



General Information

Nor-Cal Products has manufactured stainless steel weld fittings for nearly forty years. We worked with the Lawrence Livermore National Laboratory in the 60's to develop their specification for vacuum piping, which has become the standard in the industry. Weld fittings are commonly used in vacuum roughing lines on semiconductor process equipment and for forelines and pump exhaust lines in semiconductor subfabs.

All tees and crosses are fabricated with the pulled-port technique and full penetration butt welds. This provides crevice-free weld joints and the maximum in cleanliness for UHV applications. Weld fittings are available from stock in 304 stainless steel, and some sizes are stocked in 316L material for additional corrosion resistance. All weld fittings are available with various flange combinations. See appropriate catalog.

Tube Finishes

The standard finish for all weld fittings is now tumbled, although there are some fittings that are not available with the tumbled finish. These weld fittings are bead-blasted and are designated by a "B" suffix on the part number. All weld fittings can be electropolished on request. Call for pricing.



New 316L Weld Fittings

At the request of our customers who require additional corrosion resistance for downstream semiconductor applications, we now stock a variety of weld fittings in 316L stainless steel. We have added tees, elbows conical reducers and tubing in the sizes most commonly requested for forelines and pump exhaust lines.

New 45° and 90° Elbows with Tangents

We have added several 45° and 90° elbows with tangents to match our competitors' dimensions. Look for the HW suffix for elbows that match HPS weld fitting dimensions, for example.

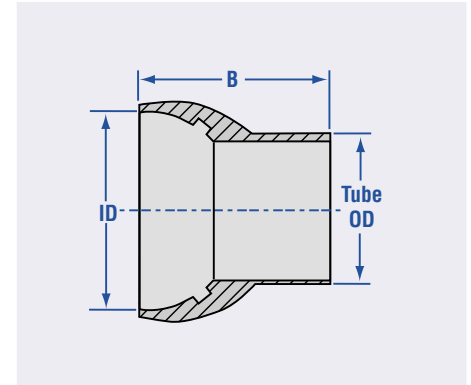


Ball Sockets

Model Number	ID	Tube OD	B	O-Ring Size	Price
BS-50/30	2.00	1.50	1.75	-	
BS-50/30-G	2.00	1.50	1.75	2-224	
BS-75/50	3.00	2.00	2.50	-	
BS-75/50-G	3.00	2.00	2.50	2-232	

Note: "G" suffix in model number indicates O-ring and O-ring groove are provided.

Dimensions in inches

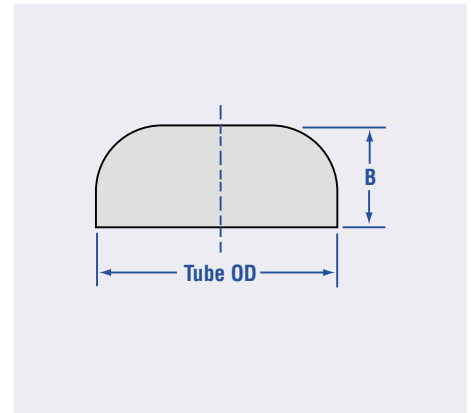


End Caps

Model Number	Tube OD	Wall Thickness	B	Price
G-2W-050	.50	.050	.32	
G-2W-075	.75	.050	.31	
G-2W-100	1.00	.060	.43	
G-2W-150	1.50	.060	.56	
G-2W-200	2.00	.060	.75	
G-2W-250	2.50	.060	.70	
G-2W-300	3.00	.074	.67	
G-2W-400	4.00	.074	.48	
G-2W-450	4.50	.074	.51	
G-2W-600	6.00	.074	.88	
G-2W-800	8.00	.074	.83	

Note: End caps are stocked with bead blasted finish.

