PAC STAINLESS LTD.

CATALOG







OPTIMIZE YOUR SOURCING

of stainless steel and specialty alloy tubing

pacstainless .com

ABOUT PAC STAINLESS

OUR HISTORY

In 1976, PAC Stainless was established in a rented warehouse in Seattle, Washington with less than two thousand dollars in inventory. From these humble beginnings, the company has been committed to servicing its customers respectfully with quality products and competitive pricing. As a result of its steadfast company ethos, PAC has grown to become a leading distributor of stainless steel and specialty alloy instrumentation and hydraulic tubing nationwide.

Now, more than ever, PAC is well-equipped to facilitate the needs of its customers as well as the growing demands of global markets. As a leading supplier of stainless steel tubing, the company prides itself on its steady stream of products and its unparalleled knowledge of tubing mills and quality products. The company recognizes its unique position within the alloy nickel market, and strives to continue to be an invaluable industry partner for both new and returning customers.

OUR BUSINESS

MISSION

Our mission is to optimize the sourcing of stainless steel and specialty alloy tubing. Procuring these products is often riddled with unexpected challenges, complexity, and delays. With the broadest and deepest inventory of hard-to-find products, we are uniquely positioned to facilitate customers in achieving success in growing their businesses.

VISION

Our vision is to solidify the company's position as the leading distributor and industry partner of instrumentation and hydraulic tubing solutions. Our goal is supported by excellent customer service, quality products, and on-time delivery.

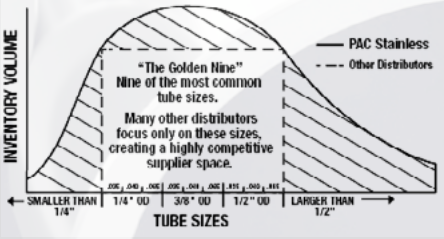
VALUES

At PAC Stainless, we practice a culture of ownership that is rooted in the values of integrity, responsibility, honesty, and dependability. These values are seen at the core of our people, our products, and our promise to not only our customers, but also to ourselves. We can promise you this:

- Commitment
- Quality
- Trust
- Respect

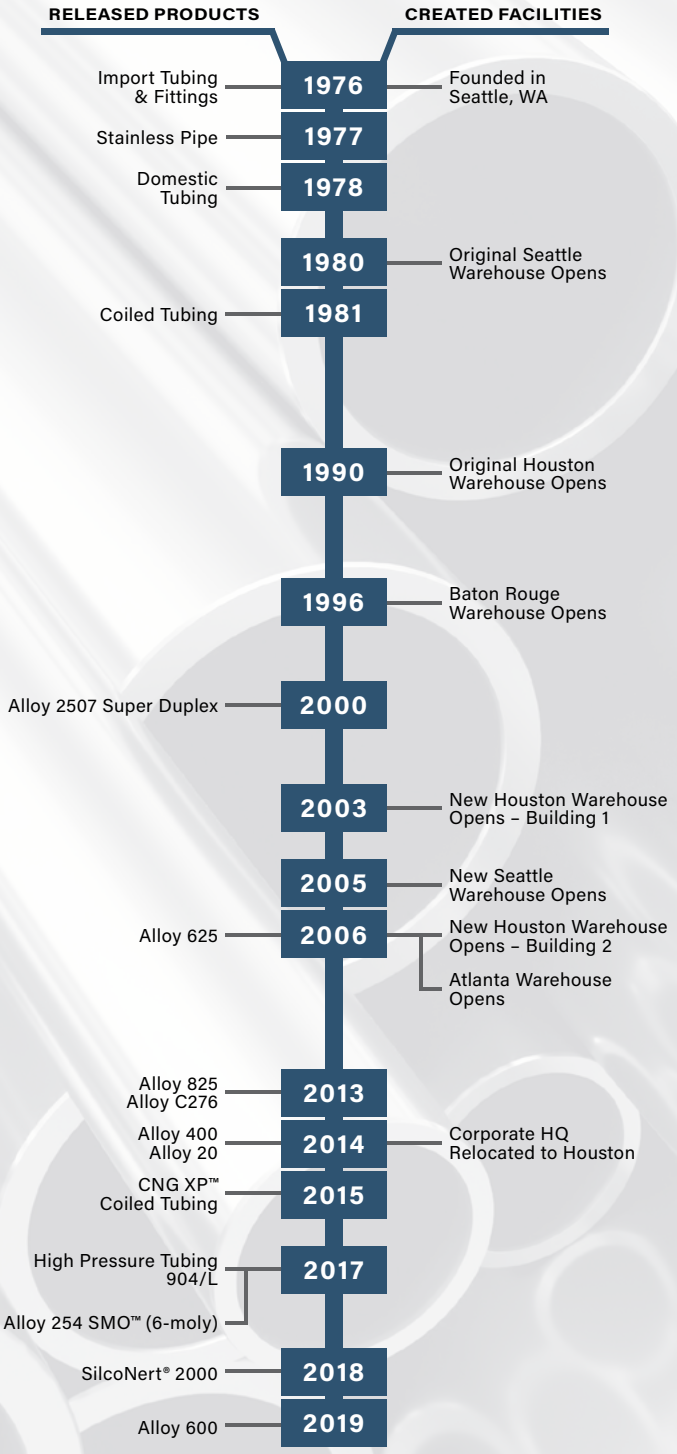
OUR WIDE INVENTORY

PAC Stainless carries an extensive product catalog of over 1,500 SKUs, well in excess of the average inventory of other tubing distributors. We have superior depth and breadth of inventory.



OUR TIMELINE

Throughout the years we have released a steady stream of new products and expanded into new facilities across the country to meet consumer demands. We have grown to become a leading provider within the industry and are proud to be able to meet our consumers' needs with quality and availability.



PAC STAINLESS LTD.

TABLE OF CONTENTS

STAINLESS STEEL TUBING

SPECIALTY ALLOY TUBING

FITTINGS, VALVES, AND ACCESSORIES

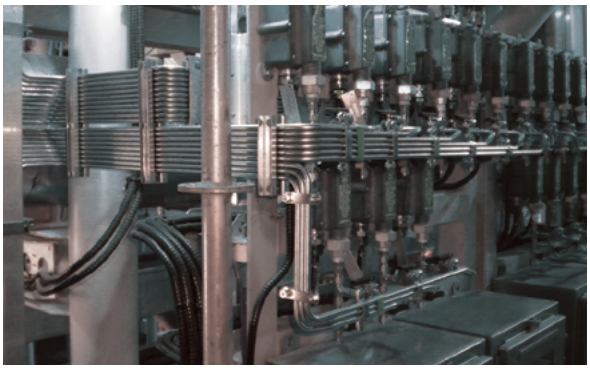
SEATTLE
WESTERN REGION SALES
1855 South 216th Street
Seattle, WA 98198
Phone.....(206) 824-7780
Toll-free.....(800) 426-4258
Fax.....(206) 878-2475
sales@pacstainless.com

TEXAS
GULF OF MEXICO SALES
5259 Brittmoore Road
Houston, TX 77041
Phone.....(713) 466-6160
Toll-free.....(800) 535-0386
Fax.....(713) 466-6334
houston@pacstainless.com

LOUISIANA
GULF OF MEXICO SALES
7115 Revenue Drive
Baton Rouge, LA 70809
Phone.....(225) 751-8400
Toll-free.....(800) 495-3272
Fax.....(225) 751-8401
batonrouge@pacstainless.com

ATLANTA
EASTERN REGION SALES
620 Jesse Cronic Road
Braselton, GA 30517
Phone.....(706) 654-4649
Toll-free.....(888) 977-4722
Fax.....(706) 654-4651
atlanta@pacstainless.com

304 / 304L STAINLESS STEEL TUBING



Whether it be seamless or welded, domestic or import, 20 foot sticks or long length coils—stainless steel tubing is our core competency. It's not only in our name, it's at the heart of what we do. Due to its excellent general corrosion resistance, high strength to weight ratio, and remarkable ductility, stainless steel has become the predominant material choice for hydraulic and instrumentation tubing. The two grades of stainless steel tubing that are most commonplace are dual certified 304/L and 316/L. These commodity grades can be found in use in a multitude of applications within a wide variety of global industries.

PRODUCT SPECIFICATIONS

ASTM A269, ASTM A213/ ASME SA213 (SEAMLESS)
ASTM A269, ASTM A249/ ASME SA249 (WELDED)

Domestic tube is bright annealed. Imported tube is solution annealed and O.D. polished to a 320-grit finish.

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.125"–5.00"	.010"–.375"

CHEMICAL REQUIREMENTS

T304/L (UNS S30400/UNS S30403)
COMPOSITION %

ELEMENTS		UNS S30400	UNS S30403
C	Carbon	0.080 max	0.035 max
Mn	Manganese	2.00 max	2.00 max
P	Phosphorous	0.045 max	0.045 max
S	Sulfur	0.030 max	0.030 max
Si	Silicon	1.00 max	1.00 max
Cr	Chromium	18.0–20.0	18.0–20.0
Ni	Nickel	8.0–11.0	8.0–12.0

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
≤ .500"	± .005"	± 10%
.500"–1.500" excl	± .005"	± 10%
1.500"–3.500" excl	± .010"	± 10%
3.500"–5.500" excl	± .015"	± 10%

MECHANICAL PROPERTIES

Yield Strength	30 ksi min
Tensile Strength	75 ksi min
Elongation (2" min)	35%
Hardness (Rockwell B Scale)	90 HRB max

OD	Wall	ID	Lbs/Ft
1/8" (.125")	.010	.105	.0124
	.012	.101	.0146
	.016	.093	.0188
	.020	.085	.0226
	.028	.069	.0293
	.035	.055	.0340
2.5/16" (.156")	.020	.116	.0293
3/16" (.188")	.010	.168	.0192
	.016	.156	.0297
	.020	.148	.0362
	.028	.132	.0483
	.035	.118	.0577
	.049	.090	.0734
1/4" (.250")	.010	.230	.0259
	.020	.210	.0496
	.028	.194	.0670
	.035	.180	.0811
	.049	.152	.1062
	.065	.120	.1297
	.083	.084	.1494
	.095	.060	.1588
5/16" (.313")	.020	.273	.0632
	.028	.257	.0860
	.035	.243	.1049
	.049	.215	.1395
	.065	.183	.1738
3/8" (.375")	.020	.335	.0766
	.028	.319	.1048
	.035	.305	.1283
	.049	.277	.1722
	.065	.245	.2173
	.083	.209	.2613
	.095	.185	.2868
	.120	.135	.3299
1/2" (.500")	.020	.460	.1035
	.028	.444	.1425
	.035	.430	.1755
	.049	.402	.2383
	.065	.370	.3049
	.083	.334	.3732
	.095	.310	.4148
	.109	.282	.4595
	.120	.260	.4917
5/8" (.625")	.020	.585	.1305
	.028	.569	.1802
	.035	.555	.2226
	.049	.527	.3043
	.065	.495	.3925
	.083	.459	.4850
	.095	.435	.5429
	.120	.385	.6534
3/4" (.750")	.028	.694	.2180
	.035	.680	.2698
	.049	.652	.3704
	.065	.620	.4801
	.083	.584	.5969
	.095	.560	.6709
	.109	.532	.7533
	.120	.510	.8151
	.188	.374	1.1390
	.250	.250	1.3480
7/8" (.875")	.028	.819	.2557
	.035	.805	.3170
	.049	.777	.4364
	.065	.745	.5677
	.083	.709	.7088
	.095	.685	.7989
	.120	.635	.9768

