



### SPECIFICATIONS

**Tube OD sizes:** 1/2 to 12 inches (12.7-304.8mm)

**Materials:** 304 or 316L stainless steel

**Vacuum range:**  $\geq 1 \times 10^{-13}$  mbar

**Temperature range:** -200° to 450°C

Nor-Cal Products has manufactured stainless steel weld fittings for nearly forty five years. We worked with Lawrence Livermore National Laboratory in the 1960'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 stainless steel for additional corrosion resistance. All weld fittings are available with various flange combinations. See appropriate section.



### Tube Finishes

The standard finish for all weld fittings is 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. (See photo at right) All weld fittings can be electropolished on request. Call for pricing.



Beadblasted Finish

Tumbled Finish

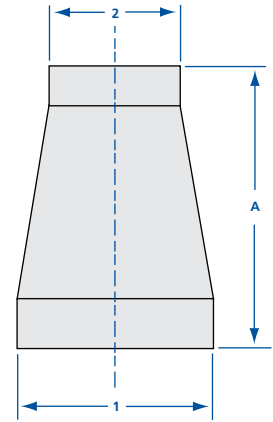
*All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.*



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 stainless steel for additional corrosion resistance. Conical adapter nipples are available with various flange combinations. See appropriate section.

### Conical Reducers

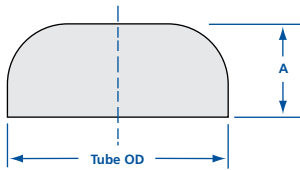
MODEL NUMBER	TUBE OD 1	TUBE OD 2	A	WALL THICKNESS
B-31W-100-075	1 (25.40)	3/4 (19.05)	1.38 (35.05)	0.065 (1.65)
B-31W-150-075	1 1/2 (38.10)	3/4 (19.05)	2.38 (60.45)	0.065 (1.65)
B-31W-150-100	1 1/2 (38.10)	1 (25.40)	2.38 (60.45)	0.065 (1.65)
B-31W-200-100	2 (50.80)	1 (25.40)	2.38 (60.45)	0.065 (1.65)
B-31W-200-150	2 (50.80)	1 1/2 (38.10)	2.38 (60.45)	0.065 (1.65)
B-31W-250-150	2 1/2 (63.50)	1 1/2 (38.10)	2.38 (60.45)	0.065 (1.65)
B-31W-250-200	2 1/2 (63.50)	2 (50.80)	2.38 (60.45)	0.065 (1.65)
B-31W-300-150	3 (76.20)	1 1/2 (38.10)	3.62 (91.95)	0.065 (1.65)
B-31W-300-200	3 (76.20)	2 (50.80)	3.62 (91.95)	0.065 (1.65)
B-31W-300-250	3 (76.20)	2 1/2 (63.50)	3.62 (91.95)	0.065 (1.65)
B-31W-400-150	4 (101.60)	1 1/2 (38.10)	3.62 (91.95)	0.065 (1.65)
B-31W-400-200	4 (101.60)	2 (50.80)	3.62 (91.95)	0.065 (1.65)
B-31W-400-250	4 (101.60)	2 1/2 (63.50)	3.62 (91.95)	0.065 (1.65)
B-31W-400-300	4 (101.60)	3 (76.20)	3.62 (91.95)	0.065 (1.65)
B-31W-600-300-B	6 (152.40)	3 (76.20)	5.50 (139.70)	0.074 (1.88)
B-31W-600-400-B	6 (152.40)	4 (101.60)	5.50 (139.70)	0.074 (1.88)
B-31W-600-400-HW	6 (152.40)	4 (101.60)	5.50 (139.70)	0.083 (2.11)



### 316L Conical Reducers

MODEL NUMBER	TUBE OD 1	TUBE OD 2	A	WALL THICKNESS
B-31W-200-100-316L	2 (50.80)	1 (25.40)	2.38 (60.45)	0.065 (1.65)
B-31W-200-150-316L	2 (50.80)	1 1/2 (38.10)	2.38 (60.45)	0.065 (1.65)
B-31W-300-200-316L	3 (76.20)	2 (50.80)	3.62 (91.95)	0.065 (1.65)
B-31W-400-150-316L-B	4 (101.60)	1 1/2 (38.10)	5.25 (133.35)	0.065 (1.65)
B-31W-400-200-316L	4 (101.60)	2 (50.80)	3.62 (91.95)	0.065 (1.65)

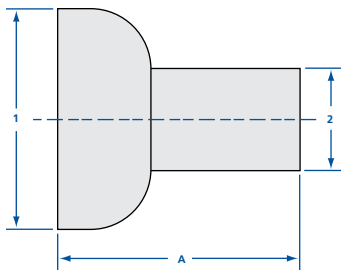
### End Caps



MODEL NUMBER	TUBE OD	A	WALL THICKNESS
G-2W-050	1/2 (12.70)	0.32 (8.13)	0.050 (1.27)
G-2W-075	3/4 (19.05)	0.31 (7.87)	0.050 (1.27)
G-2W-100	1 (25.40)	0.43 (10.92)	0.060 (1.52)
G-2W-150	1 1/2 (38.10)	0.56 (14.22)	0.060 (1.52)
G-2W-200	2 (50.80)	0.75 (19.05)	0.060 (1.52)
G-2W-250	2 1/2 (63.50)	0.70 (17.78)	0.060 (1.52)
G-2W-300	3 (76.20)	0.67 (17.02)	0.074 (1.88)
G-2W-400	4 (101.60)	0.48 (12.19)	0.074 (1.88)
G-2W-450	4 1/2 (114.30)	0.51 (12.95)	0.060 (1.52)
G-2W-600	6 (152.40)	0.88 (22.35)	0.074 (1.88)
G-2W-800	8 (203.20)	0.83 (21.08)	0.074 (1.88)



