229	53,990	76,205		
9.53	3/8"	psi		3,671	5,017	6,274	8,679		
		kPa		25,290	34,566	43,230	59,797		
12.7	1/2"	psi		2,711	3,681	5,031	6,726	8,539	
		kPa		18,678	25,362	34,667	46,343	58,834	
15.88	5/8"	psi		2,149	2,907	3,953	5,249	6,474	
		kPa		14,806	20,029	27,233	36,166	44,604	
19.05	3/4"	psi		1,780	2,402	3,255	4,304	5,809	***5,887***
		kPa		12,264	16,549	22,424	29,654	40,023	***40,562***
25.4	1"	psi			1,781	2,403	3,161	4,235	***4,741***
		kPa			12,269	16,555	21,780	29,181	***32,665***
31.75	1-1/4"	psi				***1,906***	***2,500***	***3,335***	***3,726***
		kPa				***13,131***	***17,224***	***22,980***	***25,673***
38.1	1-1/2"	psi				***1,574***	***2,060***	***2,741***	***3,058***
		kPa				***10,844***	***14,196***	***18,886***	***21,072***
50.8	2"	psi				***1,173***	***1,532***	***2,032***	***2,263***
		kPa				***8,083***	***10,556***	***13,997***	***15,593***

TUBE WORKING PRESSURE NOTES:

Tube working pressures have been calculated in accordance with ASME B31.3
Where Thickness < Diameter/6, the formula 304.1.2 3a has been used. Where Thickness ≥ Diameter/6, the formula K304.1.2 35c has been used.

For TP316
- S = 20,000 psi
- Y = 0.4
- W = 1
- E = 1
- c0 has been neglected

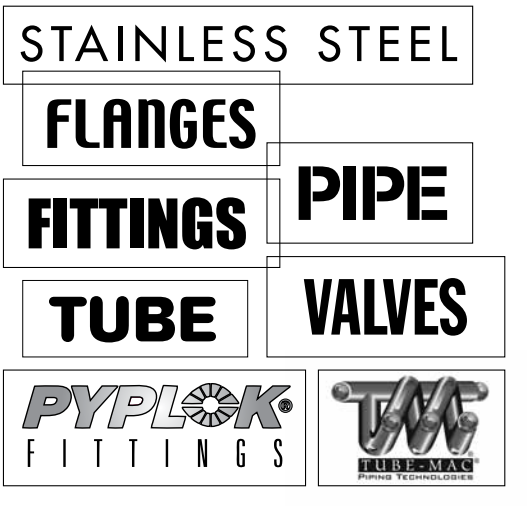
Tube Outside Diameter and Wall Thickness Tolerances have been considered when calculating the working pressures.

Numbers in standard text have been calculated based on ASTM A269/213 tolerances

Numbers in bold italic text have been calculated based on ASTM A269 tolerances

The Allowable Working Pressures calculated are a guide only. As there are variables that will alter the Allowable Working Pressure of the tube, it is the ultimate responsibility of the customer to verify that the tube is suitable for the application.

This table does not advise suitability for use with compression fittings. The purchaser must refer to the compression fitting manufacturers tubing data charts for size and wall thickness suitability.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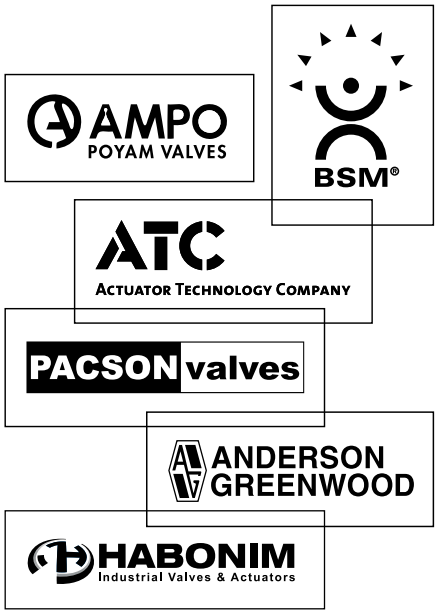
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