OD	Wall	ID	Lbs/Ft
1" (1.000")	.020	.960	.2113
	.035	.930	.3642
	.049	.902	.5024
	.065	.870	.6553
	.083	.834	.8206
	.095	.810	.9270
	.109	.782	1.0470
	.120	.760	1.1390
	.134	.732	1.2510
	.156	.688	1.4200
	.188	.624	1.6460
	.250	.500	2.0220
1, 1/8" (1.125")	.035	1.055	.4110
	.049	1.027	.5680
	.065	.995	.7430
	.109	.907	1.1940
	.120	.885	1.3000
	.188	.749	1.8990
1, 1/4" (1.250")	.049	1.152	.6345
	.065	1.120	.8305
	.083	1.084	1.0440
	.095	1.060	1.1830
	.109	1.032	1.3410
	.120	1.010	1.4620
	.134	.982	1.6120
	.156	.938	1.8400
	.188	.874	2.1530
	.250	.750	2.6960
1, 3/8" (1.375")	.049	1.277	.7005
	.065	1.245	.9181
1, 1/2" (1.500")	.035	1.430	.5528
	.049	1.402	.7666
	.065	1.370	1.0060
	.083	1.334	1.2680
	.095	1.310	1.4390
	.109	1.282	1.6350
	.120	1.260	1.7850
	.134	1.232	1.9740
	.156	1.188	2.2610
	.188	1.124	2.6590
	.250	1.000	3.3690
1, 5/8" (1.625")	.065	1.495	1.0930
	.120	1.385	1.9470
1, 3/4" (1.750")	.065	1.620	1.1810
	.120	1.510	2.1090
2" (2.000")	.049	1.902	1.0310
	.065	1.870	1.3560
	.083	1.834	1.7160
	.095	1.810	1.9510
	.109	1.782	2.2220
	.120	1.760	2.4320
	.134	1.732	2.6960
	.188	1.624	3.6730
	.250	1.500	4.7170
2, 1/4" (2.250")	.120	2.010	2.7560
2, 1/2" (2.500")	.065	2.370	1.7070
	.120	2.260	3.0790
3" (3.000")	.065	2.870	2.0570
	.120	2.760	3.7260
	.188	2.624	5.7000
	.250	2.500	7.4130
4" (4.000")	.065	3.870	2.7580
	.083	3.834	3.5050
	.250	3.500	10.108
5" (5.000")	.065	4.870	3.4590

FABRICATION

304/L stainless steel has excellent fabrication properties. Its malleability allows it to be easily formed for flaring, bending and coiling. Good machinability and the low sulfur content promotes excellent weldability in applications requiring it.

316 / 316L STAINLESS STEEL TUBING

With the addition of molybdenum, grades 316 and 316L stainless steel were developed to offer improved corrosion resistance compared to alloy 304/L. The increased performance of this austenitic chromium-nickel stainless steel makes it better suited for environments rich in salt air and chlorides. Additionally, the low carbon content makes the alloy 316/L easy to weld.

PRODUCT SPECIFICATIONS

ASTM A269, ASTM A213/ ASME SA213 (SEAMLESS)
ASTM A269, ASTM A249/ ASME SA249 (WELDED)

Domestic tube is bright annealed. Imported tube is solution annealed and O.D. polished to a 320-grit finish.

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.063″–4.00″	.010″–.375″

CHEMICAL REQUIREMENTS

T316/L (UNS S31600/UNS S31603)
COMPOSITION %

ELEMENTS		UNS S31600	UNS S31603
C	Carbon	0.08 max	0.035 max
Mn	Manganese	2.00 max	2.00 max
P	Phosphorous	0.045 max	0.045 max
S	Sulfur	0.030 max	0.030 max
Si	Silicon	1.00 max	1.00 max
Cr	Chromium	16.0–18.0	16.0–18.0
Ni	Nickel	10.0–14.0	10.0–15.0
Mo	Molybdenum	2.00–3.00	2.00–3.00

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
≤ .500″	± .005″	± 10%
.500″–1.500″ excl	± .005″	± 10%
1.500″–3.500″ excl	± .010″	± 10%
3.500″–5.500″ excl	± .015″	± 10%

MECHANICAL PROPERTIES

Yield Strength	30 ksi min
Tensile Strength	75 ksi min
Elongation (2" min)	35%
Hardness (Rockwell B Scale)	90 HRB max

FABRICATION

316/L is harder to machine than 304/L and more prone to work hardening. Special tools and methods are usually required to fabricate 316/L.

OD	Wall	ID	Lbs/Ft
1/16″ (.063″)	.010	.043	.0057
	.016	.031	.0081
	.020	.023	.0093
1/8″ (.125″)	.010	.105	.0124
	.020	.085	.0227
	.028	.069	.0294
	.035	.055	.0341
	.049	.027	.0403
3/16″ (.188″)	.020	.148	.0364
	.028	.132	.0485
	.035	.118	.0579
	.049	.090	.0737
1/4″ (.250″)	.020	.210	.0498
	.028	.194	.0673
	.035	.180	.0814
	.049	.152	.1066
	.065	.120	.1301
	.083	.084	.1500
	.095	.060	.1593
5/16″ (.313″)	.020	.273	.0634
	.028	.257	.0863
	.035	.243	.1053
	.049	.215	.1400
	.065	.183	.1744
	.083	.147	.2066
	.095	.123	.2241
3/8″ (.375″)	.020	.335	.0768
	.028	.319	.1051
	.035	.305	.1288
	.049	.277	.1728
	.065	.245	.2180
	.083	.209	.2622
	.095	.185	.2878
	.120	.135	.3311
	.134	.107	.3494
7/16″ (0.438″)	.035	.368	.1526
	.049	.340	.2062
	.065	.308	.2623
1/2″ (.500″)	.020	.460	.1039
	.028	.444	.1430
	.035	.430	.1761
	.049	.402	.2391
	.065	.370	.3059
	.083	.334	.3745
	.095	.310	.4163
	.109	.282	.4611
	.120	.260	.4934
	.156	.188	.5806
	.188	.124	.6347
9/16″ (.563″)	.035	.493	.2000
	.065	.433	.3502
5/8″ (.625″)	.035	.555	.2234
	.049	.527	.3054
	.065	.495	.3938
	.083	.459	.4867
	.095	.435	.5448
	.120	.385	.6557
3/4″ (.750″)	.035	.680	.2708
	.049	.652	.3717
	.065	.620	.4818
	.083	.584	.5990
	.095	.560	.6733
	.109	.532	.7560
	.120	.510	.8180
	.134	.482	.8931
	.156	.438	1.0030
	.188	.374	1.1430
	.250	.250	1.3530
7/8″ (.875″)	.035	.805	.3181
	.049	.777	.4379
	.065	.745	.5697
	.083	.709	.7113
	.095	.685	.8018
	.120	.635	.9803
1″ (1.000″)	.035	.930	.3654
	.049	.902	.5042
	.065	.870	.6576
	.083	.834	.8235
	.095	.810	.9302
	.109	.782	1.0510
	.120	.760	1.1430
	.134	.732	1.2560
	.156	.688	1.4250
	.188	.624	1.6520
	.250	.500	2.0290
1, 1/8″ (1.125″)	.035	1.055	.4128
	.065	.995	.7455
	.109	.907	1.1980
	.120	.885	1.3050
	.188	.749	1.9060
1, 1/4″ (1.250″)	.035	1.180	.4601
	.049	1.152	.6367
	.065	1.120	.8334
	.083	1.084	1.0480
	.095	1.060	1.1870
	.109	1.032	1.3460
	.120	1.010	1.4670
	.134	.982	1.6180
	.156	.938	1.8470
	.188	.874	2.1600
	.250	.750	2.7050
1, 3/8″ (1.375″)	.065	1.245	.9213
1, 1/2″ (1.500″)	.049	1.402	.7693
	.065	1.370	1.0090
	.083	1.334	1.2730
	.095	1.310	1.4440
	.109	1.282	1.6410
	.120	1.260	1.7920
	.134	1.232	1.9810
	.156	1.188	2.2690
	.188	1.124	2.6690
	.250	1.000	3.3810
1, 5/8″ (1.625″)	.065	1.495	1.0970
1, 3/4″ (1.750″)	.065	1.620	1.1850
	.120	1.510	2.1160
2″ (2.000″)	.049	1.902	1.0340
	.065	1.870	1.3610
	.083	1.834	1.7220
	.095	1.810	1.9580
	.109	1.782	2.2300
	.120	1.760	2.4410
	.134	1.732	2.7050
	.156	1.688	3.1130
	.188	1.624	3.6860
	.250	1.500	4.7340
	.313	1.374	5.7130
	.375	1.250	6.5930
2, 1/2″ (2.500″)	.065	2.370	1.7130
	.083	2.334	2.1710
	.120	2.260	3.0900
	.188	2.124	4.7030
	.250	2.000	6.0860
3″ (3.000″)	.065	2.870	2.0640
	.120	2.760	3.7390
	.188	2.624	5.7200
	.250	2.500	7.4390
4″ (4.000″)	.065	3.870	2.7670
	.083	3.834	3.5180
	.120	3.760	5.0380
	.250	3.500	10.140

SEAMLESS METRIC TUBING

PAC Stainless is the largest supplier of stainless steel metric tubing in the U.S. These precision manufactured tubes are cold finished to tight dimensional tolerances to meet exacting engineering requirements. Our inventories consist of both domestic and imported metric tubes to satisfy customer project requirements. Stocked in twenty-foot long lengths, these can be shipped as-is or cut short to facilitate UPS shipment.

PRODUCT SPECIFICATIONS

ASTM A269, ASTM A213 / ASME SA213 (SEAMLESS)
ASTM A269, ASTM A249 / ASME SA249 (WELDED)

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
3mm–42mm	0.5mm–4mm

CHEMICAL REQUIREMENTS

T316/L (UNS S31600/UNS S31603)
COMPOSITION %

ELEMENTS		UNS S31600	UNS S31603
C	Carbon	0.08 max	0.035 max
Mn	Manganese	2.00 max	2.00 max
P	Phosphorous	0.045 max	0.045 max
S	Sulfur	0.030 max	0.030 max
Si	Silicon	1.00 max	1.00 max
Cr	Chromium	16.0–18.0	16.0–18.0
Ni	Nickel	10.0–14.0	10.0–15.0
Mo	Molybdenum	2.00–3.00	2.00–3.00

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
≤ 38mm (1.5") excl	± .005" (.13mm)	± 10%
> 38mm–89mm (1.5"–3.5") excl	± .010" (.25mm)	± 10%

MECHANICAL PROPERTIES

Yield Strength	30 ksi min
Tensile Strength	75 ksi min
Elongation (2" min)	35%
Hardness (Rockwell B Scale)	90 HRB max

FABRICATION

T316/316L stainless steel responds well to a variety of cold working operations. This fabrication will increase the mechanical properties of the steel. Upon request, PAC Stainless will provide additional information regarding the heating, hot or cold forming, machining and welding of this steel grade.

