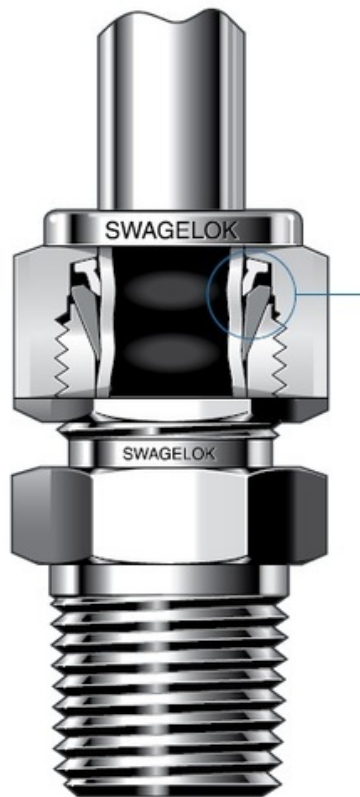




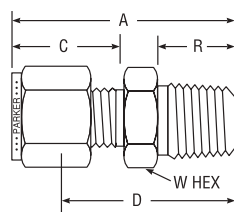
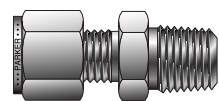
FLOW CONTROL

SWAGELOK FITTING



NPT Male Connector

For fractional tube



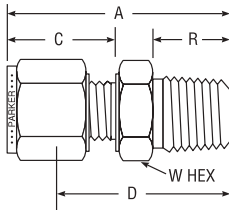
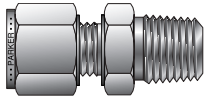
TUBE O.D.	NPT PIPE THREAD	INCHES				
		A	C	D	R	W HEX
1/16	1/16	.93	.43	.78	.38	5/16
1/16	1/8	1.03	.43	.88	.38	7/16
1/16	1/4	1.23	.43	1.08	.56	9/16
1/8	1/16	1.17	.60	.91	.38	3/8
1/8	1/8	1.20	.60	.94	.38	7/16
1/8	1/4	1.40	.60	1.14	.56	9/16
1/8	3/8	1.42	.60	1.16	.56	11/16
1/8	1/2	1.67	.60	1.41	.75	7/8
3/16	1/16	1.23	.64	.97	.38	7/16
3/16	1/8	1.23	.64	.97	.38	7/16
3/16	1/4	1.43	.64	1.17	.56	9/16
1/4	1/16	1.29	.70	1.00	.38	1/2
1/4	1/8	1.29	.70	1.00	.38	1/2
1/4	1/4	1.49	.70	1.20	.56	9/16
1/4	3/8	1.51	.70	1.22	.56	11/16
1/4	1/2	1.76	.70	1.47	.75	7/8
1/4	3/4	1.82	.70	1.53	.75	1-1/16
5/16	1/8	1.34	.73	1.05	.38	9/16
5/16	1/4	1.52	.73	1.23	.56	9/16
5/16	3/8	1.55	.73	1.25	.56	11/16
5/16	1/2	1.79	.73	1.5	.75	7/8
3/8	1/8	1.38	.76	1.09	.38	5/8
3/8	1/4	1.57	.76	1.28	.56	5/8
3/8	3/8	1.57	.76	1.28	.56	11/16
3/8	1/2	1.82	.76	1.53	.75	7/8
3/8	3/4	1.88	.76	1.59	.75	1-1/16
1/2	1/8	1.53	.87	1.13	.38	13/16
1/2	1/4	1.71	.87	1.31	.56	13/16
1/2	3/8	1.71	.87	1.31	.56	13/16
1/2	1/2	1.93	.87	1.53	.75	7/8
1/2	3/4	1.99	.87	1.59	.75	1-1/16
1/2	1	2.28	.87	1.88	.94	1-3/8
5/8	3/8	1.74	.87	1.34	.56	15/16
5/8	1/2	1.93	.87	1.53	.75	15/16
5/8	3/4	1.99	.87	1.59	.75	1-1/16
3/4	1/2	1.99	.87	1.59	.75	1-1/16
3/4	3/4	1.99	.87	1.59	.75	1-1/16
3/4	1	2.28	.87	1.88	.94	1-3/8
7/8	3/4	1.99	.87	1.59	.75	1-3/16
7/8	1	2.28	.87	1.88	.94	1-3/8
1	1/2	2.27	1.05	1.78	.75	1-3/8
1	3/4	2.27	1.05	1.78	.75	1-3/8
1	1	2.46	1.05	1.97	.94	1-3/8
1-1/4	1-1/4	3.03	1.52	2.17	.97	1-3/4
1-1/2	1-1/2	3.50	1.77	2.44	1.00	2-1/8
2	2	4.47	2.47	3.00	1.04	2-3/4