Dimensions in inches

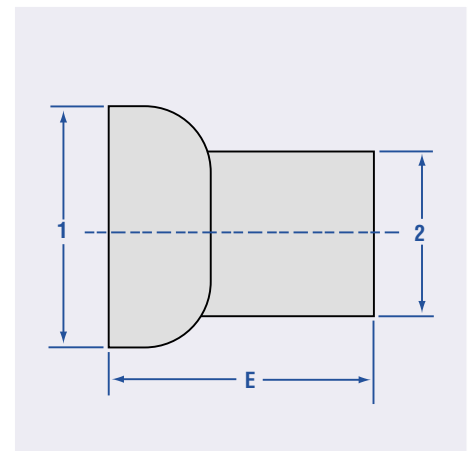


End Cap Reducers

Model Number	1	Tube OD	2	E	Price
ECR-075-050	.75	.50	.50	2.38	
ECR-100-050	1.00	.50	.50	2.38	
ECR-100-075	1.00	.75	.75	2.38	
ECR-150-050	1.50	.50	.50	2.38	
ECR-150-075	1.50	.75	.75	2.38	
ECR-150-100	1.50	1.00	1.00	2.38	
ECR-200-150	2.00	1.50	1.50	2.38	
ECR-250-200	2.50	2.00	2.00	2.38	
ECR-300-150	3.00	1.50	1.50	3.62	
ECR-300-200	3.00	2.00	2.00	3.62	
ECR-300-250	3.00	2.50	2.50	3.62	
ECR-400-200-B	4.00	2.00	2.00	3.62	
ECR-400-300-B	4.00	3.00	3.00	3.62	
ECR-600-400-B	6.00	4.00	4.00	3.62	
ECR-800-600-B	8.00	6.00	6.00	3.62	

Other reducer combinations can be supplied upon request.

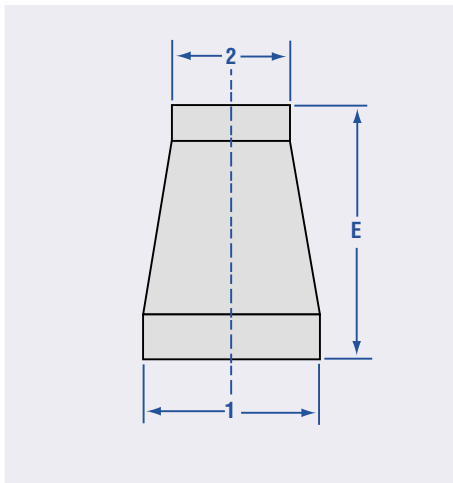
Dimensions in inches





Conical reducers provide a compact means of adapting to a smaller diameter tube with minimal loss in conductance. They are available from stock in 304 stainless steel and some sizes are stocked in 316L material for additional corrosion resistance. Conical adapter nipples are available with various flange combinations. See appropriate catalog.

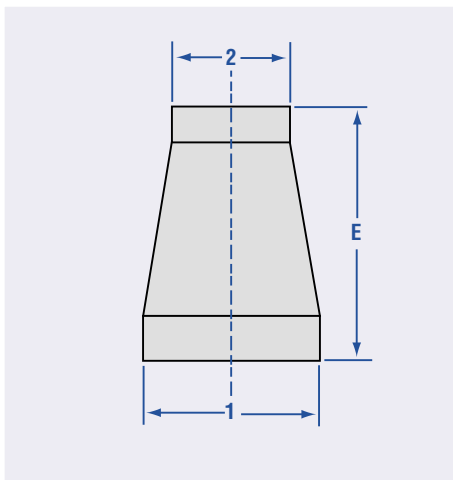
Conical Reducers



Model Number	Tube OD		E	Wall Thickness	Price
	1	2			
B-31W-100-075	1.00	.75	1.38	.065	
B-31W-150-075	1.50	.75	2.38	.065	
B-31W-150-100	1.50	1.00	2.38	.065	
B-31W-200-100	2.00	1.00	2.38	.065	
B-31W-200-150	2.00	1.50	2.38	.065	
B-31W-250-150	2.50	1.50	2.38	.065	
B-31W-250-200	2.50	2.00	2.38	.065	
B-31W-300-150	3.00	1.50	3.62	.065	
B-31W-300-200	3.00	2.00	3.62	.065	
B-31W-300-250	3.00	2.50	3.62	.065	
B-31W-400-150-B	4.00	1.50	5.25	.065	
B-31W-400-200	4.00	2.00	3.62	.065	
B-31W-400-250	4.00	2.50	3.62	.065	
B-31W-400-300	4.00	3.00	3.62	.065	

Dimensions in inches

316L Conical Reducers



Model Number	Tube OD		E	Wall Thickness	Price
	1	2			
B-31W-200-100-316L	2.00	1.00	2.38	.065	
B-31W-200-150-316L	2.00	1.50	2.38	.065	
B-31W-300-200-316L	3.00	2.00	3.62	.065	
B-31W-400-150-316L	4.00	1.50	5.25	.065	
B-31W-400-200-316L	4.00	2.00	3.62	.065	