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
3mm	0.5mm	2.0mm	.0210	25,000	6,250
4mm	0.5mm	3.0mm	.0290	18,752	4,688
	1.0mm	2.0mm	.0500	37,500	8,375
6mm	0.5mm	5.0mm	.0460	12,500	3,125
	1.0mm	4.0mm	.0830	25,000	6,250
	1.5mm	3.0mm	.1130	37,500	9,375
8mm	1.0mm	6.0mm	.1170	18,752	4,688
	1.5mm	5.0mm	.1630	28,124	7,031
10mm	1.0mm	8.0mm	.1500	15,000	3,750
	1.5mm	7.0mm	.2130	22,500	5,625
	2.0mm	6.0mm	.2670	30,000	7,500
12mm	1.0mm	10.0mm	.1830	12,500	3,125
	1.5mm	9.0mm	.2630	18,752	4,688
	2.0mm	8.0mm	.3340	25,000	6,250
14mm	1.5mm	9.0mm	.3130	16,072	4,018
15mm	1.5mm	12.0mm	.3380	15,000	3,750
	2.0mm	11.0mm	.4340	20,000	5,000
16mm	1.0mm	14.0mm	.2500	9,376	2,344
	1.5mm	13.0mm	.3630	14,064	3,516
	2.0mm	12.0mm	.4670	18,752	4,688
18mm	1.5mm	15.0mm	.4130	12,500	3,125
	2.0mm	14.0mm	.5340	16,668	4,167
20mm	1.5mm	17.0mm	.4630	11,252	2,813
	2.0mm	16.0mm	.6000	15,000	3,750
	2.5mm	15.0mm	.7300	18,752	4,688
	3.0mm	14.0mm	.8510	22,500	5,625
22mm	1.5mm	19.0mm	.5130	10,228	2,557
	2.0mm	18.0mm	.6670	13,636	3,409
	2.5mm	17.0mm	.8130	17,044	4,261
25mm	1.5mm	22.0mm	.5880	9,000	2,250
	2.0mm	21.0mm	.7670	12,000	3,000
	2.5mm	20.0mm	.9380	15,000	3,750
	3.0mm	19.0mm	1.1010	18,000	4,500
28mm	2.0mm	24.0mm	.8670	10,716	2,679
	2.5mm	23.0mm	1.0630	13,392	3,348
30mm	2.5mm	25.0mm	1.1470	12,500	3,125
	3.0mm	24.0mm	1.3510	15,000	3,750
	4.0mm	22.0mm	1.7350	20,000	5,000
35mm	2.5mm	30.0mm	1.3550	10,716	2,679
38mm	2.0mm	34.0mm	1.2010	7,896	1,974
	4.0mm	30.0mm	2.2680	15,788	3,947
40mm	2.5mm	35.0mm	1.5640	9,376	2,344
42mm	3.0mm	36.0mm	1.9510	10,716	2,679

All Pressure Ratings are approximate and for illustration purposes only. Values are not Guaranteed or Warranted.

Domestic Tube is Bright Annealed

Imported Tube is Solution Annealed OD Polished to a 320-Grit Finish

COILED STAINLESS STEEL TUBING

Coiled tubing makes long length tube installations possible without the need for joining fittings. This reduces installation time and costs, as well as eliminating potential leak points. PAC Stainless stocks both seamless and welded tube coils to meet the needs of petrochemical, CNG, geothermal, and flow measurement applications. Coiled tubing can be supplied as a loose coil or on wooden spools.

Length Capabilities

PAC Stainless can provide coiled tubing in long mill lengths that stretch over a mile, or in custom cut-to-length sections as short as fifty feet. Short, long, and everything in between—let us be your preferred source for coiled stainless steel tubing products.

PRODUCT SPECIFICATIONS

ASTM A269, ASTM A213 / ASME SA213 (SEAMLESS)
ASTM A269, ASTM A249 / ASME SA249 (WELDED)

SIZE RANGE

	Outside Diameter (OD)	Wall Thickness
WELDED 304/L	.125″–.750″	.020″–.049″
WELDED 316/L	.125″–.750″	.020″–.049″
SEAMLESS 316/L	.063″–.750″	.010″–.109″

CHEMICAL REQUIREMENTS

T304/L (UNS S30400/UNS S30403)
COMPOSITION %

ELEMENTS		UNS S30400	UNS S30403
C	Carbon	0.080 max	0.035 max
Mn	Manganese	2.00 max	2.00 max
P	Phosphorous	0.045 max	0.045 max
S	Sulfur	0.030 max	0.030 max
Si	Silicon	1.00 max	1.00 max
Cr	Chromium	18.0–20.0	18.0–20.0
Ni	Nickel	8.0–11.0	8.0–12.0

T316/L (UNS S31600/UNS S31603)
COMPOSITION %

ELEMENTS		UNS S31600	UNS S31603
C	Carbon	0.08 max	0.035 max
Mn	Manganese	2.00 max	2.00 max
P	Phosphorous	0.045 max	0.045 max
S	Sulfur	0.030 max	0.030 max
Si	Silicon	1.00 max	1.00 max
Cr	Chromium	16.0–18.0	16.0–18.0
Ni	Nickel	10.0–14.0	10.0–15.0
Mo	Molybdenum	2.00–3.00	2.00–3.00

WELDED 304/L

OD	Wall	ID	Lbs./Ft.
1/8″	.020	.085	.0226
(.125″)	.035	.055	.0340
1/4″ (.250″)	.035	.180	.0811
5/16″ (.313″)	.035	.243	.1049
3/8″ (.375″)	.035	.305	.1283
1/2″	.035	.430	.1755
3/4″ (.750″)	.035	.680	.2670

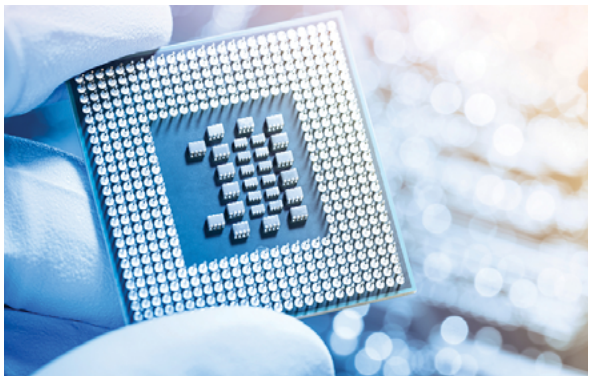
WELDED 316/L

OD	Wall	ID	Lbs./Ft.
1/8″	.028	.069	.0294
(.125″)	.035	.055	.0341
3/16" (.188")	.035	.118	.057
1/4″	.035	.180	.0814
(.250″)	.049	.152	.1066
5/16" (.313")	.035	.243	.104
3/8″	.035	.305	.1288
(.375″)	.049	.277	.1728
1/2″	.035	.430	.1761
(.500″)	.049	.402	.2391
5/8″ (.625″)	.049	.527	.3054
3/4″	.035	.680	.2708
(.750″)	.049	.652	.3717

SEAMLESS 316/L

OD	Wall	ID	Lbs./Ft.
1/16″	.010	.043	.0057
(.063″)	.020	.023	.0093
1/8″	.020	.085	.0220
(.125″)	.028	.069	.0290
	.035	.055	.0341
1/4″	.035	.180	.0814
(.250″)	.049	.152	.1066
	.065	.120	.1301
	.083	.084	.1480
3/8″	.035	.305	.1288
(.375″)	.049	.277	.1728
	.065	.245	.2180
1/2″	.035	.430	.1761
(.500″)	.049	.402	.2391
	.065	.370	.3059
	.083	.334	.3690
3/4″	.035	.680	.2780
(.750″)	.049	.652	.3717
	.065	.620	.4818
	.109	.532	.7560

OXYGEN CLEANED & CAPPED TUBING



Special cleaning in oxygen service is not only important for cleanliness but is also critical for safety. In order to handle the flow of oxygen safely, it is important to ensure that the path through which the gas will travel is free from particulates and lubricants that can lead to unintentional contamination. Oxygen cleaned and capped tubing has been specially prepared in a clean room to support product purity and eliminate contamination potential.

CLEANING SPECIFICATIONS

CGA G-4.1, ASTM G93-03, ASTM A380

SIZE RANGE

(316/L)

Outside Diameter (OD)	Wall Thickness
.125"–1.000"	.028"–.065"

OXYGEN CLEANING PROCESS

To meet the ASTM and CGA requirements, our products are cleaned for oxygen service are produced through a controlled series of process steps. An initial inspection is performed to identify any significant contaminants. The product is then meticulously cleaned and/or passivated, rinsed, and dried to ensure removal of even the slightest debris. Immediately upon completion of a final inspection, the product is capped and ultimately bagged while still inside the clean room environment to ensure the highest level of cleanliness and prevent post-cleaning contamination.

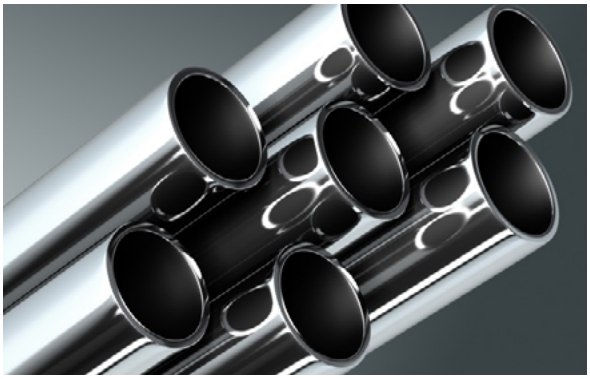
OXYGEN CLEANED MATERIAL IN STOCK

PAC Stainless holds a stock of 316/L and Alloy 400 domestic tubing cleaned and capped for oxygen service. If we do not have what you are looking for in stock, just ask. All tubing, coils, pipe, and fittings offered can be oxygen cleaned as a special order.

TYPICAL APPLICATIONS

Semiconductor Fabrication
Clean Room Applications
Oxygen Enriched Environments
Gas Chromatography

ELECTROPOLISHED (EP) TUBING



For applications with surface finish requirements well beyond the quality realized in a standard mill finish, PAC maintains an inventory of electropolished tubing (EP) in diameters ranging from 1/8" through 1". Through submersion in an electrically charged electrolyte solution bath, a smooth uniform surface is created by dissolving imperfections. This process removes any contamination on, or just below, the tube's surface and passivates it, bolstering the corrosion resistance of the steel.

PRODUCT SPECIFICATIONS

ASTM A269, A213 / ASME SA213

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.125"–1.000"	.028"–.065"

CERTIFIED CLEANLINESS

The pharmaceutical, petrochemical, food & beverage and semi-conductor industries all contain processes where fine smoothing of the tube is critical for heightened cleanliness, the removal of occluded gases, or friction reduction imperatives.

Stocked in a 316/316L chemistry with a maximum hardness of RB 90, the surface finish of the tube internal surface is certified to have a maximum roughness of 10 Ra micro-inches.

In ISO Class 4 clean room conditions, each tube is purged with ultra high purity (UHP) nitrogen and then capped and double bagged. Certification qualifying the tubing's production standards, chemical composition, material traceability, and maximum surface roughness is provided for all material.

TYPICAL APPLICATIONS

Semiconductor Fabrication
Food & Beverage Industries
Pharmaceutical Manufacturing
Petrochemical Industries

SILCONERT® 2000 COATED TUBING

PAC Stainless is a premier stocking source of stainless steel tubing treated with SilcoNert® 2000 from SilcoTek®, the pioneer of chemically inert coating technology. Industry leaders in petrochemical, oil, gas, and power generation rely on SilcoNert® coated tubing to increase the reliability, accuracy, and speed of their process analyzers—especially when dealing with challenging chemical compounds like sulfur, mercury, NOX, and more. SilcoNert® coated stainless steel tubing is a necessity for keeping critical processes running and meeting strict environmental monitoring requirements.

WHAT IS SILCONERT® 2000?

SilcoNert® is a brand of proprietary amorphous silicon coatings from SilcoTek®. SilcoNert® 2000 – also commonly referred to as Sulfinert®—is the most inert version of the coating that is available. While uncoated stainless steel tubing adsorbs reactive chemical compounds before they can reach the analyzer's detector (thus providing inaccurate readings), SilcoNert® 2000 enables chemical analysis down to parts-per-trillion levels by shielding the stainless steel tubing from chemical adsorption.

SilcoTek coatings are applied with an innovative chemical vapor deposition (CVD) process. CVD is performed in the gas phase at high temperatures, so even 1/16" OD and smaller tube sizes are uniformly coated to create an inert barrier throughout the interior surface.

WHY USE SILCONERT® COATED TUBING?

Stainless steel is versatile, but if left untreated, it will cause problems in applications where sensitive chemistry makes the difference between profitability or plant shut-down. Tubing accounts for a majority of the surface area in any process system, so it's critical that it performs at its peak. SilcoNert® coated stainless steel tubing from PAC Stainless should be specified when dealing with chemical compounds known to be reactive to untreated stainless steel.