### End Cap Reducers



MODEL NUMBER	TUBE OD 1	TUBE OD 2	A
ECR-075-050	3/4 (19.05)	1/2 (12.70)	2.38 (60.45)
ECR-100-050	1 (25.40)	1/2 (12.70)	2.38 (60.45)
ECR-100-075	1 (25.40)	3/4 (19.05)	2.38 (60.45)
ECR-150-050	1 1/2 (38.10)	1/2 (12.70)	2.38 (60.45)
ECR-150-075	1 1/2 (38.10)	3/4 (19.05)	2.38 (60.45)
ECR-150-100	1 1/2 (38.10)	1 (25.40)	2.38 (60.45)
ECR-200-150	2 (50.80)	1 1/2 (38.10)	2.38 (60.45)
ECR-250-200	2 1/2 (63.50)	2 (50.80)	2.38 (60.45)
ECR-300-150	3 (76.20)	1 1/2 (38.10)	3.62 (91.95)
ECR-300-200	3 (76.20)	2 (50.80)	3.62 (91.95)
ECR-300-250	3 (76.20)	2 1/2 (63.50)	3.62 (91.95)
ECR-400-200-B	4 (101.60)	2 (50.80)	3.62 (91.95)
ECR-400-300-B	4 (101.60)	3 (76.20)	3.62 (91.95)
ECR-600-400-B	6 (152.40)	4 (101.60)	3.62 (91.95)
ECR-800-600-B	8 (203.20)	6 (152.40)	3.62 (91.95)

Other reducer combinations can be supplied upon request.

### SPECIFICATIONS

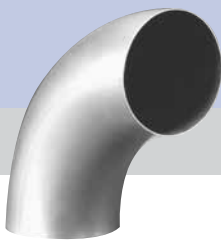
**Tube OD sizes:** 1 to 6 inches (25.4-152.4mm)

**Materials:** 304 or 316L stainless steel

**Vacuum range:**  $\geq 1 \times 10^{-13}$  mbar

**Temperature range:** -200° to 450°C

# Weld Fittings Elbows



### SPECIFICATIONS

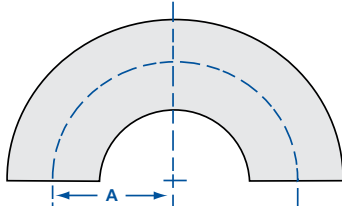
**Tube OD sizes:** 1/2 to 10 inches (12.7-254mm)

**Materials:** 304 or 316L stainless steel

**Vacuum range:** ≥1 x 10<sup>-13</sup> mbar

**Temperature range:** -200° to 450°C

Nor-Cal Products offers 180° return bend radius elbows in sizes up to 2 inches (50.8mm) OD and 45° and 90° radius elbows in sizes up to 10 inches (254mm) 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 stainless steel for additional corrosion resistance. We have added several 45° and 90° elbows with tangents to match other commonly available 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 section.



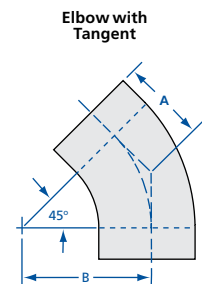
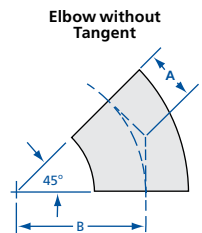
### 180° Return Bend Radius Elbows

MODEL NUMBER	TUBE OD	WALL THICKNESS	A
G-2WU-050	1/2 (12.70)	0.049 (1.24)	0.75 (19.05)
G-2WU-075	3/4 (19.05)	0.035 (0.89)	1.00 (25.40)
G-2WU-100	1 (25.40)	0.065 (1.65)	1.50 (38.10)
G-2WU-150	1 1/2 (38.10)	0.065 (1.65)	2.25 (57.15)
G-2WU-200	2 (50.80)	0.065 (1.65)	3.00 (76.20)