Dimensions in inches

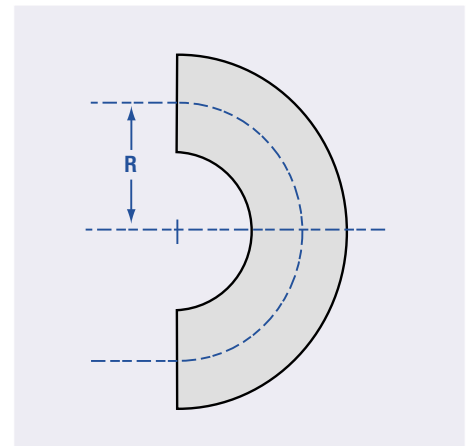


Nor-Cal Products offers 45° and 90° radius elbows in sizes up to ten inches OD and 180° return bend radius elbows in sizes up to two inches OD. Radius elbows offer the highest conductance geometry in a tube bend. All elbows are available from stock in 304 stainless steel, and some sizes are stocked in 316L material for additional corrosion resistance. We have added several 45° and 90° elbows with tangents to match our competitors' dimensions. Look for the HW suffix for elbows that match HPS weld fitting dimensions, for example. Elbows are also available with various flange combinations. See appropriate catalog.

180° Return Bend Radius Elbows

Model Number	Tube OD	Wall Thickness	R	Price
G-2WU-050	.50	.049	.75	
G-2WU-075	.75	.035	1.00	
G-2WU-100	1.00	.065	1.50	
G-2WU-150	1.50	.065	2.25	
G-2WU-200	2.00	.065	3.00	

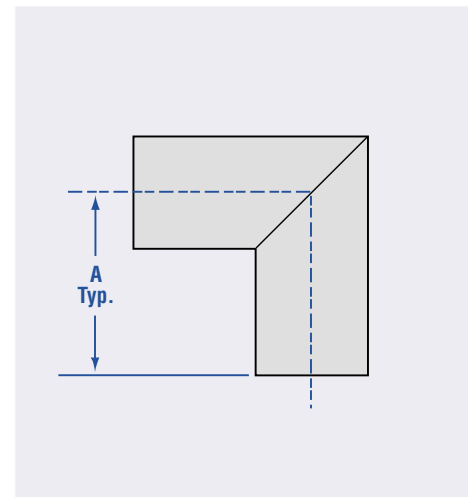
Dimensions in inches



90° Mitered Elbows

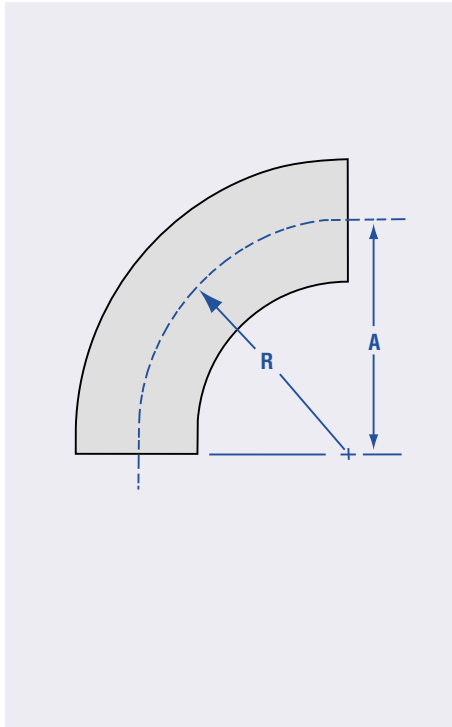
Model Number	Tube OD	Wall Thickness	A	Price
E-075M	.75	.035	1.00	
E-100M	1.00	.065	1.88	
E-150M	1.50	.065	2.25	
E-150MH	1.50	.065	2.41	
E-200M	2.00	.065	3.00	
E-200MH	2.00	.065	2.61	
E-250M	2.50	.065	3.00	
E-250MV	2.50	.065	3.75	
E-300M	3.00	.065	3.25	
E-400M	4.00	.083	3.88	
E-400MV-B	4.00	.083	4.87	
E-500M-B	5.00	.083	4.25	
E-600M-B	6.00	.083	5.00	
E-600MV-B	6.00	.083	6.06	
E-800M-B	8.00	.120	7.00	
E-1000M-B	10.00	.120	9.50	

Dimensions in inches





90° Radius Elbows



Model Number	Tube OD	Wall Thickness	A	R	Price
G-2WC-050	.50	.049	.75	.75	
G-2WC-075	.75	.035	1.00	1.00	
G-2WC-100	1.00	.065	1.50	1.50	
G-2WC-150	1.50	.065	2.25	2.25	
G-2WC-200	2.00	.065	3.00	3.00	
G-2WC-250	2.50	.065	3.75	3.75	
G-2WC-300	3.00	.065	4.50	4.50	
G-2WC-400	4.00	.083	6.00	6.00	
G-2WC-600-B	6.00	.083	9.00	9.00	
G-2WC-800-B	8.00	.120	12.00	12.00	
G-2WC-1000-B	10.00	.120	15.00	15.00	