PRODUCT SPECIFICATIONS

ASTM A269, ASTM A213/ ASME SA213 (SEAMLESS)

CHEMICAL REQUIREMENTS

T316/L (UNS S31600/UNS S31603)
COMPOSITION %

ELEMENTS		UNS S31600	UNS S31603
C	Carbon	0.08 max	0.035 max
Mn	Manganese	2.00 max	2.00 max
P	Phosphorous	0.045 max	0.045 max
S	Sulfur	0.030 max	0.030 max
Si	Silicon	1.00 max	1.00 max
Cr	Chromium	16.0–18.0	16.0–18.0
Ni	Nickel	10.0–14.0	10.0–15.0
Mo	Molybdenum	2.00–3.00	2.00–3.00

SIZE OPTIONS

Other sizes are available upon request.

STICK TUBING – 80" LENGTHS (INTERNAL & EXTERNAL COAT)

OD	WALL
.125"	.020"
.125"	.028"
.250"	.035"
.250"	.049"
.375"	.035"
.500"	.035"

COILED TUBING (INTERNAL COAT ONLY)

OD	WALL
.063"	.020"
.125"	.020"
.125"	.035"
.250"	.035"
.375"	.035"
.500"	.035"

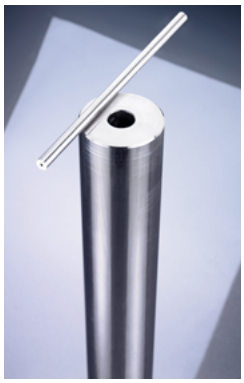
COATING OPTIONS

SILCONERT® 2000

Spec	Description
Composition	Functionalized hydrogenated amorphous silicon
Deposition Process	Thermal chemical vapor deposition
Max Temperature	450° C
Typical Thickness	100–500 nanometers
Hydrophobicity *Water Contact Angle*	> 65°
Allowable pH Exposure	0–8

*All Stock is manufactured domestically and DFAT compliant.

HIGH-PRESSURE FLUID SYSTEM COMPONENTS


PAC Stainless supplies the tubing and accessories that are required for high-pressure applications. Medium pressure (up to 20,000 PSI), high pressure (30,000 through 60,000 PSI), and ultra-high pressure (90,000 PSI) solutions are offered for tubing valves and fittings. Tubes are provided in random lengths between 20′ and 24′ long and are available in 316L, HP120™, and HP160™.

PRODUCT SPECIFICATIONS

ASTM A213, ASTM A269 (CHEMISTRY ONLY)

MECHANICAL PROPERTIES & FABRICATION

All tubing is seamless, austenitic, 1/8 hard, cold-drawn, tested and inspected to meet maximum strength and performance. All parts are designed in accordance to the high pressure valve industry standard practices. Pressure boundary component wall thickness are designed in accordance with ASME B31.3 Chapter IX, High Pressure Piping, Equation 35b.

Nominal OD	Pressure Type	OD	ID	Min AWP
1/4″	Ultra-High	.243"/.250"	.079"/.083"	90,000
1/4″	High	.243″/.250″	.079″/.083″	60,000
1/4″	Medium	.243″/.250″	.104″/.109″	20,000
3/8″	Ultra-High	.365"/.375"	.121"/.125"	90,000
3/8″	High	.365″/.375″	.121″/.125″	60,000
3/8″	Medium	.365″/.375″	.198″/.203″	20,000
9/16″	High	.552″/.563″	.182″/.187″	60,000
9/16″	High	.552″/.563″	.245″/.250″	40,000
9/16″	Medium	.552″/.563″	.307″/.312″	20,000
9/16″	Medium	.552″/.563″	.354″/.359″	15,000
3/4″	High	.740″/.750″	.245″/.250″	60,000
3/4″	Medium	.740″/.750″	.432″/.437″	20,000
3/4″	Medium	.740″/.750″	.510″/.515″	15,000
1″	High	.990″/1.000″	.432″/.437″	60,000
1″	Medium	.990″/1.000″	.557″/.562″	20,000
1″	Medium	.990″/1.000″	.682″/.687″	15,000

All Pressure Ratings are approximate and for illustration purposes only. Values are not Guaranteed or Warranted.

TYPICAL APPLICATIONS

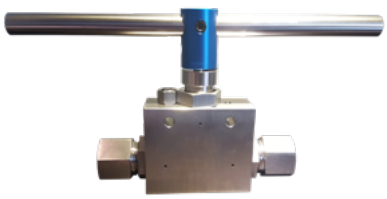
Oil & Gas
Surface & Subsea
Hydraulic
Test Benches
Waterjet Cutting
Chemical Injections & Sampling

FITTINGS AND VALVES

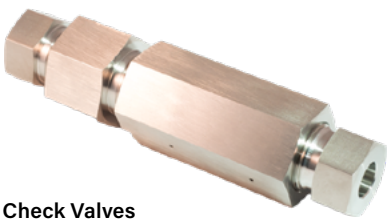
Feature	Detail
Connection Type	Variety
Connection Size	.250″–1.500″
MAWP	60,000 PSI
Pipe Fittings MAWP	≤ 15,000 PSI
Cone & Thread MAWP	≤ 60,000 PSI
Material	316 cold worked stainless steel. Special alloys are available.

Fittings & Adapters

Needle Valves



Ball Valves



Check Valves

317L STAINLESS STEEL TUBING

Similar in composition to 316L and 304L, alloy 317L is an austenitic molybdenum, chromium, nickel stainless alloy. Due to the higher moly content, 317L provides enhanced resistance to pitting and stress corrosion cracking particularly in chloride or halide-rich environments. 317L has higher creep, stress-to-rupture, and tensile strength than its 316L and 304L counterparts which makes it a great solution to demanding applications found offshore, in pulp & paper mills and in chemical processing plants.

PRODUCT SPECIFICATIONS

ASTM A213 / ASME SA213 / NACE MR0175

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.125"–1.000"	.028"–.134"

CHEMICAL REQUIREMENTS

ASTM TP317L (UNS S31703)
COMPOSITION %

C	Carbon	0.035 max
Mn	Manganese	2.00 max
P	Phosphorous	0.045 max
S	Sulfur	0.030 max
Si	Silicon	1.00 max
Cr	Chromium	18.0–20.0
Ni	Nickel	11.0–15.0
Mo	Molybdenum	3.0–4.0

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
≤ .500"	± .005"	± 10%
.500"–1.500" excl	± .005"	± 10%

MECHANICAL PROPERTIES

Yield Strength	30 ksi min
Tensile Strength	75 ksi min
Elongation (2" min)	35%
Hardness (Rockwell B Scale)	90 HRB max

FABRICATION

The low carbon content provides resistance to intergranular corrosion and superior weldability over 316. 317L can be hardened by cold working as opposed to heat treating.

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
1/8" (.125")	.028	.069	.0294	30,240	7,560
	.035	.055	.0341	37,800	9,450
1/4" (.250")	.035	.180	.0814	23,333	5,833.25
	.049	.152	.1066	26,460	6,615
	.065	.120	.1301	35,100	8,775
3/8" (.375")	.035	.305	.1288	12,600	3,150
	.049	.277	.1728	17,640	4,410
	.065	.245	.2180	23,400	5,850
1/2" (.500")	.035	.430	.1761	9,450	2,362.5
	.049	.402	.2391	13,230	3,307.5
	.065	.370	.3059	17,550	4,387.5
	.083	.334	.3745	22,410	5,602.5
3/4" (.750")	.065	.620	.4818	11,700	2,925
	.083	.584	.5990	14,940	3,735
	.095	.560	.6773	17,100	4,275
	.109	.532	.7560	19,620	4,905
	.120	.510	.8181	24,000	6,000
1" (1.000")	.065	.870	.6576	8,775	2,193.75
	.083	.834	.8235	11,205	2,801.25
	.095	.810	.9302	12,825	3,206.25
	.109	.782	1.051	14,715	3,678.75
	.120	.760	1.143	16,200	4,050
	.134	.732	1.256	18,090	4,522.5

TYPICAL APPLICATIONS

Offshore Oil and Gas
Chemical and Petrochemical
Pulp & Paper
Food Processing
Textile Equipment

ALLOY 20 NICKEL TUBING

Alloy 20 is an austenitic, nickel-iron-chromium-molybdenum alloy with the addition of copper. This combination makes it preferable in applications involving sulfuric, phosphoric, and nitric acids. The chromium and molybdenum content provide good pitting and crevice corrosion resistance. This grade exhibits exceptional resistance to stress corrosion cracking (SCC) induced by chlorides. Alloy 20 can be utilized in a wide variety of chemical process environments and has good performance in most acids, alkalines, salts, and seawater.

PRODUCT SPECIFICATIONS

ASTM B729, B464, B468 / ASME SB729, SB464, SB468 / NACE MR0175

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.250"–.500"	.035"–.065"

Cold Finished and Bright Annealed Tube

CHEMICAL REQUIREMENTS

ALLOY 20 (UNS N08020)
COMPOSITION %

C	Carbon	0.07 max
Mn	Manganese	2.0 max
P	Phosphorous	0.045 max
S	Sulfur	0.035 max
Si	Silicon	1.0 max
Ni	Nickel	32.0–38.0
Cr	Chromium	19.0–21.0
Mo	Molybdenum	2.0–3.0
Cu	Copper	3.0–4.0
Nb + Ta	Niobium + Tantalum	(8.0xC) 1.0 max
Fe	Iron	35.0 max

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
.250"	± .005"	± 15%
.375"	± .005"	± 15%
.500"	± .005"	± 15%

MECHANICAL PROPERTIES

Yield Strength	35 ksi min
Tensile Strength	80 ksi min
Elongation (min 2")	30%

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
1/4" (.250")	.035	.180	.0825	20,400	5,100
	.049	.152	.1080	30,000	7,500
3/8" (.375")	.035	.305	.1305	13,200	3,300
	.049	.277	.1752	19,200	4,800
1/2" (.500")	.049	.402	.2424	14,800	3,700
	.065	.370	.3102	20,400	5,100

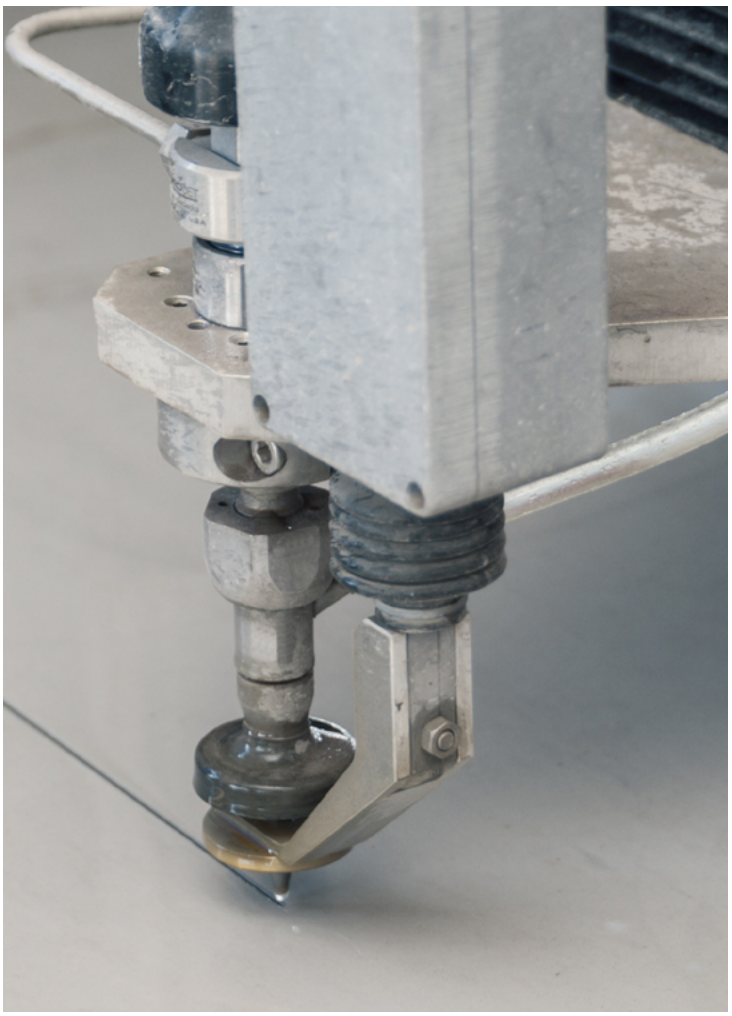
All Pressure Ratings are approximate and for illustration purposes only. Values are not Guaranteed or Warranted.