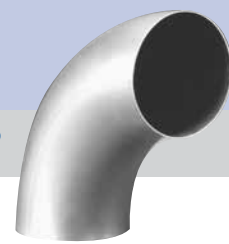


### 45° Radius Elbows

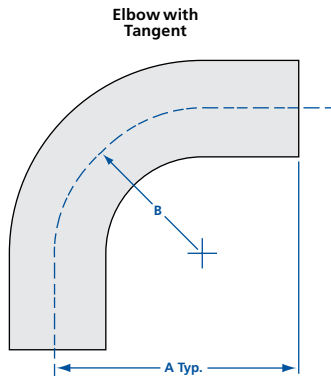
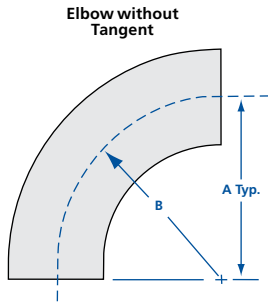
MODEL NUMBER	TUBE OD	WALL THICKNESS	A	B	316L TANGENT
G-2WK-050	1/2 (12.70)	0.049 (1.24)	0.31 (7.87)	0.75 (19.05)	
G-2WK-075	3/4 (19.05)	0.035 (0.89)	0.41 (10.41)	1.00 (25.40)	
G-2WK-075T	3/4 (19.05)	0.065 (1.65)	0.41 (10.41)	1.13 (28.70)	
G-2KL-075	3/4 (19.05)	0.035 (0.89)	0.76 (19.30)	1.00 (25.40)	✓
G-2WK-100	1 (25.40)	0.065 (1.65)	0.62 (15.75)	1.50 (38.10)	
G-2WK-100-316L	1 (25.40)	0.065 (1.65)	0.62 (15.75)	1.50 (38.10)	✓
G-2KL-100	1 (25.40)	0.065 (1.65)	0.97 (24.64)	1.50 (38.10)	✓
G-2KL-100HW	1 (25.40)	0.065 (1.65)	1.19 (30.23)	1.50 (38.10)	✓
G-2KL-100-316L	1 (25.40)	0.065 (1.65)	0.97 (24.64)	1.50 (38.10)	✓ ✓
G-2WK-150	1 1/2 (38.10)	0.065 (1.65)	0.93 (23.62)	2.25 (57.15)	
G-2WK-150-316L	1 1/2 (38.10)	0.065 (1.65)	0.93 (23.62)	2.25 (57.15)	✓
G-2KL-150	1 1/2 (38.10)	0.065 (1.65)	1.53 (35.86)	2.25 (57.15)	✓
G-2KL-150HW	1 1/2 (38.10)	0.065 (1.65)	1.63 (41.40)	2.25 (57.15)	✓
G-2KL-150-316L	1 1/2 (38.10)	0.065 (1.65)	1.53 (35.86)	2.25 (57.15)	✓ ✓
G-2WK-200	2 (50.80)	0.065 (1.65)	1.24 (31.50)	3.00 (76.20)	
G-2WK-200-316L	2 (50.80)	0.065 (1.65)	1.24 (31.50)	3.00 (76.20)	✓
G-2KL-200	2 (50.80)	0.065 (1.65)	1.84 (46.74)	3.00 (76.20)	✓
G-2KL-200HW	2 (50.80)	0.065 (1.65)	2.31 (58.67)	3.00 (76.20)	✓
G-2KL-200-316L	2 (50.80)	0.065 (1.65)	1.84 (46.74)	3.00 (76.20)	✓ ✓
G-2WK-250	2 1/2 (63.50)	0.065 (1.65)	1.55 (39.37)	3.75 (95.25)	
G-2WK-250-316L	2 1/2 (63.50)	0.065 (1.65)	1.55 (39.37)	3.75 (95.25)	✓
G-2KL-250	2 1/2 (63.50)	0.065 (1.65)	3.00 (76.20)	3.75 (95.25)	✓
G-2WK-300	3 (76.20)	0.065 (1.65)	1.86 (47.24)	4.50 (114.30)	
G-2WK-300-316L	3 (76.20)	0.065 (1.65)	1.86 (47.24)	4.50 (114.30)	✓
G-2KL-300	3 (76.20)	0.065 (1.65)	3.68 (93.47)	4.50 (114.30)	✓
G-2KL-300-316L	3 (76.20)	0.065 (1.65)	3.68 (93.47)	4.50 (114.30)	✓ ✓
G-2WK-400	4 (101.60)	0.083 (2.11)	2.49 (63.25)	6.00 (152.40)	
G-2WK-400-316L	4 (101.60)	0.083 (2.11)	2.49 (63.25)	6.00 (152.40)	✓
G-2KL-400	4 (101.60)	0.083 (2.11)	4.78 (121.41)	6.00 (152.40)	✓
G-2KL-400HW	4 (101.60)	0.083 (2.11)	4.81 (122.17)	6.00 (152.40)	✓
G-2KL-400-316L	4 (101.60)	0.083 (2.11)	4.78 (121.41)	6.00 (152.40)	✓ ✓
G-2WK-600-B	6 (152.40)	0.083 (2.11)	3.73 (94.74)	9.00 (228.60)	
G-2WK-800-B	8 (203.20)	.109-.134 (2.77-3.40)	4.97 (126.24)	12.00 (304.80)	
G-2WK-1000-B	10 (254.00)	.109-.134 (2.77-3.40)	6.21 (157.73)	15.00 (381.00)	



All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.