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Sizes 20, 24, 32 require additional lubrication prior to assembly.

NPT Male Connector For metric tube



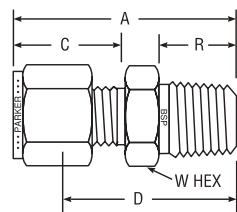
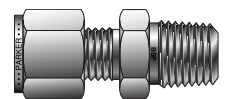
TUBE O.D.	NPT PIPE THREAD	MILLIMETERS				
		A	C	D	R	W HEX
2	1/8	29,7	15,3	23,1	9,5	12,0
3	1/8	29,7	15,3	23,1	9,5	12,0
3	1/4	35,3	15,3	28,7	14,3	14,0
4	1/8	31,2	16,1	24,6	9,5	12,0
4	1/4	36,3	16,1	29,7	14,3	14,0
6	1/8	32,9	17,7	25,4	9,5	14,0
6	1/4	38,1	17,7	30,6	14,3	14,0
6	3/8	38,5	17,7	31,0	14,3	18,0
6	1/2	44,8	17,7	37,3	19,1	22,0
8	1/8	34,2	18,6	26,7	9,5	15,0
8	1/4	38,8	18,6	31,3	14,3	15,0
8	3/8	39,3	18,6	31,8	14,3	18,0
8	1/2	45,6	18,6	38,1	19,1	22,0
10	1/8	36,1	19,5	28,6	9,5	18,0
10	1/4	40,9	19,5	33,3	14,3	18,0
10	3/8	40,9	19,5	33,3	14,3	18,0
10	1/2	47,5	19,5	38,9	19,1	22,0
10	3/4	46,4	19,5	38,9	19,1	27,0
10	1	55,0	19,5	47,5	23,8	35,0
12	1/4	43,4	22,0	33,3	14,3	22,0
12	3/8	43,4	22,0	33,3	14,3	22,0
12	1/2	49,0	22,0	38,9	19,1	22,0
12	3/4	50,5	22,0	40,4	19,1	27,0
14	1/4	44,2	22,0	34,1	14,3	24,0
14	3/8	44,2	22,0	34,1	14,3	24,0
14	1/2	49,0	22,0	38,9	19,1	24,0
15	1/2	49,0	22,0	38,9	19,1	24,0
16	3/8	44,1	22,0	34,01	14,3	24,0
16	1/2	49,0	22,0	38,9	19,1	24,0
16	3/4	50,5	22,0	40,5	19,1	27,0
18	1/2	50,6	22,0	40,5	19,1	27,0
18	3/4	50,6	22,0	40,5	19,1	27,0
20	1/2	50,6	22,0	42,2	19,1	30,0
20	3/4	52,3	22,0	42,2	19,1	30,0
20	1	57,7	22,0	47,6	23,8	35,0
22	3/4	52,3	22,0	42,2	19,1	35,0
25	1/2	57,5	26,5	45,3	19,1	35,0
25	3/4	57,5	26,5	45,2	19,1	35,0
25	1	62,3	26,5	50,0	23,8	35,0