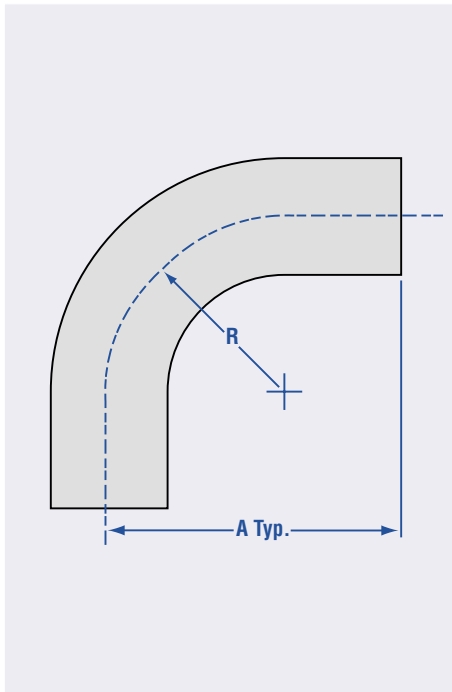
Dimensions in inches

316L 90° Radius Elbows

Model Number	Tube OD	Wall Thickness	A	R	Price
G-2WC-100-316L	1.00	.065	1.50	1.50	
G-2WC-150-316L	1.50	.065	2.25	2.25	
G-2WC-200-316L	2.00	.065	3.00	3.00	
G-2WC-250-316L	2.50	.065	3.75	3.75	
G-2WC-300-316L	3.00	.065	4.50	4.50	
G-2WC-400-316L	4.00	.083	6.00	6.00	

Dimensions in inches

90° Radius Elbows with Tangents



Model Number	Tube OD	Wall Thickness	A	R	Price
G-2WC-075H	.75	.035	1.42	1.00	
G-2WC-100H	1.00	.065	1.82	1.50	
G-2WC-100HW	1.00	.065	2.06	1.50	
G-2WC-150H	1.50	.065	2.41	2.25	
G-2WC-150HW	1.50	.065	2.94	2.25	
G-2WC-150HL	1.50	.065	4.97	2.25	
G-2WC-200H	2.00	.065	4.06	3.00	
G-2WC-200HL	2.00	.065	5.36	3.00	
G-2WC-250H	2.50	.065	5.19	3.75	
G-2WC-300H	3.00	.065	6.31	4.50	
G-2WC-400H	4.00	.083	8.31	6.00	

Dimensions in inches

316L 90° Radius Elbows with Tangents

Model Number	Tube OD	Wall Thickness	A	R	Price
G-2WC-100H-316L	1.00	.065	1.82	1.50	
G-2WC-150H-316L	1.50	.065	2.41	2.25	
G-2WC-200H-316L	2.00	.065	4.06	3.00	

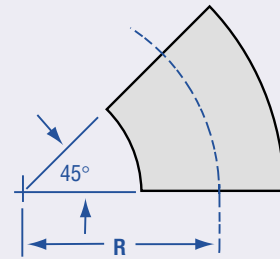
Dimensions in inches



45° Radius Elbows

Model Number	Tube OD	Wall Thickness	R	Price
G-2WK-050	.50	.049	.75	
G-2WK-075	.75	.035	1.00	
G-2WK-075T	.75	.065	1.13	
G-2WK-100	1.00	.065	1.50	
G-2WK-150	1.50	.065	2.25	
G-2WK-200	2.00	.065	3.00	
G-2WK-250	2.50	.065	3.75	
G-2WK-300	3.00	.065	4.50	
G-2WK-400	4.00	.083	6.00	
G-2WK-600-B	6.00	.083	9.00	
G-2WK-800-B	8.00	.134	12.00	
G-2WK-1000-B	10.00	.134	15.00	

Dimensions in inches



316L 45° Radius Elbows

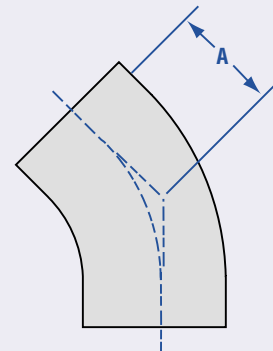
Model Number	Tube OD	Wall Thickness	R	Price
G-2WK-100-316L	1.00	.065	1.50	
G-2WK-150-316L	1.50	.065	2.25	
G-2WK-200-316L	2.00	.065	3.00	
G-2WK-250-316L	2.50	.065	3.75	
G-2WK-300-316L	3.00	.065	4.50	
G-2WK-400-316L	4.00	.083	6.00	