### 90° Radius Elbows



MODEL NUMBER	TUBE OD	WALL THICKNESS	A	B	316L TANGENT
G-2WC-050	1/2 (12.70)	0.049 (1.24)	0.75 (19.05)	0.75 (19.05)	
G-2WC-075	3/4 (19.05)	0.035 (0.89)	1.00 (25.40)	1.00 (25.40)	
G-2WC-075H	3/4 (19.05)	0.035 (0.89)	1.42 (36.07)	1.00 (25.40)	✓
G-2WC-100	1 (25.40)	0.065 (1.65)	1.50 (38.10)	1.50 (38.10)	
G-2WC-100-316L	1 (25.40)	0.065 (1.65)	1.50 (38.10)	1.50 (38.10)	✓
G-2WC-100H	1 (25.40)	0.065 (1.65)	1.82 (46.23)	1.50 (38.10)	✓
G-2WC-100HW	1 (25.40)	0.065 (1.65)	2.06 (52.32)	1.50 (38.10)	✓
G-2WC-100H-316L	1 (25.40)	0.065 (1.65)	1.82 (46.23)	1.50 (38.10)	✓ ✓
G-2WC-150	1 1/2 (38.10)	0.065 (1.65)	2.25 (57.15)	2.25 (57.15)	
G-2WC-150-316L	1 1/2 (38.10)	0.065 (1.65)	2.25 (57.15)	2.25 (57.15)	✓
G-2WC-150H	1 1/2 (38.10)	0.065 (1.65)	2.41 (61.21)	2.25 (57.15)	✓
G-2WC-150HW	1 1/2 (38.10)	0.065 (1.65)	2.94 (74.68)	2.25 (57.15)	✓
G-2WC-150HL	1 1/2 (38.10)	0.065 (1.65)	4.97 (126.24)	2.25 (57.15)	✓
G-2WC-150H-316L	1 1/2 (38.10)	0.065 (1.65)	2.41 (61.21)	2.25 (57.15)	✓ ✓
G-2WC-200	2 (50.80)	0.065 (1.65)	3.00 (76.20)	3.00 (76.20)	
G-2WC-200-316L	2 (50.80)	0.065 (1.65)	3.00 (76.20)	3.00 (76.20)	✓
G-2WC-200H	2 (50.80)	0.065 (1.65)	4.06 (103.12)	3.00 (76.20)	✓
G-2WC-200HL	2 (50.80)	0.065 (1.65)	5.36 (136.14)	3.00 (76.20)	✓
G-2WC-200H-316L	2 (50.80)	0.065 (1.65)	4.06 (103.12)	3.00 (76.20)	✓ ✓
G-2WC-250	2 1/2 (63.50)	0.065 (1.65)	3.75 (95.25)	3.75 (95.25)	
G-2WC-250-316L	2 1/2 (63.50)	0.065 (1.65)	3.75 (95.25)	3.75 (95.25)	✓
G-2WC-250H	2 1/2 (63.50)	0.065 (1.65)	5.19 (131.83)	3.75 (95.25)	✓
G-2WC-300	3 (76.20)	0.065 (1.65)	4.50 (114.30)	4.50 (114.30)	
G-2WC-300-316L	3 (76.20)	0.065 (1.65)	4.50 (114.30)	4.50 (114.30)	✓
G-2WC-300H	3 (76.20)	0.065 (1.65)	6.31 (160.27)	4.50 (114.30)	✓
G-2WC-400	4 (101.60)	0.083 (2.11)	6.00 (152.40)	6.00 (152.40)	
G-2WC-400-316L	4 (101.60)	0.083 (2.11)	6.00 (152.40)	6.00 (152.40)	✓
G-2WC-400H	4 (101.60)	0.083 (2.11)	8.31 (211.07)	6.00 (152.40)	✓
G-2WC-600-B	6 (152.40)	0.109 (2.77)	9.00 (228.60)	9.00 (228.60)	
G-2WC-800-B	8 (203.20)	.109 -134 (2.77-3.40)	12.00 (304.80)	12.00 (304.80)	
G-2WC-1000-B	10 (254.00)	.109 -134 (2.77-3.40)	15.00 (381.00)	15.00 (381.00)	

### SPECIFICATIONS

Tube OD sizes: 1/2 to 10 inches (12.7-254mm)

Materials: 304 stainless steel  
(316L available upon request)

Vacuum range: ≥1 x 10<sup>-13</sup> mbar

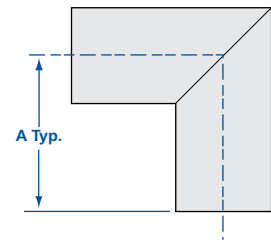
Temperature range: -200° to 450°C



### 90° Mitered Elbow



MODEL NUMBER	TUBE OD	WALL THICKNESS	A
E-075M	3/4 (19.05)	0.035 (0.89)	1.00 (25.40)
E-100M	1 (25.40)	0.065 (1.65)	1.88 (47.75)
E-150M	1 1/2 (38.10)	0.065 (1.65)	2.25 (57.15)
E-150MH	1 1/2 (38.10)	0.065 (1.65)	2.41 (61.21)
E-200M	2 (50.80)	0.065 (1.65)	3.00 (76.20)
E-200MH	2 (50.80)	0.065 (1.65)	2.61 (66.29)
E-250M	2 1/2 (63.50)	0.065 (1.65)	3.00 (76.20)
E-250MV	2 1/2 (63.50)	0.065 (1.65)	3.75 (95.25)
E-300M	3 (76.20)	0.065 (1.65)	3.25 (82.55)
E-400M	4 (101.60)	0.083 (2.11)	3.88 (98.55)
E-400MV-B	4 (101.60)	0.083 (2.11)	4.87 (123.70)
E-500M-B	5 (127.00)	0.083 (2.11)	4.25 (107.95)
E-600M-B	6 (152.40)	0.083 (2.11)	5.00 (127.00)
E-600MV-B	6 (152.40)	0.083 (2.11)	6.06 (153.92)
E-800M-B	8 (203.20)	0.120 (3.05)	7.00 (177.80)
E-1000M-B	10 (254.00)	0.120 (3.05)	9.50 (241.30)