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

BSP Taper Male Connector

For fractional tube



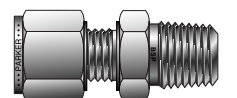
INCHES							
TUBE O.D.	BSPT THREAD	A	C	D	R	W HEX	BORE
1/8	1/8	1.20	.60	0.94	.38	7/16	.19
1/8	1/4	1.40	.60	1.14	.56	9/16	.19
1/4	1/8	1.30	.70	1.00	.38	1/2	.19
1/4	1/4	1.50	.70	1.20	.56	9/16	.19
1/4	3/8	1.52	.70	1.22	.56	11/16	.19
1/4	1/2	1.77	.70	1.47	.75	7/8	.19
5/16	1/8	1.34	.73	1.05	.38	9/16	.19
5/16	1/4	1.52	.73	1.23	.56	9/16	.19
3/8	1/8	1.39	.76	1.09	.38	5/8	.19
3/8	1/4	1.57	.76	1.28	.56	5/8	.28
3/8	3/8	1.57	.76	1.28	.56	11/16	.28
3/8	1/2	1.82	.76	1.53	.75	7/8	.28
1/2	1/4	1.69	.86	1.31	.56	13/16	.28
1/2	3/8	1.69	.86	1.31	.56	13/16	.38
1/2	1/2	1.91	.66	1.53	.75	7/8	.41

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

BSP Taper Male Connector

For metric tube

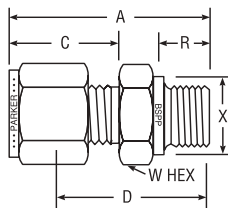
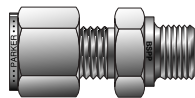


MILLIMETERS						
TUBE O.D.	BSPT THREAD	A	C	D	R	W HEX
2	1/8	29,7	15,3	23,1	9,5	12,0
3	1/8	29,7	15,3	23,1	9,7	12,0
3	1/4	35,3	15,3	28,7	14,2	14,0
4	1/8	31,2	16,1	24,6	9,7	12,0
4	1/4	36,3	16,1	29,7	14,2	14,0
6	1/8	32,9	17,7	25,4	9,7	14,0
6	1/4	40,0	17,7	30,5	14,2	14,0
6	3/8	38,5	17,7	31,0	14,2	18,0
6	1/2	45,6	17,7	38,1	19,1	22,0
8	1/8	33,9	18,6	26,4	9,5	15,0
8	1/4	38,7	18,6	31,2	14,2	15,0
8	3/8	39,3	18,6	31,8	14,2	18,0
8	1/2	45,6	18,6	38,1	19,1	22,0
10	1/8	36,2	19,5	28,6	9,5	18,0
10	1/4	40,9	19,5	33,3	14,2	18,0
10	3/8	40,9	19,5	33,3	14,2	18,0
10	1/2	46,5	19,5	38,9	19,1	22,0
12	1/4	43,4	22,0	33,3	14,2	22,0
12	3/8	43,4	22,0	33,3	14,2	22,0
12	1/2	49,0	22,0	38,9	19,1	22,0
12	3/4	49,5	22,0	40,4	19,1	27,0
15	1/2	49,0	22,0	38,9	19,1	24,0
16	3/8	44,2	22,0	34,1	14,2	24,0
16	1/2	49,0	22,0	38,9	19,1	24,0
16	3/4	49,5	22,0	40,5	19,1	27,0
18	1/2	50,6	22,0	40,4	19,1	27,0
18	3/4	50,6	22,0	40,4	19,1	27,0
20	1/2	52,3	22,0	42,2	19,1	30,0
20	3/4	52,3	22,0	42,2	19,1	30,0
22	3/4	52,3	22,0	42,2	19,1	30,0
25	3/4	57,5	26,5	45,2	19,1	35,0
25	1	62,3	26,5	50,0	23,9	35,0