TYPICAL APPLICATIONS

Piping
Heat Exchangers
Steam Condensers
Flue-Gas Desulfurization
Food Processing
Chemical Processing

FABRICATION

The chemical composition of alloy 20 allows excellent formability for bending and flaring, and the addition of Niobium provides minimal carbide precipitation during welding.



ALLOY 2507 SUPER DUPLEX TUBING

PAC Stainless is the largest stocking distributor of Super Duplex 2507 tubing in North America. Alloy 2507 Super Duplex is a high-alloy duplex stainless steel with a PRE (Pitting Resistance Equivalent) value of minimum 42.5.

The grade is characterized by very good chloride corrosion resistance, combined with very high mechanical strength. It is particularly suited for use in aggressive environments such as warm chlorinated seawater and acidic, chloride containing media. It is widely used in offshore oil and gas exploration/production and in heat exchangers in petrochemical/chemical processing. The grade is also suitable for hydraulic and instrumentation applications in tropical marine environments.

PRODUCT SPECIFICATIONS

ASTM A-789

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.250″–1.000″	.035″–.134″

Cold Finished and Bright Annealed Tube

CHEMICAL REQUIREMENTS

SUPER DUPLEX 2507 (UNS S32750)
COMPOSITION %

C	Carbon	0.03 max
Mn	Manganese	1.20 max
P	Phosphorous	0.035 max
S	Sulfur	0.020 max
Si	Silicon	0.80 max
Ni	Nickel	6.0–8.0
Cr	Chromium	24.0–26.0
Mo	Molybdenum	3.0–5.0
N	Nitrogen	0.24–0.32
Cu	Copper	0.50 max

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
≤ .500″	± .005″	± 15%
0.500″–1.500″ excl	± .005″	± 10%

MECHANICAL PROPERTIES

Yield Strength	80 ksi min
Tensile Strength	116 ksi min
Elongation (min 2″)	15%
Hardness (Rockwell C Scale)	32 HRC max

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
1/4″ (.250″)	.035	.180	.0803	29,232	7,308
	.049	.152	.1051	40,925	10,231
	.065	.120	.1283	54,288	13,572
3/8″ (.375″)	.035	.305	.1270	19,488	4,872
	.049	.277	.1704	27,283	
	.065	.245	.2150	36,192	9,048
	.083	.209	.2586	46,214	11,554
1/2″ (.500″)	.035	.430	.1736	14,616	3,654
	.049	.402	.2358	20,462	5,116
	.065	.370	.3017	27,144	6,786
	.083	.334	.3693	34,661	8,665
	.095	.310	.4105	39,672	9,918
5/8″ (.625″)	.065	.495	.3884	21,715	5,429
	.083	.459	.4800	27,729	6,932
	.095	.435	.5372	37,416	9,354
	.120	.385	.6465	40,090	10,023
3/4″ (.750″)	.065	.620	.4750	18,096	4,524
	.083	.584	.5906	23,107	5,777
	.095	.560	.6639	26,448	6,612
	.109	.532	.7454	30,346	7,587
	.120	.510	.8066	33,408	8,352
	.134	.482	.8807	37,300	9,325
1″ (1.000″)	.065	.870	.6484	13,572	3,393
	.083	.834	.8120	17,330	4,333
	.109	.782	1.036	22,759	5,690
	.120	.760	1.127	25,056	6,264

All Pressure Ratings are approximate and for illustration purposes only. Values are not Guaranteed or Warranted.

ALLOY 254 SMO™ (6-MOLY) TUBING

Alloy 6MO tubing is a high-alloy austenitic stainless steel designed for maximum resistance to pitting and crevice corrosion. The high levels of chromium, molybdenum, and nitrogen make 254 SMO™ (6-moly) suitable for high chloride environments such as brackish water, seawater pulp mill, bleach plants, and other high chloride process streams.

Alloy 6MO is compatible with the common austenitic stainless steels and is often used as a replacement in critical components of larger constructions where type 316L or 317L has failed by pitting, crevice attack, or chloride stress corrosion cracking.

Alloy 6MO is substantially stronger than the common austenitic grades, but is also characterized by high ductility and impact strength.

PRODUCT SPECIFICATIONS

ASTM A213, A269 / ASME SA213 / NORSOK M650 / NACE MR0175

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.250"–.750"	.035"–.065"

CHEMICAL REQUIREMENTS

ALLOY 6MO (UNS S31254)
COMPOSITION %

C	Carbon	0.020 max
Mn	Manganese	1.00 max
P	Phosphorous	0.030 max
S	Sulfur	0.010 max
Si	Silicon	0.80 max
Cr	Chromium	19.5–20.5
Ni	Nickel	17.5–18.5
Mo	Molybdenum	6.0–6.5
N	Nitrogen	0.18–0.22
Cu	Copper	0.50–1.00

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
≤ .500"	± .005"	± 15%
.500"–.750"	± .005"	± 10%

MECHANICAL PROPERTIES

Yield Strength	45 ksi min
Tensile Strength	98 ksi min
Elongation (min 2")	35%
Hardness (Rockwell B Scale)	96 HRB max

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
1/4" (0.250")	.035	.180	.0828	23,940	5,985
	.049	.152	.1084	33,516	8,379
3/8" (0.375")	.035	.305	.1310	15,960	3,990
	.049	.277	.1758	22,344	5,586
	.065	.245	.2218	29,640	7,410
1/2" (0.500")	.035	.430	.1792	11,970	2,993
	.049	.402	.2433	16,758	4,190
	.065	.370	.3113	22,230	5,558
3/4" (0.750")	.065	.620	.4901	14,820	3,705

All Pressure Ratings are approximate and for illustration purposes only. Values are not Guaranteed or Warranted.

TYPICAL APPLICATIONS

Seawater Handling Equipment
Pulp Mill Bleach Systems
Oil & Gas Production Equipment
Chemical Processing Equipment
Food Processing Equipment

FABRICATION

Alloy 254 SMO™ (6-moly) has excellent weldability in addition to excellent formability which permits cold bending to very tight bending radii.

ALLOY C276 NICKEL TUBING

Alloy C276 is a nickel-molybdenum-chromium-tungsten superalloy, showing excellent resistance to mechanical and chemical degradation. The high nickel and molybdenum content impart remarkable corrosion resistance in reducing environments while chromium provides the same in an oxidizing media. Molybdenum also provides strong resistance to crevice corrosion and pitting. This alloy gives an excellent performance in a wide range of chemical processing conditions, often where nothing else works. Target applications include those involving strong oxidizers such as ferric and cupric chlorides and hot contaminated media (organic and inorganic), formic acid, seawater, and brine solutions.

PRODUCT SPECIFICATIONS

ASTM B622, B829 / ASME SB622, SB829 / NACE MR0175

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.250″–.500″	.035″–.065″

Cold Finished and Bright Annealed Tube

CHEMICAL REQUIREMENTS

ALLOY C276 (UNS N10276)
COMPOSITION %

Ni	Nickel	57.0 min
Cr	Chromium	14.5–16.5
Mo	Molybdenum	15.0–17.0
Fe	Iron	4.0–7.0
W	Tungsten	3.0–4.5
C	Carbon	0.010 max
Si	Silicon	0.08 max
Co	Cobalt	2.5 max
Mn	Manganese	1.0 max
V	Vanadium	0.35 max
P	Phosphorous	0.04 max
S	Sulfur	0.03 max

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
.250″–.500″ excl	+.004″/-.005″	± 15%

MECHANICAL PROPERTIES

Yield Strength	41 ksi min
Tensile Strength	100 ksi min
Elongation (min 2″)	40%

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
1/4″ (.250″)	.035	.180	.0910	26,063	6,516
	.049	.152	.1191	38,044	9,511
3/8″ (.375″)	.035	.305	.1440	16,673	4,168
	.049	.277	.1933	24,123	6,031
	.065	.245	.2438	33,206	8,302
1/2″ (.500″)	.035	.430	.1969	12,258	3,065
	.049	.402	.2674	17,581	4,395
	.065	.370	.3421	23,990	5,998

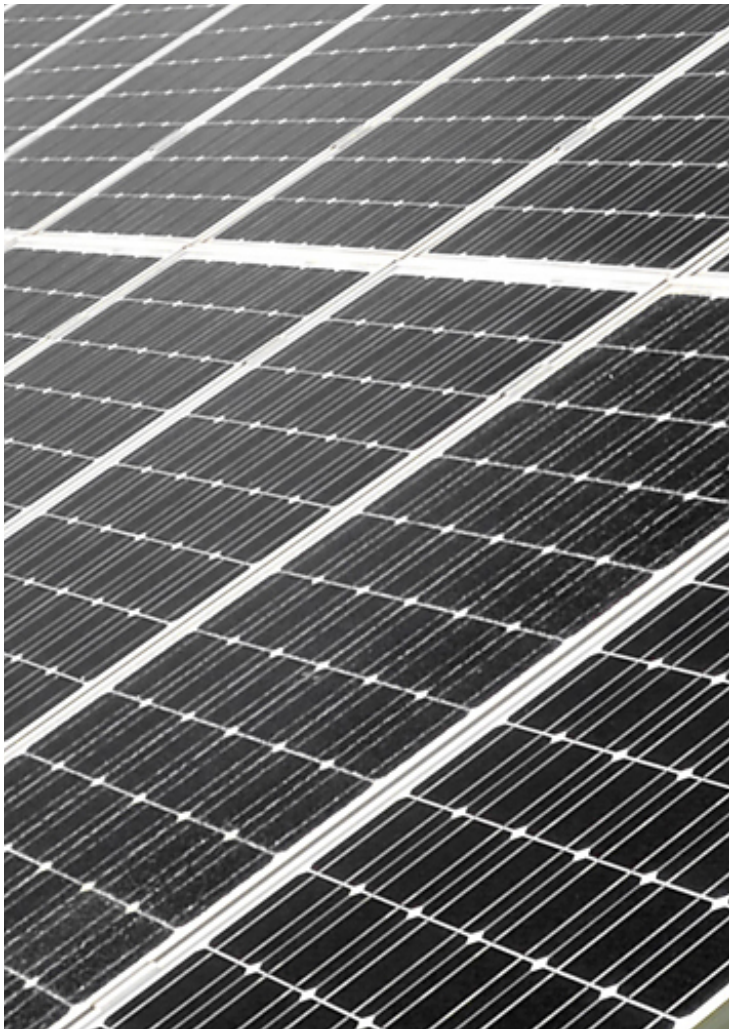
All Pressure Ratings are approximate and for illustration purposes only.
Values are not Guaranteed or Warranted.

TYPICAL APPLICATIONS

Equipment in Sulfuric Acid Environments
Chemical Processing - Organic/Inorganic Chlorides
Sour Gas Well Environments
Pulp & Paper Productions - Digesters, Bleach Plants
Waste Treatment - Evaporators
Pollution Control - Sulfur Compounds in Flue Gas

FABRICATION

Detailed fabrication and welding process information is available upon request.



TITANIUM GRADE 2 TUBING

Titanium Grade 2 is an unalloyed, commercially pure titanium. It is the most commonly used grade of titanium because of its strength, weldability, and outstanding resistance to corrosion. Good ductility and formability make it a popular alloy choice for tubing or piping systems, heat exchangers, reaction and pressure vessels, and flue-gas desulphurization systems. Titanium Gr2 is used across industries such as chemical processing, petrochemical processing, aerospace, and marine.