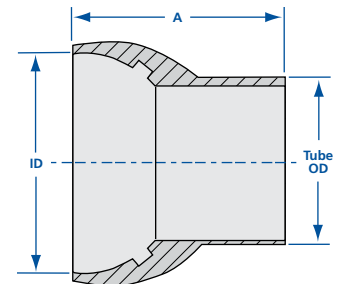


### Ball Sockets



MODEL NUMBER	ID	TUBE OD	A	O-RING SIZE
BS-50/30	2 (50.80)	1 1/2 (38.10)	1.75 (19.05)	-
BS-50/30-G	2 (50.80)	1 1/2 (38.10)	1.75 (19.05)	2-224
BS-75/50	3 (76.20)	2 (50.80)	2.50 (63.50)	-
BS-75/50-G	3 (76.20)	2 (50.80)	2.50 (63.50)	2-232

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



# Weld Fittings

## Tees

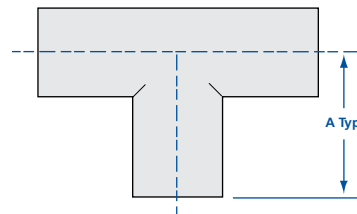


304 stainless steel tees and reducer tees are fabricated with the pulled-port technique and full penetration welds. This provides crevice-free weld joints and the maximum in cleanliness for UHV applications. Other sizes are available on request. We have added tees to match other commonly available dimensions. Look for the HW suffix for tees that match HPS weld fitting dimensions, for example. These fittings are also offered with various flange combinations. See appropriate flange section.



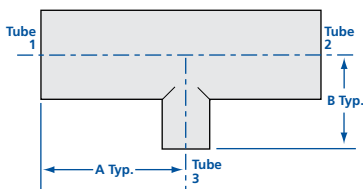
### Tees

MODEL NUMBER	TUBE OD	WALL THICKNESS	A
G-7W-050	1/2 (12.70)	0.049 (1.24)	0.75 (19.05)
G-7W-075	3/4 (19.05)	0.035 (0.89)	1.00 (25.40)
G-7W-075HW	3/4 (19.05)	0.065 (1.65)	1.88 (47.75)
G-7W-075T	3/4 (19.05)	0.065 (1.65)	1.00 (25.40)
G-7W-100	1 (25.40)	0.065 (1.65)	1.88 (47.75)
G-7W-150	1 1/2 (38.10)	0.065 (1.65)	2.25 (57.15)
G-7W-150H	1 1/2 (38.10)	0.065 (1.65)	2.41 (61.21)
G-7W-200	2 (50.80)	0.065 (1.65)	3.00 (76.20)
G-7W-200H	2 (50.80)	0.065 (1.65)	2.61 (66.29)
G-7W-250	2 1/2 (63.50)	0.065 (1.65)	3.00 (76.20)
G-7W-250V	2 1/2 (63.50)	0.065 (1.65)	3.75 (95.25)
G-7W-300	3 (76.20)	0.065 (1.65)	3.25 (82.55)
G-7W-400	4 (101.60)	0.083 (2.11)	3.88 (98.55)
G-7W-400V	4 (101.60)	0.083 (2.11)	4.87 (123.70)
G-7W-500-B	5 (127.00)	0.083 (2.11)	4.25 (107.95)
G-7W-600-B	6 (152.40)	0.083 (2.11)	5.00 (127.00)
G-7W-600V-B	6 (152.40)	0.083 (2.11)	6.06 (153.92)
G-7W-800-B	8 (203.20)	0.120 (3.05)	7.00 (177.80)
G-7W-1000-B	10 (254.00)	0.120 (3.05)	9.50 (241.30)