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

BSPP Male Connector For fractional tube



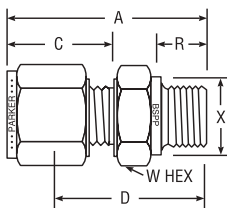
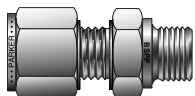
INCHES								
TUBE O.D.	BSPP THREAD	A	C	D	R	X	W HEX	BORE
1/8	1/8	1.18	.60	0.92	.28	0.54	9/16	.16
1/8	1/4	1.27	.60	1.13	.44	0.70	3/4	.09
1/8	3/8	1.46	.60	1.17	.44	0.86	7/8	.28
1/4	1/8	1.28	.70	0.98	.28	0.54	9/16	.16
1/4	1/4	1.49	.70	1.19	.44	0.70	3/4	.19
1/4	3/8	1.55	.70	1.25	.44	0.86	7/8	.19
1/4	1/2	1.77	.70	1.47	.56	1.01	1-1/16	.19
3/8	1/8	1.35	.76	1.06	.28	0.54	5/8	.16
3/8	1/4	1.54	.76	1.25	.44	0.70	3/4	.25
3/8	3/8	1.57	.76	1.28	.44	0.86	7/8	.28
3/8	1/2	1.82	.76	1.53	.56	1.01	1-1/16	.28
1/2	1/4	1.66	.86	1.28	.44	0.70	13/16	.25
1/2	3/8	1.69	.86	1.31	.44	0.86	7/8	.31
1/2	1/2	1.91	.86	1.53	.56	1.01	1-1/16	.41
3/4	1/2	1.93	.86	1.53	.56	1.01	1-1/16	.41
3/4	3/4	2.07	.86	1.69	.63	1.25	1-3/8	.63
1	1/2	2.21	1.04	1.72	.56	1.01	1-3/8	.41
1	1	2.35	1.04	1.88	.72	1.52	1-5/8	.88

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Sealing washer must be used with BSPP end shown ISO228/1 (Form A). See page 73.
For Form B undercut part number and add B before R. e.g. M6MSC1/4BR.

BSPP Male Connector For metric tube



MILLIMETERS								
TUBE O.D.	BSPP THREAD	A	C	D	R	X	W HEX	
2	1/8	28,4	15,3	21,8	7,1	14,0	13,7	
3	1/8	30,0	15,3	23,4	7,1	13,7	14,0	
3	1/4	35,3	15,3	28,7	11,2	17,8	19,0	
6	1/8	32,5	17,7	25,0	7,1	13,7	14,0	
6	1/4	37,7	17,7	30,2	11,2	17,8	19,0	
6	3/8	39,0	17,7	31,5	11,2	21,8	22,0	
6	1/2	45,6	17,7	38,1	14,2	25,7	27,0	
8	1/8	33,1	18,6	25,6	7,1	15,0	13,7	
8	1/4	38,5	18,6	31,0	11,2	17,8	19,0	
8	3/8	39,8	18,6	32,3	11,2	21,8	22,0	
8	1/2	45,6	18,6	38,1	14,2	25,7	27,0	
10	1/4	39,4	19,5	31,8	11,2	17,8	19,0	
10	3/8	40,6	19,5	33,0	11,2	21,8	22,0	
10	1/2	46,5	19,5	38,9	14,2	25,7	27,0	
12	1/4	42,6	22,0	32,5	11,2	17,8	22,0	
12	3/8	43,1	22,0	33,0	11,2	21,8	22,0	
12	1/2	49,0	22,0	38,9	14,2	25,7	27,0	
12	3/4	52,8	22,0	42,7	16,0	31,8	35,0	
16	3/8	43,5	22,0	33,4	11,2	22,0	21,8	
16	1/2	49,0	22,0	38,9	14,2	26,0	27,0	
18	1/2	49,0	22,0	38,9	14,2	26,0	27,0	
18	3/4	53,1	22,0	43,0	16,0	35,0	32,0	
20	1/2	50,5	22,0	40,4	14,2	30,0	25,7	
20	3/4	52,8	22,0	42,7	16,0	32,0	35,0	
22	3/4	52,8	22,0	42,7	16,0	32,0	35,0	
25	3/4	59,8	26,5	47,6	16,0	35,0	31,8	
25	1	60,1	26,5	47,8	18,3	39,0	41,0	

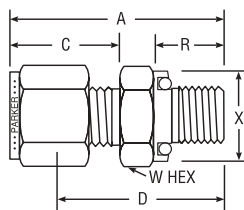
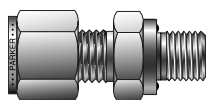
NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Sealing washer must be used with BSPP end shown ISO228/1 (Form A). See page 73.
For Form B undercut, add a "B" before the "R." e.g. M6MSC1/4BR.