PRODUCT SPECIFICATIONS

ASTM B338

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.125"–.500"	.035"

CHEMICAL REQUIREMENTS

TITANIUM GRADE 2 (UNS R50400)
COMPOSITION %

N	Nitrogen	0.03 max
C	Carbon	0.08 max
H	Hydrogen	0.015 max
Fe	Iron	0.30 max
O	Oxygen	0.25 max
Residuals, each		0.1 max
Residuals, total		0.4 max
Ti	Titanium	Balance

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
.125"–.500"	+.003"/-.000"	± 10%

MECHANICAL PROPERTIES

Yield Strength	40 ksi min
Tensile Strength	50 ksi min
Elongation (min 2")	20%
Hardness (Rockwell B Scale)	80 HRB max

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
1/8" (.125")	.035	.055	.0183	40,400	10,100
1/4" (.250")	.035	.180	.0462	19,200	4,800
3/8" (.375")	.035	.305	.0731	12,400	3,100
1/2" (.500")	.035	.430	.100	9,200	2,300

All Pressure Ratings are approximate and for illustration purposes only. Values are not Guaranteed or Warranted.

TYPICAL APPLICATIONS

Heat exchangers
Oil & gas components
Power generation
Seawater cooling
Desalination equipment
Chlorate manufacturing
Reactor autoclaves

FABRICATION

Titanium Grade 2 responds well to cold forming using standard methods. It can be readily machined, but special attention must be paid to maintaining sharp tools and the liberal use of coolant. As with machining austenitic stainless steels, cuts should be deep and continuous with slow feeds and speeds.

ALLOY 400 NICKEL TUBING

This nickel-copper chemistry features a high intensity single-phase solid solution metallurgical structure. Alloy 400 has greater corrosion resistance than nickel under reducing conditions and is more resistant than copper under oxidizing conditions. This grade has been widely used in applications requiring strong resistance to corrosive environments featuring acids, alkalies, and high temperature steam. It is all but immune to the stress corrosion cracking (SCC) induced by chlorides and most freshwater conditions. A very tough material (as measured by impact testing), Alloy 400 has excellent mechanical properties in sub-zero conditions. It does not undergo a ductile-to-brittle transformation even when cooled to the temperature of liquid hydrogen. On the opposite side of the temperature range, Alloy 400 performs well in temperatures up to 1000° F.

PRODUCT SPECIFICATIONS

ASTM B163, B165 / ASME SB163 / NACE MR0175

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.125"–1.000"	.035"–.083"

CHEMICAL REQUIREMENTS

ALLOY 400 (UNS N04400)
COMPOSITION %

Ni	Nickel	63.0 min
Cu	Copper	28.0–34.0
Fe	Iron	2.5 max
Mn	Manganese	2.0 max
C	Carbon	0.3 max
Si	Silicon	0.5 max
S	Sulfur	0.024 max

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
.094"–.1875" excl	+.003"/-.000"	± 10%
.1875"–.500" excl	+.004"/-.000"	± 10%
.500"–1.250" incl	+.005"/-.000"	± 10%

MECHANICAL PROPERTIES

Yield Strength	28 ksi min
Tensile Strength	70 ksi min
Elongation (min 2")	35%

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
1/8" (.125")	.035	.055	.0378	35,280	8,820
1/4" (.250")	.035	.180	.0902	17,640	4,410
	.049	.152	.1181	24,696	6,174
	.065	.120	.1442	9,500	2,375
3/8" (.375")	.035	.305	.1427	11,760	2,940
	.049	.277	.1915	16,464	4,116
	.065	.245	.2416	21,840	5,460
1/2" (.500")	.035	.430	.1951	8,820	2,205
	.049	.402	.2649	12,348	3,087
	.065	.370	.3390	16,380	4,095
3/4" (.750)	.049	.652	.4118	8,232	2,058
	.065	.620	.5338	10,920	2,730
1" (1.000")	.065	.870	.7286	9,100	2,275
	.083	.834	.9124	11,620	2,905

All Pressure Ratings are approximate and for illustration purposes only. Values are not Guaranteed or Warranted.

TYPICAL APPLICATIONS

Equipment in Sulfuric Acid Environments
Chemical Processing - Organic/Inorganic Chlorides
Sour Gas Well Environments
Pulp & Paper Production - Digesters & Bleach Plants
Waste Treatment - Evaporators
Pollution Control - Sulfur Compounds in Flue Gas

FABRICATION

Alloy 400 can be satisfactorily fabricated, welded, and joined by standard methodologies and rates of production. Usually, subsequent thermal treatment to effect re-balancing of the alloy is not required. Contact PAC Stainless for detailed fabrication and welding information.

ALLOY 600 NICKEL TUBING

Alloy 600 has great applications for a number of uses where the ability to resist highly corrosive environments with extremely high temperatures is present. The blend of nickel and chromium yields a solid resistance to oxidation in operating temperatures ranging from cryogenic levels to scorching 2,000°F. The high nickel content makes near complete resistance to stress corrosion cracking in chloride environments possible. The chromium portion of the alloy's chemical profile provides the ability to withstand high temperatures. While the finer grain structure of the cold finished tube product brings better corrosion resistance, as well as higher fatigue and impact strength values.

PRODUCT SPECIFICATIONS

ASTM B163, B167 / ASME SB163 / NACE MR0175, MR0103

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.250"–.750"	.035"–.083"

CHEMICAL REQUIREMENTS

ALLOY 600 (UNS N06600) COMPOSITION %

Ni	Nickel	72.0 min
Cu	Copper	0.5 max
Fe	Iron	6.0–10.0
Mn	Manganese	1.0 max
C	Carbon	0.15 max
Si	Silicon	0.5 max
S	Sulfur	0.015 max
Cr	Chromium	14.0–17.0

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
≤ .500" excl	+.005"	± 12.5%
.500"–.750" excl	+.005"	± 12.5%

MECHANICAL PROPERTIES

Yield Strength	35 ksi min
Tensile Strength	80 ksi min
Elongation (min 2")	30%

FABRICATION

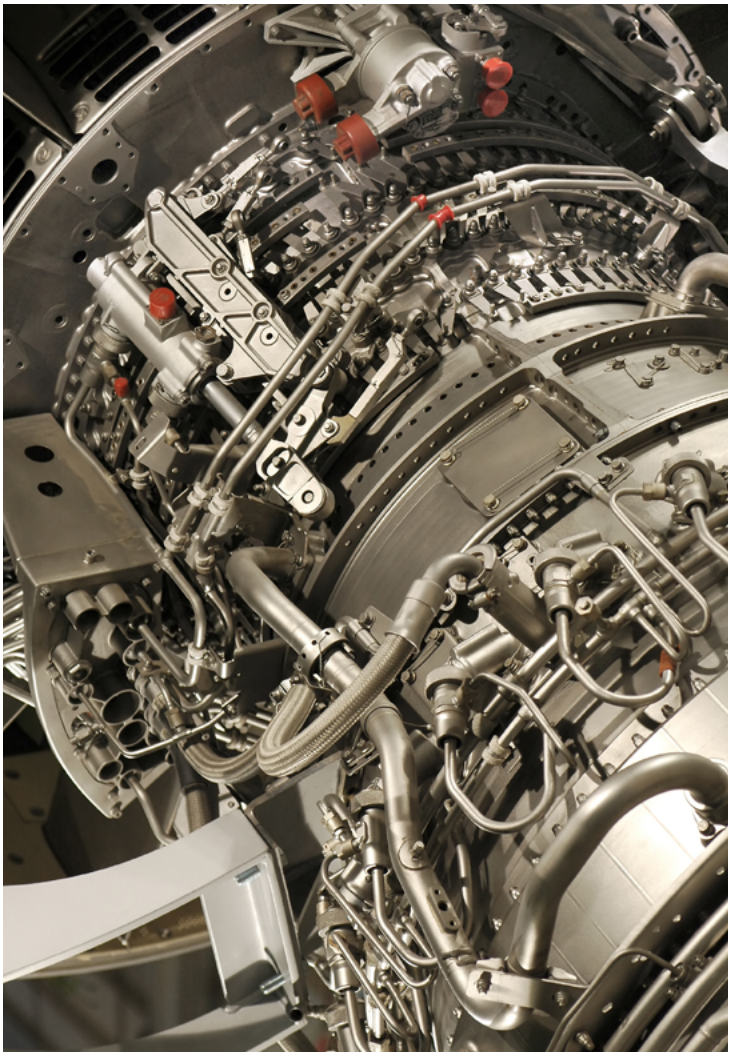
Alloy 600 can be easily welded by standard process. The manageability of this alloy is excellent, residing between the utility of T303 and T304.

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
1/4" (.250")	.035	.180	.0868	20,160	5,040
3/8" (.375")	.035	.305	.1373	13,440	3,360
	.049	.277	.1843	18,816	4,704
1/2" (.500")	.035	.430	.1877	10,080	2,520
	.065	.370	.3262	18,720	4,680
	.083	.334	.3993		
3/4" (.750")	.065	.620	.5136	18,240	4,560

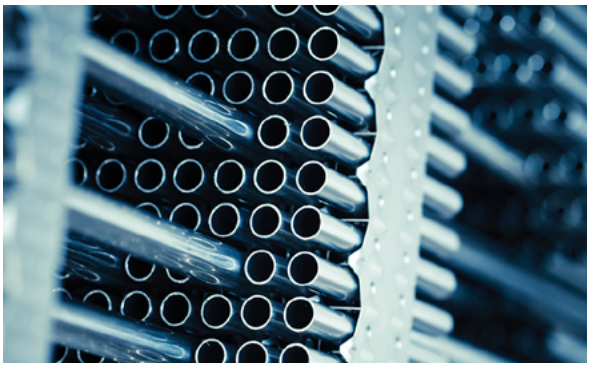
All Pressure Ratings are approximate and for illustration purposes only. Values are not Guaranteed or Warranted.

TYPICAL APPLICATIONS

Offshore
Subsea
Aerospace
Nuclear
Heat Exchangers
Offshore Applications
Chemical Processing



ALLOY 625 NICKEL TUBING



Alloy 625 is an austenitic nickel alloy resistant to crevice corrosion and oxidation, specifically under a wide range of temperatures from cryogenic to 1800°F. This makes the product well suited for nuclear and aerospace applications. The main feature of alloy 625 is the addition of niobium which increases the strength of the tubing without heat treating.

PRODUCT SPECIFICATIONS

ASTM B444 / ASME SB444 / NACE MR0175

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.375"–.750"	.035"–.095"

CHEMICAL REQUIREMENTS

ALLOY 625 (UNS N06625)
COMPOSITION %

C	Carbon	0.10 max
Mn	Manganese	0.50 max
Si	Silicon	0.50 max
P	Phosphorous	0.015 max
Cr	Chromium	20.0–23.0
Nb + Ta	Niobium + Tantalum	3.15–4.15
Co	Cobalt	1.0 max
Mo	Molybdenum	8.0–10.0
Fe	Iron	5.0 max
Al	Aluminum	0.40 max
Ti	Titanium	0.40 max
Ni	Nickel	58.0 min

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
.375"–.500" excl	+.004"/-.000"	± 10%
.500"–1.250" excl	+.005"/-.000"	± 10%

MECHANICAL PROPERTIES

Yield Strength	60 ksi min
Tensile Strength	120 ksi min
Elongation (min 2")	30%

FABRICATION

Alloy 625 has excellent forming and welding characteristics, but is prone to work hardening.