### Reducer Tees

MODEL NUMBER	TUBE 1 & 2 ARM OD	TUBE 3 LEG OD	A	B
G-7WR-100-050	1 (25.40)	1/2 (12.70)	1.88 (47.75)	1.00 (25.40)
G-7WR-100-075	1 (25.40)	3/4 (19.05)	1.88 (47.75)	1.12 (28.45)
G-7WR-150-050	1 1/2 (38.10)	1/2 (12.70)	2.25 (57.15)	1.25 (31.75)
G-7WR-150-075	1 1/2 (38.10)	3/4 (19.05)	2.25 (57.15)	1.38 (35.05)
G-7WR-150-100	1 1/2 (38.10)	1 (25.40)	2.25 (57.15)	2.13 (54.10)
G-7WR-200-050	2 (50.80)	1/2 (12.70)	3.00 (76.20)	1.50 (38.10)
G-7WR-200-075	2 (50.80)	3/4 (19.05)	3.00 (76.20)	1.63 (41.40)
G-7WR-200-100	2 (50.80)	1 (25.40)	3.00 (76.20)	2.38 (60.45)
G-7WR-200-150	2 (50.80)	1 1/2 (38.10)	3.00 (76.20)	2.50 (63.50)
G-7WR-250-150	2 1/2 (63.50)	1 1/2 (38.10)	3.00 (76.20)	2.75 (69.85)
G-7WR-250-200	2 1/2 (63.50)	2 (50.80)	3.00 (76.20)	3.25 (82.55)
G-7WR-300-150	3 (76.20)	1 1/2 (38.10)	3.25 (82.55)	3.00 (76.20)
G-7WR-300-200	3 (76.20)	2 (50.80)	3.25 (82.55)	3.50 (88.90)
G-7WR-300-250	3 (76.20)	2 1/2 (63.50)	3.25 (82.55)	3.25 (82.55)
G-7WR-400-150-B	4 (101.60)	1 1/2 (38.10)	3.88 (98.55)	3.50 (88.90)
G-7WR-400-200-B	4 (101.60)	2 (50.80)	3.88 (98.55)	4.00 (101.60)
G-7WR-400-250-B	4 (101.60)	2 1/2 (63.50)	3.88 (98.55)	3.75 (95.25)
G-7WR-400-300-B	4 (101.60)	3 (76.20)	3.88 (98.55)	3.75 (95.25)
G-7WR-500-400-B	5 (127.00)	4 (101.60)	4.25 (107.95)	4.38 (111.25)
G-7WR-600-150-B	6 (152.40)	1 1/2 (38.10)	5.00 (127.00)	4.50 (114.30)
G-7WR-600-200-B	6 (152.40)	2 (50.80)	5.00 (127.00)	5.00 (127.00)
G-7WR-600-250-B	6 (152.40)	2 1/2 (63.50)	5.00 (127.00)	4.75 (120.65)
G-7WR-600-400-B	6 (152.40)	4 (101.60)	5.00 (127.00)	4.88 (123.95)
G-7WR-600-500-B	6 (152.40)	5 (127.00)	5.00 (127.00)	4.75 (120.65)
G-7WR-800-600-B	8 (203.20)	6 (152.40)	7.00 (177.80)	6.00 (152.40)



#### SPECIFICATIONS

**Tube OD sizes:** 1/2 to 10 inches (12.7-254mm)

**Materials:** 304 or stainless steel  
(316L available upon request)

**Vacuum range:** ≥1 x 10<sup>-13</sup> mbar

**Temperature range:** -200° to 450°C

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

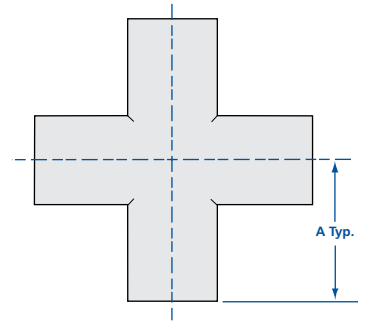


304 stainless steel crosses and reducer crosses are offered in a wide range of sizes as standard products. All crosses are fabricated with the pulled-port technique and full penetration butt welds. This provides crevice-free weld joints and the maximum in cleanliness for UHV applications. As always,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

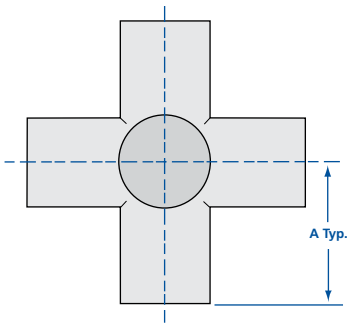
### 4-Way Crosses



MODEL NUMBER	TUBE OD	WALL THICKNESS	A
G-9W-050	1/2 (12.70)	0.049 (1.24)	0.75 (19.05)
G-9W-075	3/4 (19.05)	0.035 (.89)	1.00 (25.40)
G-9W-100	1 (25.40)	0.065 (1.65)	1.88 (47.75)
G-9W-150	1 1/2 (38.10)	0.065 (1.65)	2.25 (57.15)
G-9W-150H	1 1/2 (38.10)	0.065 (1.65)	2.41 (61.21)
G-9W-200	2 (50.80)	0.065 (1.65)	3.00 (76.20)
G-9W-200H	2 (50.80)	0.065 (1.65)	2.61 (66.29)
G-9W-250	2 1/2 (63.50)	0.065 (1.65)	3.00 (76.20)
G-9W-250V	2 1/2 (63.50)	0.065 (1.65)	3.75 (95.25)
G-9W-300	3 (76.20)	0.065 (1.65)	3.25 (82.55)
G-9W-400	4 (101.60)	0.083 (2.11)	3.88 (98.55)
G-9W-400V	4 (101.60)	0.083 (2.11)	4.87 (123.70)
G-9W-500-B	5 (127.00)	0.083 (2.11)	4.25 (107.95)
G-9W-600-B	6 (152.40)	0.083 (2.11)	5.00 (127.00)
G-9W-600V-B	6 (152.40)	0.083 (2.11)	6.06 (153.92)
G-9W-800-B	8 (203.20)	0.120 (3.05)	7.00 (177.80)
G-9W-1000-B	10 (254.00)	0.120 (3.05)	9.50 (241.30)