Dimensions in inches

45° Radius Elbows with Tangents

Model Number	Tube OD	Wall Thickness	A	Price
G-2KL-075	.75	.035	.76	
G-2KL-100	1.00	.065	.97	
G-2KL-100HW	1.00	.065	1.19	
G-2KL-150	1.50	.065	1.53	
G-2KL-150HW	1.50	.065	1.63	
G-2KL-200	2.00	.065	1.84	
G-2KL-200HW	2.00	.065	2.31	
G-2KL-250	2.50	.065	3.00	
G-2KL-300	3.00	.065	3.68	
G-2KL-400	4.00	.083	4.78	
G-2KL-400HW	4.00	.083	4.81	

Dimensions in inches



316L 45° Radius Elbows with Tangents

Model Number	Tube OD	Wall Thickness	A	Price
G-2KL-100-316L	1.00	.065	.97	
G-2KL-150-316L	1.50	.065	1.53	
G-2KL-200-316L	2.00	.065	1.84	
G-2KL-300-316L	3.00	.065	3.68	
G-2KL-400-316L	4.00	.083	4.77	

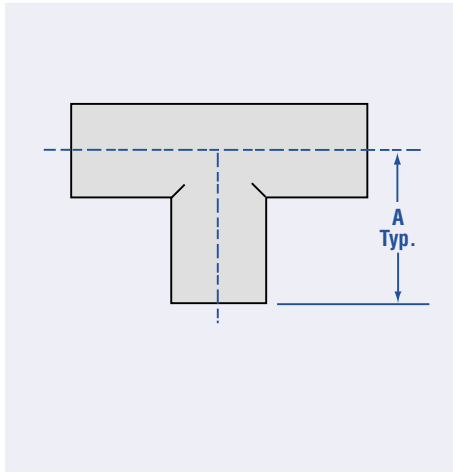
Dimensions in inches



304 stainless steel tees and reducer tees are fabricated with the pulled-port technique and full penetration butt welds. This provides crevice-free weld joints and the maximum in cleanliness for UHV applications. Other sizes are available on request. These fittings are also offered with various flange combinations. See appropriate catalog.

Tees

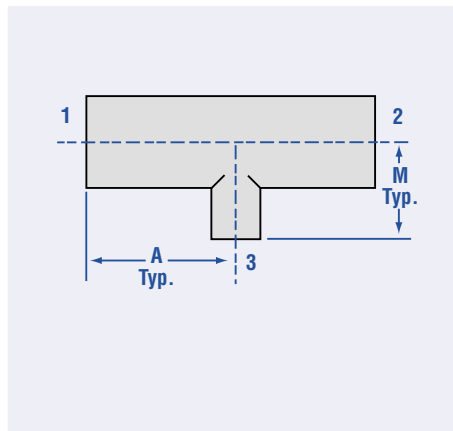
Model Number	Tube OD	Wall Thickness	A	Price
G-7W-050	.50	.049	.75	
G-7W-075	.75	.035	1.00	
G-7W-075T	.75	.065	1.88	
G-7W-100	1.00	.065	1.88	
G-7W-150	1.50	.065	2.25	
G-7W-150H	1.50	.065	2.41	
G-7W-200	2.00	.065	3.00	
G-7W-200H	2.00	.065	2.61	
G-7W-250	2.50	.065	3.00	
G-7W-250V	2.50	.065	3.75	
G-7W-300	3.00	.065	3.25	
G-7W-400	4.00	.083	3.88	
G-7W-400V	4.00	.083	4.87	
G-7W-500-B	5.00	.083	4.25	
G-7W-600-B	6.00	.083	5.00	
G-7W-600V-B	6.00	.083	6.06	
G-7W-800-B	8.00	.120	7.00	
G-7W-1000-B	10.00	.120	9.50	