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
3/8" (.375")	.035	.305	.1368	20,160	5,040
	.049	.277	.1837	28,224	7,056
	.065	.245	.2317	37,440	9,360
	.083	.209	.2787	47,808	11,952
1/2" (.500")	.035	.430	.1871	15,120	3,780
	.049	.402	.2541	21,168	5,292
	.065	.370	.3251	28,080	7,020
	.083	.334	.3980	35,856	8,964
3/4" (.750")	.065	.620	.5119	18,720	4,680
	.095	.560	.7155	27,360	6,840

All Pressure Ratings are approximate and for illustration purposes only. Values are not Guaranteed or Warranted.

TYPICAL APPLICATIONS

Offshore
Subsea
Aerospace
Nuclear
Heat Exchangers
Offshore Applications
Chemical Processing

ALLOY 825 NICKEL TUBING

Alloy 825 is an austenitic nickel-iron-chromium alloy defined by additions of molybdenum, copper, and titanium. It was developed to provide exceptional resistance to numerous corrosive environments, both oxidizing and reducing. With a nickel content range between 38–46%, this grade exhibits pronounced resistance to stress corrosion cracking (SCC) induced by chlorides and alkalies. The chromium and molybdenum content provides good pitting resistance in all environments except strongly oxidizing chloride solutions. Utilized as an effective material in a wide variety of process environments, Alloy 825 maintains good mechanical properties from cryogenic temperatures to 1,000° F.

PRODUCT SPECIFICATIONS

ASTM B163, B829 / ASME SB163 / NACE MR0175

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.250"–.750"	.035"–.065"

Cold Finished and Bright Annealed Tube

CHEMICAL REQUIREMENTS

ALLOY 825 (UNS N08825)
COMPOSITION %

Ni	Nickel	38.0–46.0
Cu	Copper	1.5–3.0
Mo	Molybdenum	2.5–3.5
Fe	Iron	22.0 min
Mn	Manganese	1.0 max
C	Carbon	0.05 max
Si	Silicon	0.5 max
S	Sulfur	0.03 max
Cr	Chromium	19.5–23.5
Al	Aluminum	0.2 max
Ti	Titanium	0.6–1.2

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
.250"–.500" excl	+.004"/-.000"	± 10%
.500"–.750" incl	+.005"/-.000"	± 10%

MECHANICAL PROPERTIES

Yield Strength	35 ksi min
Tensile Strength	85 ksi min
Elongation (min 2")	30%
Hardness (Rockwell B Scale)	90 HRB max

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
1/4" (.250")	.035	.180	.0834	21,420	5,355
	.049	.152	.1092	29,988	7,497
3/8" (.375")	.035	.305	.1319	14,280	3,570
	.049	.277	.1771	19,992	4,998
	.065	.245	.2233	26,520	6,630
1/2" (.500")	.035	.430	.1804	10,710	2,678
	.049	.402	.2449	14,994	3,749
	.065	.370	.3134	19,890	4,973
3/4" (.750")	.065	.620	.4935	13,260	3,315
	.095	.560	.6897	19,380	4,845

All Pressure Ratings are approximate and for illustration purposes only. Values are not Guaranteed or Warranted.

TYPICAL APPLICATIONS

Oil & Gas Production - Sour Gas & Oil Wells
Acid Production - Sulphuric & Phosphoric
Pollution Control - Sulfur-Containing Flue Gas
Pickling Operations - Heating Coils & Tanks
Radioactive Waste Handling - Fuel Element Dissolvers
Food Processing Equipment

FABRICATION

This material has excellent formability, typical of nickel-base alloys, allowing the material to be bent to extremely small radii. Annealing after bending is not normally necessary. Upon request, PAC Stainless will provide additional information regarding the heating, hot or cold forming, machining and welding of Alloy 825 product.

ALLOY 904L TUBING

Alloy 904L is a low carbon, high alloy austenitic stainless steel which is widely used in applications where the corrosion properties of AISI 316L and AISI 317L are not adequate. The addition of copper to this grade gives it corrosion resistant properties superior to the conventional chrome nickel stainless steels, in particular to sulfuric, phosphoric, and acetic acids.

PRODUCT SPECIFICATIONS

ASTM A213, A269 / ASME SA213 AVG WALL / NACE MR0175, MR0103

SIZE RANGE

Outside Diameter (OD)	Wall Thickness
.250″–1.000″	.035″–.065″

Cold Finished and Bright Annealed Tube

CHEMICAL REQUIREMENTS

ALLOY 904L (UNS N08904) COMPOSITION %

C	Carbon	0.020 max
Mn	Manganese	2.00 max
P	Phosphorous	0.040 max
S	Sulfur	0.030 max
Si	Silicon	1.00 max
Cr	Chromium	19.0–23.0
Ni	Nickel	23.0–28.0
Mo	Molybdenum	4.0–5.0
N	Nitrogen	0.10 max
Cu	Copper	1.00–2.00

DIMENSIONAL TOLERANCES

OD	OD Tolerance	Wall Tolerance
≤ .500″	± .005″	± 15%
0.500″–1.500″ excl	± .005″	± 10%

MECHANICAL PROPERTIES

Yield Strength	31 ksi min
Tensile Strength	71 ksi min
Elongation (min 2″)	35%
Hardness (Rockwell B Scale)	90 HRB max

FABRICATION

Alloy 904L is non-magnetic in all conditions and has excellent formability and weldability. The austenitic structure also gives this grade excellent toughness, even in cryogenic temperatures.

OD	Wall	ID	Lbs./Ft.	Bursting PSI	Working PSI
0.250″	.035	.180	.0825	16,898	4,225
	.049	.152	.1080	23,657	5,914
	.065	.120	.1319	31,382	7,846
0.375″	.035	.305	.1305	11,265	2,816
	.049	.277	.1752	15,771	3,943
	.065	.245	.2210	17,971	4,493
0.500″	.035	.430	.1785	8,946	2,237
	.049	.402	.2424	12,524	3,131
	.065	.370	.3102	16,614	4,154
0.750″	.049	.652	.3768	8,349	2,087
	.065	.620	.4884	11,076	2,769
1.000″	.065	.870	.6667	8,307	2,077

All Pressure Ratings are approximate and for illustration purposes only. Values are not Guaranteed or Warranted.

TYPICAL APPLICATIONS

Acid Production
Fertilizer Processing
Oil Refining
Gas Scrubbers
Pulp & Paper Processes
Seawater Cooling Equipment
Control & Instrumentation

INSTRUMENTATION FITTINGS

PAC Stainless is proud to offer top instrumentation fittings and valve lines. The brand that we offer adheres to the most stringent industry standards and, as a result, is one of the most certified tube fitting and valve manufacturers in the world. This quality, high-value, import product is available in stainless steel and many other nickel alloys.

Fittings and tubing go hand-in-hand; anywhere instrumentation or hydraulic tubing is in use you can bet on seeing a fitting on one end and/or a valve on the other. It just makes sense to purchase your valves and fittings from the same place that you get your tubing. Let PAC Stainless be your one-stop-shop for all of your valve and fitting needs.

COMPRESSION TUBE FITTINGS

Two ferrule fittings have been successfully tested against ASTM-F1387 with flawless results. These fittings are available in a variety of configurations including straights, elbows, tees, crosses, caps, plugs, connectors, adapters, and reducers; and include options like port connectors, tube stub, AN fittings, NPT thread, SAE thread, BSP threaded (BSPP and BSPT), butt weld, and socket weld.

Double and Single Ferrule, Fractional sizes: 1/16" to 2", Metric sizes: 3mm to 50mm, Temperature range: -325°F to 1200°F.

PIPE & WELD FITTINGS

Three lines of instrumentation grade pipe fittings are available. Traditional thread and weld fittings that meet standard code pressure ratings, 6K thread fittings over 1" rated to 6,000 psig, and 10K thread fittings rated to 10,000 psig (689 bar).

These pipe fittings are manufactured to restricted thread tolerances and feature rolled male threads which provide an ease of installation and less likelihood of galling.

NPT thread (female NPT and male NPT), SAE thread, and BSP thread (BSPP and BSPT) end connections are available; and weld fittings include tube socket weld, pipe socket weld, and butt weld. JIC 37° flare (AN) fittings and adapters are also available.

STAINLESS STEEL HYDRAULIC ADAPTERS

Instrumentation Quality, Heat Code Traceable, 316 Stainless Steel adapters, offered in 3 separate series. Our K series (JIC, 37° flare) meets SAE J514 requirements and is available in all configurations up to 2". Our DIN 2353 series N is manufactured in accordance with both DIN2353/DIN EN ISO8434-1.

The DIN Bite type rube fitting is a flareless metric fitting that consists of a body, progressive ring (sleeve), and nut. We offer a complete line of configurations up to 38mm.

Our HD series of O-Ring Face Seal (ORFS) adapters are manufactured in strict accordance with SAE J1453. This series provides superior sealing performance and is suitable for higher pressure hydraulic systems. All configurations available up to 2".

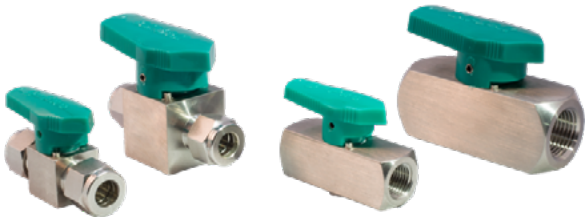
INSTRUMENTATION VALVES

PAC Stainless can provide you with the complete line of quality-assured valves for all of your flow control needs. All pressure ratings are approximate and for illustration purposes only. Values are not guaranteed or warranted.

BALL VALVES

Sizes	Temperature Range	Max. Pressure Rating
1/8″–1″	-40ºF–450ºF	10,000 psig

This versatile valve solution is available in two way and angled (shut-off), and three way (switching) designs. There are 12 different styles of ball valves available with various end connection options.



NEEDLE VALVES

Sizes	Temperature Range	Max. Pressure Rating
1/8″–1″	-40ºF–450ºF	10,000 psig

Needle valves provide shut-off and flow regulation in analytical instrumentation and process systems. Straight and angle pattern options are available in a wide range of end connection, stem, o-ring, and material configurations.

METERING VALVES

Sizes	Temperature Range	Max. Pressure Rating
1/16″–3/8″	-40ºF–450ºF	2,000 psig

For use in analytical instrumentation and other applications where fine flow metering capabilities are required. 1°, 3°, and 6° stem taper angles can be selected for different sensitivity levels of flow control. Panel mounting can be achieved with no handle removal.

PLUG VALVES

Sizes	Temperature Range	Max. Pressure Rating
1/8″–1/2″	-10ºF–400ºF	3,000 psig

Plug valves provide low-torque, quarter-turn actuation, making them an ideal solution where repeated manual actuation is required. Compact and lightweight, these plug valves can be mounted close together, allowing for great use in small spaces.

ALSO AVAILABLE

Quick Connects, Check Valves, Toggle Valves, Manifold Valves, and more. Please contact us for a full catalog and detailed product specifications.

TUBE WORKING TOOLS

ELECTRIC TUBE BENDER ROBEND® 4000 SET

Complete with 6 Die Sizes and Carrying Case

The ROTHENBERGER ROBEND® 4000 will reliably bend copper, aluminum, carbon steel, and stainless steel tube. The kit comes complete with a carrying case and 6 bending die sizes: 1/2", 5/8", 3/4", 7/8", 1" and 1 1/8". Options include dies for 1 1/4" and 1 3/8" tube, metric sizes, and tripod. The unit automatically stops at your preset bend angle and provides fast, smooth bends- with quick reverse. Great for repetitive, consistent bends. This 110 volt unit has a robust motor and gear box for reliable performance. It is portable and easy to take to your job site where you can use the optional tripod or set on a work bench.

Key Benefits

- Reliable, repeated alternate-angled bends easily produced with accuracy and consistency.
- Prefabrication of repetitive bends.
- Reduces the need to buy or store manufactured fittings.
- Saves in soldering and welding joints, solder/welding material and energy, reducing labor costs.
- Problem-free bending leaves the tube surface finish unblemished, even with stainless steel tube.