BSPP Male Connector with ED Seal

For fractional tube



TUBE O.D.	BSPP THREAD	INCHES						
		A	C	D	R	X	W HEX	BORE
1/4	1/4	1.48	.70	1.19	.47	.74	3/4	.19
1/4	1/2	1.76	.70	1.38	.55	1.04	1-1/16	.19
3/8	3/8	1.60	.76	1.31	.47	.86	7/8	.28
1/2	1/4	1.69	.86	1.31	.47	.74	13/16	.25
1/2	3/8	1.69	.86	1.31	.47	.86	7/8	.31
1/2	1/2	1.85	.86	1.47	.55	1.04	1-1/16	.41
3/4	3/4	1.98	.86	1.59	.63	1.25	1-5/16	.63

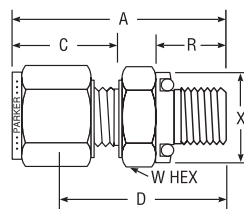
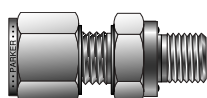
NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

ED fittings are supplied with sealing washers in nitrile as standard, suitable for temperatures of between -35°C and +100°C (-31°F to +212°F). Fluorocarbon seals are available upon request which are suitable for temperatures of between -25°C and +120°C (-13°F to +248°F).

Male Connector with ED Seal

For metric tube



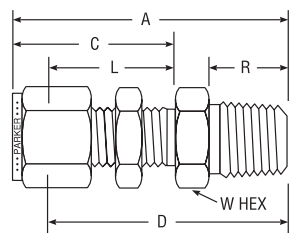
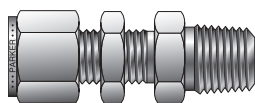
MILLIMETERS							
TUBE O.D.	BSPP THREAD	A	C	D	R	X	W HEX
6	1/8	32,5	17,7	25,0	7,9	13,7	14,0
6	1/4	38,2	17,7	30,7	11,9	18,8	19,0
6	3/8	39,5	17,7	32,0	11,9	21,8	22,0
6	1/2	44,5	17,7	37,0	14,0	26,4	27,0
10	1/4	40,0	19,5	32,3	11,9	18,8	19,0
10	3/8	41,1	19,5	38,1	11,9	21,8	22,0
10	1/2	46,0	19,5	38,4	14,0	26,4	27,0
12	1/4	43,1	22,0	33,0	11,9	18,8	22,0
12	3/8	43,6	22,0	33,5	11,9	21,8	22,0
12	1/2	48,5	22,0	38,4	14,0	26,4	27,0

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

ED fittings are supplied with sealing washers in nitrile as standard, suitable for temperatures of between -35°C and +100°C (-31°F to +212°F). Fluorocarbon seals are available upon request which are suitable for temperatures of between -25°C and +120°C (-13°F to +248°F).