Dimensions in inches

Reducer Tees

Model Number	Tube 1 & 2 Arm OD	Tube 3 Leg OD	A	M	Price
G-7WR-100-050	1.00	.50	1.88	1.00	
G-7WR-100-075	1.00	.75	1.88	1.12	
G-7WR-150-050	1.50	.50	2.25	1.25	
G-7WR-150-075	1.50	.75	2.25	1.38	
G-7WR-150-100	1.50	1.00	2.25	2.13	
G-7WR-200-050	2.00	.50	3.00	1.50	
G-7WR-200-075	2.00	.75	3.00	1.63	
G-7WR-200-100	2.00	1.00	3.00	2.38	
G-7WR-250-150	2.50	1.50	3.00	2.75	
G-7WR-250-200	2.50	2.00	3.00	3.25	
G-7WR-300-150	3.00	1.50	3.25	3.00	
G-7WR-300-200	3.00	2.00	3.25	3.50	
G-7WR-300-250	3.00	2.50	3.25	3.25	
G-7WR-400-150-B	4.00	1.50	3.88	3.50	
G-7WR-400-200-B	4.00	2.00	3.88	4.00	
G-7WR-400-250-B	4.00	2.50	3.88	3.75	
G-7WR-400-300-B	4.00	3.00	3.88	3.75	
G-7WR-500-400-B	5.00	4.00	4.25	4.38	
G-7WR-600-150-B	6.00	1.50	5.00	4.50	
G-7WR-600-200-B	6.00	2.00	5.00	5.00	
G-7WR-600-250-B	6.00	2.50	5.00	4.75	
G-7WR-600-400-B	6.00	4.00	5.00	4.88	
G-7WR-600-500-B	6.00	5.00	5.00	4.75	
G-7WR-800-600-B	8.00	6.00	7.00	6.00	



Dimensions in inches

Prices subject to change without notice. - International product pricing will vary.

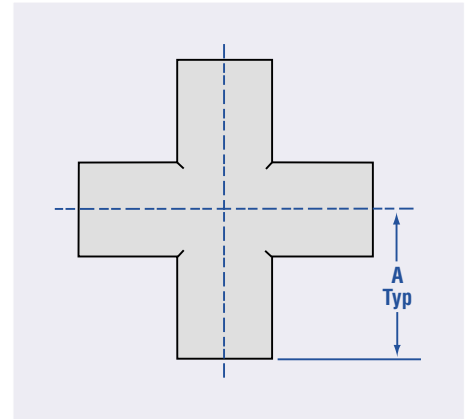
WELD-LIT 11/01



304 stainless steel crosses and reducer crosses are offered in a wide range of sizes as standard products. All crosses are fabricated with the pulled-port technique and full penetration butt welds. This provides crevice-free weld joints and the maximum in cleanliness for UHV applications. As always, other sizes are available on request. These fittings are offered with various flange combinations. See appropriate catalog.

4-Way Crosses

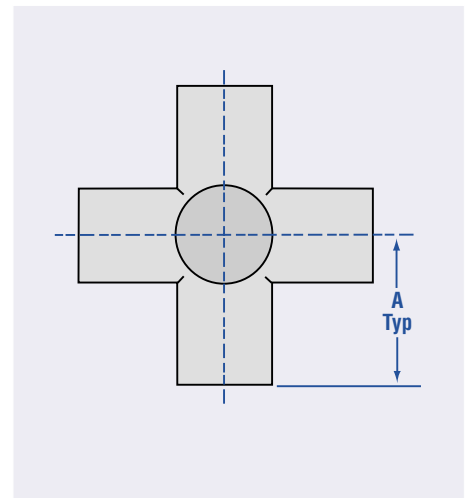
Model Number	Tube OD	Wall Thickness	A	Price
G-9W-050	.50	.049	.75	
G-9W-075	.75	.035	1.00	
G-9W-100	1.00	.065	1.88	
G-9W-150	1.50	.065	2.25	
G-9W-150H	1.50	.065	2.41	
G-9W-200	2.00	.065	3.00	
G-9W-200H	2.00	.065	2.61	
G-9W-250	2.50	.065	3.00	
G-9W-250V	2.50	.065	3.75	
G-9W-300	3.00	.065	3.25	
G-9W-400	4.00	.083	3.88	
G-9W-400V	4.00	.083	4.87	
G-9W-500-B	5.00	.083	4.25	
G-9W-600-B	6.00	.083	5.00	
G-9W-600V-B	6.00	.083	6.06	
G-9W-800-B	8.00	.120	7.00	
G-9W-1000-B	10.00	.120	9.50	