### 5-Way Crosses



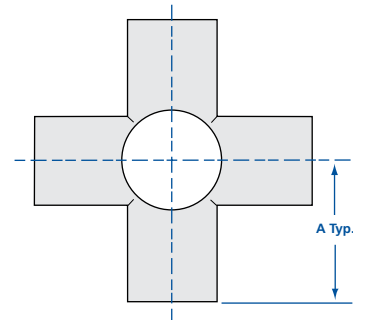
MODEL NUMBER	TUBE OD	WALL THICKNESS	A
G-10W-075	3/4 (19.05)	0.035 (0.89)	1.00 (25.40)
G-10W-100	1 (25.40)	0.065 (1.65)	1.88 (47.75)
G-10W-150	1 1/2 (38.10)	0.065 (1.65)	2.25 (57.15)
G-10W-200	2 (50.80)	0.065 (1.65)	3.00 (76.20)
G-10W-250	2 1/2 (63.50)	0.065 (1.65)	3.00 (76.20)
G-10W-250V	2 1/2 (63.50)	0.065 (1.65)	3.75 (95.25)
G-10W-300-B	3 (76.20)	0.065 (1.65)	3.25 (82.55)
G-10W-400-B	4 (101.60)	0.083 (2.11)	3.88 (98.55)
G-10W-400V-B	4 (101.60)	0.083 (2.11)	4.87 (123.70)
G-10W-500-B	5 (127.00)	0.083 (2.11)	4.25 (107.95)
G-10W-600-B	6 (152.40)	0.083 (2.11)	5.00 (127.00)
G-10W-600V-B	6 (152.40)	0.083 (2.11)	6.06 (153.92)
G-10W-800-B	8 (203.20)	0.120 (3.05)	7.00 (177.80)
G-10W-1000-B	10 (254.00)	0.120 (3.05)	9.50 (241.30)



### 6-Way Crosses



MODEL NUMBER	TUBE OD	WALL THICKNESS	A
G-11W-075	3/4 (19.05)	0.035 (0.89)	1.00 (25.40)
G-11W-100	1 (25.40)	0.065 (1.65)	1.88 (47.75)
G-11W-150	1 1/2 (38.10)	0.065 (1.65)	2.25 (57.15)
G-11W-200	2 (50.80)	0.065 (1.65)	3.00 (76.20)
G-11W-250	2 1/2 (63.50)	0.065 (1.65)	3.00 (76.20)
G-11W-250V	2 1/2 (63.50)	0.065 (1.65)	3.75 (95.25)
G-11W-300-B	3 (76.20)	0.065 (1.65)	3.25 (82.55)
G-11W-400-B	4 (101.60)	0.083 (2.11)	3.88 (98.55)
G-11W-400V-B	4 (101.60)	0.083 (2.11)	4.87 (123.70)
G-11W-500-B	5 (127.00)	0.083 (2.11)	4.25 (107.95)
G-11W-600-B	6 (152.40)	0.083 (2.11)	5.00 (127.00)
G-11W-600V-B	6 (152.40)	0.083 (2.11)	6.06 (153.92)
G-11W-800-B	8 (203.20)	0.120 (3.05)	7.00 (177.80)
G-11W-1000-B	10 (254.00)	0.120 (3.05)	9.50 (241.30)