Features

- Simple and fast pre-selection of required bending angle on rotary scale.
- Automatic stop at preselected angle during automatic operation.
- Precision clutch separates gears and motor, protecting the machine without wear and frequent adjustments of sliding clutches.
- High-reduction gears & High-speed rapid reverse.

TUBE CUTTERS

Hand-held roller blade style cutters for square cuts

TC-1050 "IMP"® general-purpose mini tube cutter for 1/8" to 5/8" OD tubing.

TC-1010 Hi-Duty® tube cutter with stainless steel cutter wheel for 1/8" to1-1/8" OD tubing.

S75015 Replacement stainless steel cutter wheel (compatible with TC-1010 and TC-1000).

TUBE FLARING TOOLS

Creates smooth 37° or 45° flared tube ends

437-FB General-purpose 37° flaring tool for 3/16", 3/8", 1/2", and 5/8" OD tubing.

447-F Heavy-duty stainless steel 37° flaring tool for 3/16", 3/8", 1/2", and 5/8" OD tubing.

195-FB Replacement stainless steel cutter wheel (compatible with TC-1010 and TC-1000).

TUBE DEBURRING TOOLS

Deburr ID and OD of tubing after cutting

208-F General-purpose reamer.

208-FSS Reamer with Tungsten-hardened cutter blades for stainless steel.

HAND TUBE BENDERS*

Eliminate the need for fitting elbows by creating up to 180° tubing bends by hand around a radius. *Each tool bends only one selected size.

664-FH Heavy-duty roller tube bender with Roto-Lok™ for quick handle repositioning. Available in 1/4", 3/8", and 1/2" OD tube sizes.

564-FH Heavy-duty roller tube bender, rugged yet precise, for accurate day-in/day-out use. Available in 3/8" and 1/2" OD tube sizes.

364-FHA Lever-type tube bender. Available in 1/8" to 1/2" OD tube sizes for stainless steel. 5/8" to 1" OD tube sizes for copper and aluminum.

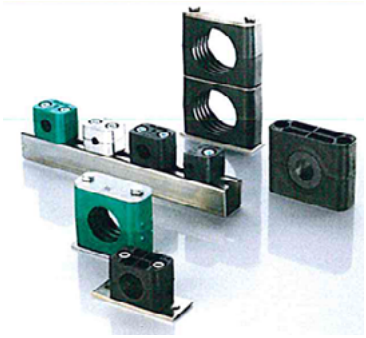
TC-1010

447-F

208-FSS

664-FH Series A

TUBING CLAMPS



PAC Stainless stocks three different clamp options in a wide variety of sizes. The versatile STAUFF® clamps, the customizable "Shark Clamp" and the simple, yet effective Gang Clamps. All of these clamps are available to meet your tubing support and bundling needs. Whether your clamp requirements call for single-line or multi-line runs in a stainless steel or polymer construction, PAC Stainless has the appropriate clamp for your application.

STAUFF® CLAMPS

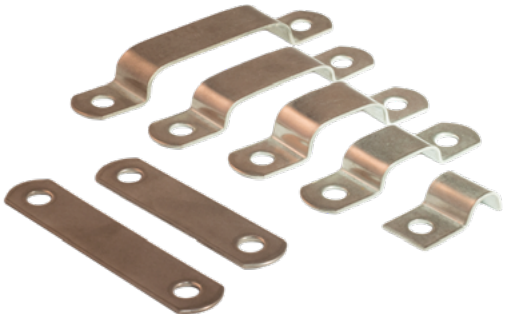
STAUFF® Clamps have become well-known in many onshore and offshore applications as the industry standard for tube, pipe and hose support clamping systems. With the addition of their anti-corrosion technology (ACT) clamp, STAUFF® continues to provide solutions for high-vibration and corrosive environments and are proven to have excellent weathering resistance even under extreme conditions. Please contact us for any of your STAUFF® Clamp needs.

SHARK CLAMPS

The Shark Clamps provided by PAC Stainless, are designed for use in combination with many industry standard tubing trays and channel systems. These 316 stainless steel clamps are offered with a plain finish or powder coated black. These clamps provide a quick and customizable method for running multiple tubing lines at once. Compatible with fractional, metric, or encapsulated tubing. Shark Clamps can accommodate a wide variety of sizes and options. Mounting hardware is also available.

GANG CLAMPS

These clamps can accommodate anywhere from 1 to 12 tubes and custom sizes can be manufactured. All tubing Gang Clamps are fabricated in 316 stainless steel with a minimum 16 gauge thickness. Mounting holes are drilled to facilitate the use of 1/4" threaded fasteners. Back plates are offered with the multi-line clamps; Single clamps come as a one piece solution. Yoke and Duplex clamps are also available.



GANG CLAMP SIZES IN STOCK SIZES

	1	2	3	4	5	6	7	8	9	10	11	12
1/4"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3/8"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1/2"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5/8"	✓	✓	✓	✓	✓	✓						
3/4"	✓	✓	✓	✓								
1"	✓											

THEORETICAL BURSTING PRESSURES

STAINLESS STEEL TUBING

PSI	Wall .016"	.020"	.028"	.035"	.049"	.065"	.083"	.095"	.109"	.120"	.134"	.156"	.188"	.250"	.313"	.375"	.500"	.750"
OD 1/16"	38,000	48,000																
1/8"	19,200	24,000	39,000	42,000	58,800													
3/16"	12,800	15,998	22,403	29,498	39,203	51,863												
1/4"		12,000	16,800	21,000	29,400	39,000	49,800	57,000										
5/16"		9,600	13,440	16,800	23,520	31,200	39,780	45,750										
3/8"		8,003	11,998	14,003	19,598	26,003	33,203	38,003	43,598	48,000								
7/16"		6,857	9,600	12,000	16,800	22,285	28,457	32,571	37,371	41,143								
1/2"		6,000	8,400	10,500	14,700	19,500	24,900	28,500	32,700	36,000								
9/16"		5,333	7,467	9,333	13,067	17,333	22,123	25,333	29,066	32,000								
5/8"		4,800	6,720	8,400	11,760	15,600	19,920	22,888	26,160	28,800	32,160	37,440	44,880					
3/4"		3,998	5,603	6,998	9,803	12,997	16,598	18,998	21,803	24,000	26,800	31,200	37,403					
7/8"		3,428	4,800	6,000	8,400	11,145	14,228	16,283	18,683	20,573	22,971	26,745	32,055					
1"		3,000	4,200	5,250	7,350	9,750	12,450	14,250	16,350	18,000	20,100	23,400	28,050	37,500				
1-1/8"		2,663	3,735	4,665	6,533	8,670	11,070	12,668	14,535	15,998	17,866	20,798	24,930	33,330				
1-1/4"		2,400	3,360	4,200	5,880	7,800	9,960	11,400	13,080	14,400	16,080	18,720	22,440	30,000				
1-3/8"			3,053	3,818	5,348	7,087	9,053	10,365	11,888	13,088	14,618	17,018	20,400	27,270				
1-1/2"			2,948	3,503	4,898	6,503	8,303	9,503	10,890	12,000	13,400	15,600	18,698	24,998				
1-5/8"				3,230	4,523	6,000	7,662	8,769	10,062	11,077	12,369	14,400	17,354	23,077				
1-3/4"				3,000	4,200	5,573	7,118	8,145	9,345	10,283	11,486	13,373	16,028	21,428				
2"				2,625	3,675	4,875	6,225	7,125	8,175	9,000	10,050	11,700	14,025	18,750	23,475	28,125	37,500	
2-1/4"				2,333	3,270	4,335	5,535	6,330	7,268	8,003	8,933	10,403	12,465	16,665	20,865	24,998	33,330	
2-1/2"				2,100	2,940	3,900	4,980	5,700	6,540	7,200	8,040	9,360	11,220	15,000	18,780	22,500	30,000	
2-3/4"				1,913	2,670	3,548	4,530	5,183	5,948	6,548	7,309	8,513	10,200	13,636	17,070	20,453	27,270	40,913
3"				1,748	2,453	3,248	4,148	4,748	5,453	6,000	6,700	7,800	9,353	12,503	15,653	18,750	24,998	37,500
3-1/4"						3,000	3,833	4,388	5,033	5,535	6,185	7,200	8,633	11,535	14,445	17,310	23,078	34,613
3-1/2"						2,783	3,555	4,073	4,673	5,145	5,743	6,683	8,018	10,718	13,418	16,073	21,428	32,146
3-3/4"						2,603	3,323	3,803	4,358	4,800	5,360	6,240	7,478	9,998	12,518	15,000	20,003	30,000
4"						2,438	3,113	3,563	4,088	4,500	5,025	5,850	7,013	9,375	11,738	14,063	18,750	28,125

The ASME code suggests a safety factor of four when determining working pressure

T304/L, T316/L and T317L A269 tubing for temperatures between -20F and 100F.

E.g. 1/4" OD x .035" BP = 21,000 PSI
21,000 PSI ÷ 4 = 5,250 PSI
Working Pressure = 5,250 PSI

For higher temperatures multiply working pressures by:

	300˚F	500˚F	1000˚F
T304/L	.828	.744	.665
T316/L & T317/L	.900	.853	.764

All Pressure Ratings are approximate and for illustration purposes only. Values are not Guaranteed or Warranted.

INDUSTRIES WE SERVE

Our valued relationships with industry partners gives credit to the versatility and reliability of stainless steel and specialty alloy tubing in the marketplace. As a customer-centric company, we strive to remain informed of industry changes to help better serve our customers. Our experience and expertise extends into the following industry sectors:

Aerospace
Chemical Process
Fabrication
Food & Beverage
High Purity
Marine
Oil & Gas
Power Generation
Pulp & Paper
Renewable Energy

Visit us at pacstainless.com/industries for more information on common industry applications for stainless steel and specialty alloy tubing.

PAC STAINLESS LTD.

OFFERING A WIDE VARIETY OF PRODUCTS

Whether your applications require domestic material or you are looking for the value of a quality import product, PAC Stainless has what you need. All of our tubing is heat-and-lot traceable and provided with test reports to ensure material composition from our ISO-certified mill sources. We inventory high quality **3R60** (316/L 2.5% Min Moly) and **DFARS Compliant** material to meet your most demanding specifications.

In addition, if you are looking for a product that is not listed in our catalog, we can most likely get it for you. Our great relationships with our worldwide partners can help you find custom sizes and unique materials.

INDUSTRY APPLICATIONS

Subsea Pressure Exchange
Process Instrumentation
Fluid Transfer and Containment
Industrial Control Panels
Hydraulic Systems
Clean Room Environments
Fuel Dispensing Stations
Heat Exchangers
High Pressure Connectivity

LOCATIONS

ATLANTA
EASTERN REGION SALES

PAC Stainless Ltd.
620 Jesse Cronic Road
Braselton, Georgia 30517 (Atlanta)
Phone (706) 654-4649
Toll-free (888) 977-4722
Fax (706) 654-4651
Email: atlanta@pacstainless.com

LOUISIANA
GULF OF MEXICO SALES

PAC Stainless Ltd.
7115 Revenue Drive
Baton Rouge, Louisiana 70809
Phone (225) 751-8400
Toll-free (800) 495-3272
Fax (225) 751-8401
Email: batonrouge@pacstainless.com

SEATTLE
WESTERN REGION SALES

PAC Stainless Ltd.
P.O. Box 13510
1855 South 216th Street
Seattle, Washington 98198
Phone (206) 824-7780
Toll-free (800) 426-4258
Fax (206) 878-2475
Email: sales@pacstainless.com

HOUSTON
GULF OF MEXICO SALES

PAC Stainless Ltd.
Company Headquarters
5259 Brittmoore Road
Houston, Texas 77041
Phone (713) 466-6160
Toll-free (800) 535-0386
Fax (713) 466-6334
Email: houston@pacstainless.com