Dimensions in inches

5-Way Crosses

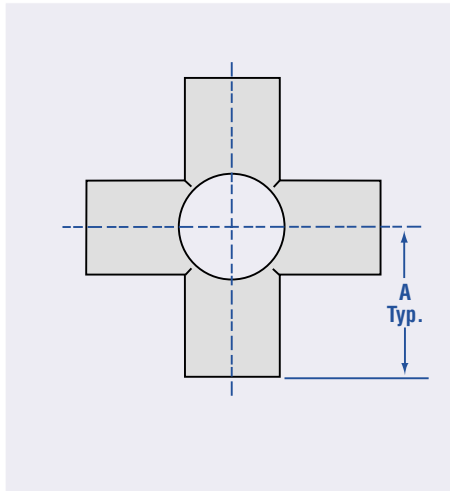
Model Number	Tube OD	Wall Thickness	A	Price
G-10W-075	.75	.035	1.00	
G-10W-100	1.00	.065	1.88	
G-10W-150	1.50	.065	2.25	
G-10W-200	2.00	.065	3.00	
G-10W-250	2.50	.065	3.00	
G-10W-250V	2.50	.065	3.75	
G-10W-300-B	3.00	.065	3.25	
G-10W-400-B	4.00	.083	3.88	
G-10W-400V-B	4.00	.083	4.87	
G-10W-500-B	5.00	.083	4.25	
G-10W-600-B	6.00	.083	5.00	
G-10W-600V-B	6.00	.083	6.06	
G-10W-800-B	8.00	.120	7.00	
G-10W-1000-B	10.00	.120	9.50	



Dimensions in inches



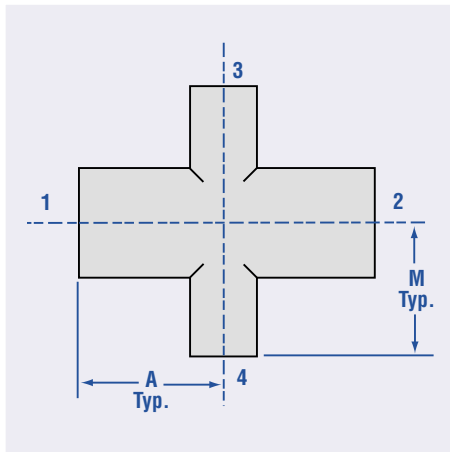
6-Way Crosses



Model Number	Tube OD	Wall Thickness	A	Price
G-11W-075	.75	.035	1.00	
G-11W-100	1.00	.065	1.88	
G-11W-150	1.50	.065	2.25	
G-11W-200	2.00	.065	3.00	
G-11W-250	2.50	.065	3.00	
G-11W-250V	2.50	.065	3.75	
G-11W-300-B	3.00	.065	3.25	
G-11W-400-B	4.00	.083	3.88	
G-11W-400V-B	4.00	.083	4.87	
G-11W-500-B	5.00	.083	4.25	
G-11W-600-B	6.00	.083	5.00	
G-11W-600V-B	6.00	.083	6.06	
G-11W-800-B	8.00	.120	7.00	
G-11W-1000-B	10.00	.120	9.50	

Dimensions in inches

Reducer Crosses



Model Number	Tube 1 & 2 Arm OD	Tube 3 & 4 Leg OD	A	M	Price
G-9WR-100-050	1.00	.50	1.88	1.00	
G-9WR-100-075	1.00	.75	1.88	1.12	
G-9WR-150-050	1.50	.50	2.25	1.25	
G-9WR-150-075	1.50	.75	2.25	1.38	
G-9WR-150-100	1.50	1.00	2.25	2.13	
G-9WR-200-050	2.00	.50	3.00	1.50	
G-9WR-200-075	2.00	.75	3.00	1.63	
G-9WR-200-150	2.00	1.50	3.00	2.50	
G-9WR-250-150	2.50	1.50	3.00	2.75	
G-9WR-250-200	2.50	2.00	3.00	3.25	
G-9WR-300-150	3.00	1.50	3.25	3.00	
G-9WR-300-200	3.00	2.00	3.25	3.50	
G-9WR-300-250	3.00	2.50	3.25	3.25	
G-9WR-400-150-B	4.00	1.50	3.88	3.50	
G-9WR-400-200-B	4.00	2.00	3.88	4.00	
G-9WR-400-250-B	4.00	2.50	3.88	3.75	
G-9WR-400-300-B	4.00	3.00	3.88	3.75	
G-9WR-500-400-B	5.00	4.00	4.25	4.38	
G-9WR-600-150-B	6.00	1.50	5.00	4.50	
G-9WR-600-200-B	6.00	2.00	5.00	5.00	
G-9WR-600-250-B	6.00	2.50	5.00	4.75	
G-9WR-600-300-B	6.00	3.00	5.00	4.75	
G-9WR-600-400-B	6.00	4.00	5.00	4.88	
G-9WR-600-500-B	6.00	5.00	5.00	4.75	
G-9WR-800-600-B	8.00	6.00	7.00	6.00	

Other reducer combinations can be supplied upon request.

Dimensions in inches





Nor-Cal's consumption of stainless steel tubing for its own products makes it possible to offer 304 and 316L stainless steel tubing lengths up to 20 feet.