NPT Male Bulkhead Connector For fractional tube



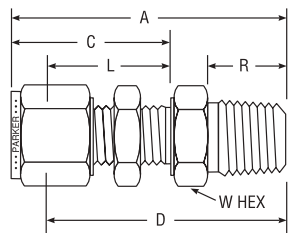
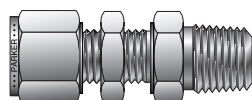
INCHES							
TUBE O.D.	NPT PIPE THREAD	A	C	D	L	R	W HEX
1/16	1/16	1.19	0.68	1.038	.53	.38	5/16
1/16	1/8	1.27	0.68	1.116	.53	.38	7/16
1/8	1/8	1.83	1.23	1.571	.97	.38	1/2
3/16	1/8	1.89	1.26	1.634	1.00	.38	9/16
1/4	1/8	1.95	1.31	1.655	1.02	.38	5/8
1/4	1/4	2.132	1.31	1.842	1.02	.56	5/8
1/4	3/8	2.162	1.31	1.872	1.02	.56	11/16
1/4	1/2	2.374	1.31	2.084	1.02	.75	7/8
5/16	1/8	2.08	1.42	1.779	1.12	.38	11/16
5/16	1/4	2.27	1.42	1.966	1.12	.56	11/16
3/8	1/8	2.08	1.44	1.788	1.15	.38	3/4
3/8	1/4	2.265	1.44	1.975	1.15	.56	3/4
3/8	3/8	2.265	1.44	1.975	1.15	.56	3/4
3/8	1/2	2.48	1.44	2.219	1.15	.75	7/8
1/2	1/4	2.494	1.65	2.094	1.25	.56	15/16
1/2	3/8	2.494	1.65	2.094	1.25	.56	15/16
1/2	1/2	2.712	1.65	2.312	1.25	.75	15/16
1/2	3/4	2.722	1.65	2.322	1.25	.75	1-1/8
5/8	3/8	2.628	1.68	2.228	1.28	.56	1-1/16
5/8	1/2	2.816	1.68	2.416	1.28	.75	1-1/16
3/4	1/2	3.00	1.87	2.601	1.47	.75	1-3/16
3/4	3/4	3.00	1.87	2.601	1.47	.75	1-3/16
7/8	3/4	3.31	2.09	2.913	1.69	.75	1-3/8
1	3/4	3.54	2.27	3.006	1.78	.75	1-5/8
1	1	3.72	2.27	3.194	1.78	.94	1-5/8

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

For bulkhead hole drill size and maximum bulkhead thickness, see page 29, Part BC.

NPT Male Bulkhead Connector For metric tube



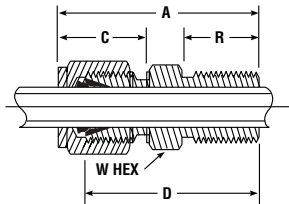
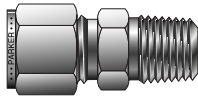
MILLIMETERS									
TUBE O.D.	NPT THREAD	A	C	D	L	R	W HEX	B'HEAD HOLE DRILL SIZE	MAX. B'HEAD THICK.
6	1/8	49,6	33,7	42,1	26,2	9,5	16,0	11,5	10,2
6	1/4	53,5	33,7	46,0	26,2	14,3	16,0	11,5	10,2
8	1/8	52,3	36,0	44,8	28,5	9,5	18,0	13,1	11,2
8	1/4	57,5	36,0	50,0	28,5	14,3	18,0	13,1	11,2
10	1/4	58,4	37,0	50,8	29,4	14,3	22,0	16,3	11,2
10	3/8	58,4	37,0	50,8	29,4	14,3	22,0	16,3	11,2
10	1/2	63,1	37,0	55,5	29,4	19,0	22,0	16,3	11,2
12	1/4	63,3	10,1	53,2	31,8	14,3	24,0	19,5	12,7
12	3/8	64,5	10,1	54,4	31,8	14,3	24,0	19,5	12,7
12	1/2	67,5	10,1	57,4	31,8	19,0	24,0	19,5	12,7

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Thermocouple Connector

For fractional tube



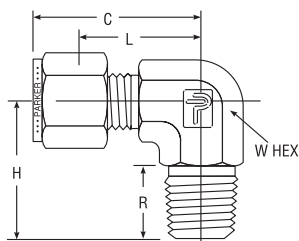
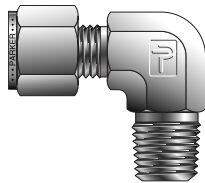
TUBE O.D.	NPT PIPE THREAD	INCHES				
		A	C	D	R	W HEX
1/16	1/16	0.93	.43	0.78	.38	5/16
1/16	1/8	1.03	.43	0.88	.38	7/16
1/16	1/4	1.23	.43	1.08	.56	9/16
1/8	1/16	1.17	.60	0.91	.38	3/8
1/8	1/8	1.20	.60	0.94	.38	7/16
1/8	1/4	1.40	.60	1.14	.56	9/16
3/16	1/8	1.23	.64	0.97	.38	7/16
3/16	1/4	1.43	.64	1.17	.56	9/16
1/4	1/8	1.29	.70	1.00	.38	1/2
1/4	1/4	1.49	.70	1.20	.56	9/16
1/4	3/8	1.60	.70	1.22	.56	11/16
1/4	1/2	1.87	.70	1.47	.75	7/8
5/16	1/4	1.52	.73	1.22	.56	9/16
3/8	1/4	1.57	.76	1.28	.56	5/8
3/8	3/8	1.57	.76	1.28	.56	11/16
3/8	1/2	1.82	.76	1.53	.75	7/8
3/8	3/4	1.88	.76	1.59	.75	1-1/16
1/2	1/2	1.93	.87	1.53	.76	7/8
1/2	3/4	1.99	.87	1.59	.75	1-1/16
5/8	3/4	1.99	.87	1.59	.75	1-1/16
3/4	3/4	1.99	.87	1.59	.75	1-1/16
1	1	2.46	1.05	1.97	.94	1-3/8