# Weld Fittings

## Reducer Crosses & Stainless Steel Tubing

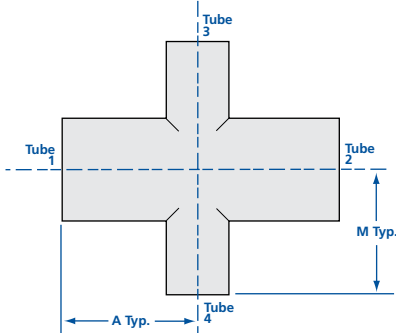
### SPECIFICATIONS

**Tube OD sizes:** 3/4 to 12 inches (19.05-304.8mm)

**Materials:** 304 or stainless steel (316L available upon request)

**Vacuum range:**  $\geq 1 \times 10^{-13}$  mbar

**Temperature range:** -200° to 450°C



### Reducer Crosses

MODEL NUMBER	TUBE 1 & 2 ARM OD	TUBE 3 & 4 LEG OD	A	M
G-9WR-100-050	1 (25.40)	1/2 (12.70)	1.88 (47.75)	1.00 (25.40)
G-9WR-100-075	1 (25.40)	3/4 (19.05)	1.88 (47.75)	1.12 (28.45)
G-9WR-150-050	1 1/2 (38.10)	1/2 (12.70)	2.25 (57.15)	1.25 (31.75)
G-9WR-150-075	1 1/2 (38.10)	3/4 (19.05)	2.25 (57.15)	1.38 (35.05)
G-9WR-150-100	1 1/2 (38.10)	1 (25.40)	2.25 (57.15)	2.13 (54.10)
G-9WR-200-050	2 (50.80)	1/2 (12.70)	3.00 (76.20)	1.50 (38.10)
G-9WR-200-075	2 (50.80)	3/4 (19.05)	3.00 (76.20)	1.63 (41.40)
G-9WR-200-150	2 (50.80)	1 1/2 (38.10)	3.00 (76.20)	2.50 (63.50)
G-9WR-250-150	2 1/2 (63.50)	1 1/2 (38.10)	3.00 (76.20)	2.75 (69.85)
G-9WR-250-200	2 1/2 (63.50)	2 (50.80)	3.00 (76.20)	3.25 (82.55)
G-9WR-300-150	3 (76.20)	1 1/2 (38.10)	3.25 (82.55)	3.00 (76.20)
G-9WR-300-200	3 (76.20)	2 (50.80)	3.25 (82.55)	3.50 (88.90)
G-9WR-300-250	3 (76.20)	2 1/2 (63.50)	3.25 (82.55)	3.25 (82.55)
G-9WR-400-150-B	4 (101.60)	1 1/2 (38.10)	3.88 (98.55)	3.50 (88.90)
G-9WR-400-200-B	4 (101.60)	2 (50.80)	3.88 (98.55)	4.00 (101.60)
G-9WR-400-250-B	4 (101.60)	2 1/2 (63.50)	3.88 (98.55)	3.75 (95.25)
G-9WR-400-300-B	4 (101.60)	3 (76.20)	3.88 (98.55)	3.75 (95.25)
G-9WR-500-400-B	5 (127.00)	4 (101.60)	4.25 (107.95)	4.38 (111.25)
G-9WR-600-150-B	6 (152.40)	1 1/2 (38.10)	5.00 (127.00)	4.50 (114.30)
G-9WR-600-200-B	6 (152.40)	2 (50.80)	5.00 (127.00)	5.00 (127.00)
G-9WR-600-250-B	6 (152.40)	2 1/2 (63.50)	5.00 (127.00)	4.75 (120.65)
G-9WR-600-300-B	6 (152.40)	3 (76.20)	5.00 (127.00)	4.75 (120.65)
G-9WR-600-400-B	6 (152.40)	4 (101.60)	5.00 (127.00)	4.88 (123.95)
G-9WR-600-500-B	6 (152.40)	5 (127.00)	5.00 (127.00)	4.75 (120.65)
G-9WR-800-600-B	8 (203.20)	6 (152.40)	7.00 (177.80)	6.00 (152.40)

Other reducer combinations can be supplied upon request.



### 304 & 316L Stainless Steel Tubing

Nor-Cal's consumption of stainless steel tubing for its own products makes it possible to offer 304 and 316L stainless steel tubing in lengths up to 20 feet. 304 stainless steel tubing standard finishes are white pickled (Number 1 unpolished), bright annealed or polished OD and ID, 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 A270, and has received a 150 grit polish on the OD and 180 grit on the ID. Special cleaning, materials and surface finishes are available for an additional charge.



### SPECIFICATIONS

**Tube OD sizes:** 1/2 to 12 inches (12.7-304.8mm)

**Materials:** 304 or 316L stainless steel

**Finishes:** Bright Annealed, polished ID & OD & white pickled

**Vacuum range:**  $\geq 1 \times 10^{-13}$  mbar

**Temperature range:** -200° to 450°C

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

MODEL NUMBER	SURFACE FINISH	TUBE OD	TUBE ID	WALL THICKNESS
SST-050	Bright annealed	1/2 (12.70)	0.402 (10.21)	0.049 (1.24)
SST-075	Bright annealed	3/4 (19.05)	0.680 (17.27)	0.035 (0.89)
SST-075-316L	Bright annealed	3/4 (19.05)	0.680 (17.27)	0.035 (0.89)
SST-100	Polished ID & OD	1 (25.40)	0.870 (22.10)	0.065 (1.65)
SST-100-316L	Bright annealed	1 (25.40)	0.870 (22.10)	0.065 (1.65)
SST-125	Bright annealed	1 1/4 (31.75)	1.120 (28.45)	0.065 (1.65)
SST-150	Polished ID & OD	1 1/2 (38.10)	1.370 (34.80)	0.065 (1.65)
SST-150-316L	Bright annealed	1 1/2 (38.10)	1.370 (34.80)	0.065 (1.65)
SST-162	Bright annealed	1 5/8 (41.28)	1.490 (37.85)	0.065 (1.65)
SST-175	Bright annealed	1 3/4 (44.45)	1.630 (41.40)	0.065 (1.65)
SST-200	Polished ID & OD	2 (50.80)	1.870 (47.50)	0.065 (1.65)
SST-200-316L	Bright annealed	2 (50.80)	1.870 (47.50)	0.065 (1.65)
SST-250	Polished ID & OD	2 1/2 (63.5)	2.370 (60.20)	0.065 (1.65)
SST-250-316L	Bright annealed	2 1/2 (63.5)	2.370 (60.20)	0.065 (1.65)
SST-300	Polished ID & OD	3 (76.20)	2.870 (72.90)	0.065 (1.65)
SST-300-316L	Bright annealed	3 (76.20)	2.870 (72.90)	0.065 (1.65)
SST-400	Polished ID & OD	4 (101.60)	3.834 (97.38)	0.083 (2.11)
SST-400-316L	Bright annealed	4 (101.60)	3.834 (97.38)	0.083 (2.11)
SST-500	White pickled	5 (127.00)	4.834 (122.78)	0.083 (2.11)
SST-600	White pickled	6 (152.40)	5.834 (148.18)	0.083 (2.11)
SST-800	White pickled	8 (203.20)	7.760 (197.10)	0.120 (3.05)
SST-1000	White pickled	10 (254.00)	9.760 (247.90)	0.120 (3.05)
SST-1200	White pickled	12 (304.80)	11.760 (298.70)	0.120 (3.05)

\* Cutting fee applies, call for pricing. To order specify length required in feet as follows: SST-400-20.0 (20" length of 4" OD tube) SST-150-316L-20.0 (20" length of 1.5" OD tube)