304 stainless steel tubing standard finishes are white pickled (Number 1 unpolished), bright annealed or polished O.D. and I.D., depending on the size.

316L stainless steel tubing is offered with a bright annealed finish only. Bright annealed and polished tubing has been pickled and passivated. Polished tube can be described as No. 4 polished. The surface meets ASTM A 270, and has received a 150 grit polish on the O.D. and 180 grit on the I.D. Special cleaning, materials and surface finishes are available for an additional charge.

Stainless Steel Tubing

Model Number	Surface Finish	Tube OD	Tube ID	Wall Thickness	Price per Ft. (add cut chg. *)
SST-050	Bright annealed	.50	.402	.049	
SST-075	Bright annealed	.75	.680	.035	
SST-100	Polished ID & OD	1.00	.870	.065	
SST-125	Bright annealed	1.25	1.120	.065	
SST-150	Polished ID & OD	1.50	1.370	.065	
SST-162	Bright annealed	1.62	1.490	.065	
SST-175	Bright annealed	1.75	1.630	.065	
SST-200	Polished ID & OD	2.00	1.870	.065	
SST-250	Polished ID & OD	2.50	2.370	.065	
SST-300	Polished ID & OD	3.00	2.870	.065	
SST-400	Polished ID & OD	4.00	3.834	.083	
SST-500	White pickled	5.00	4.834	.083	
SST-600	White pickled	6.00	5.834	.083	
SST-800	White pickled	8.00	7.760	.120	
SST-1000	White pickled	10.00	9.760	.120	
SST-1200	White pickled	12.00	11.760	.120	

* Cutting charge: \$15.00 per piece from 1 to 10 pieces
To order specify length required in feet as follows:
SST-150-3.0, SST-400-20.0

Dimensions in inches

316L Stainless Steel Tubing

Model Number	Surface Finish	Tube OD	Tube ID	Wall Thickness	Price per Ft. (add cut chg. *)
SST-075-316L	Bright annealed	.75	.680	.035	
SST-100-316L	Bright annealed	1.00	.870	.065	
SST-150-316L	Bright annealed	1.50	1.370	.065	
SST-200-316L	Bright annealed	2.00	1.870	.065	
SST-250-316L	Bright annealed	2.50	2.370	.065	
SST-300-316L	Bright annealed	3.00	2.870	.065	
SST-400-316L	Bright annealed	4.00	3.834	.083	

* Cutting charge: \$15.00 per piece from 1 to 10 pieces
To order specify length required in feet as follows:
SST-150-316L-3.0, SST-400-316L-20.0

Dimensions in inches

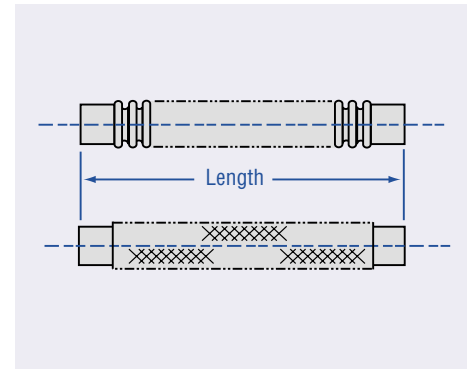
Prices subject to change without notice. - International product pricing will vary.

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Flexible Stainless Steel Hose

Nom OD	Model Number	Length	Price
.75	FH-075-12	12	
	FH-075-18	18	
	FH-075-24	24	
	FH-075-36	36	
1.00	FH-100-12	12	
	FH-100-18	18	
	FH-100-24	24	
	FH-100-36	36	
1.50	FH-150-12	12	
	FH-150-18	18	
	FH-150-24	24	
	FH-150-36	36	
2.00	FH-200-12	12	
	FH-200-18	18	
	FH-200-24	24	
	FH-200-36	36	
2.50	FH-250-12	12	
	FH-250-18	18	
	FH-250-24	24	
	FH-250-36	36	
3.00	FH-300-12	12	
	FH-300-18	18	
	FH-300-24	24	
	FH-300-36	36	
4.00	FH-400-12	12	
	FH-400-18	18	
	FH-400-24	24	
	FH-400-36	36	



Stainless steel vacuum hose is available in .75 to 4 inch diameters in standard lengths of 12, 18, 24 and 36 inches. The flexibility and reliability of these hoses, provided by 321 stainless steel, makes them ideally suited for vibration isolation and roughing and alignment manifolds.

Intermediate lengths, protective stainless steel braiding and thick and thin walled flex hose can be supplied upon request. Refer to the appropriate catalog for NW, ASA, CF and ISO flanged flex hose.

Dimensions in inches