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

NPT Male Elbow

For fractional tube



TUBE O.D.	NPT PIPE THREAD	INCHES				
		C	H	L	R	W HEX
1/16	1/16	.75	0.70	.60	.38	7/16
1/16	1/8	.75	0.70	.60	.38	7/16
1/8	1/16	.93	0.70	.67	.38	7/16
1/8	1/8	.93	0.70	.67	.38	7/16
1/8	1/4	.97	0.93	.72	.56	9/16
3/16	1/8	1.00	0.74	.74	.38	1/2
3/16	1/4	1.00	0.93	.74	.56	9/16
1/4	1/16	1.06	0.74	.77	.38	1/2
1/4	1/8	1.06	0.74	.77	.38	1/2
1/4	1/4	1.06	0.93	.77	.56	9/16
1/4	3/8	1.17	1.04	.88	.56	11/16
1/4	1/2	1.25	1.31	.96	.75	13/16
5/16	1/8	1.13	0.79	.84	.38	9/16
5/16	1/4	1.13	0.97	.84	.56	9/16
3/8	1/8	1.20	0.82	.91	.38	5/8
3/8	1/4	1.20	1.01	.91	.56	5/8
3/8	3/8	1.23	1.13	.97	.56	11/16
3/8	1/2	1.31	1.31	1.02	.75	13/16
3/8	3/4	1.46	1.46	1.17	.75	1-1/16
1/2	1/4	1.42	1.12	1.02	.56	13/16
1/2	3/8	1.42	1.12	1.02	.56	13/16
1/2	1/2	1.42	1.31	1.02	.75	13/16
1/2	3/4	1.57	1.46	1.17	.75	1-1/16
5/8	3/8	1.50	1.20	1.10	.56	15/16
5/8	1/2	1.50	1.39	1.10	.75	15/16
5/8	3/4	1.57	1.46	1.17	.75	1-1/16
3/4	1/2	1.57	1.46	1.17	.75	1-1/16
3/4	3/4	1.57	1.46	1.17	.75	1-1/16
7/8	3/4	1.76	1.65	1.36	.75	1-3/8
1	3/4	1.93	1.65	1.45	.75	1-3/8
1	1	1.93	1.84	1.45	.94	1-3/8
1-1/4	1-1/4	2.61	1.88	1.75	.97	1-5/8
1-1/2	1-1/2	3.06	2.38	2.00	1.00	1-7/8
2	2	4.22	2.79	2.75	1.04	2-13/16

NOTE: C dimension is typical finger-tight.

Dimensions for reference only, subject to change.

Sizes 20, 24 require additional lubrication prior to assembly.

Color Coding

For easy reference, table column headings are color indicated as follows:

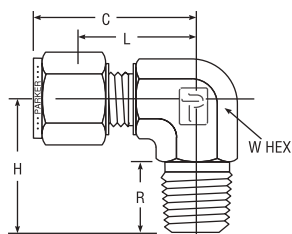
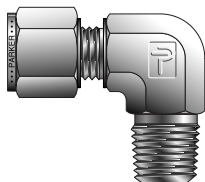
fractional



metric



NPT Male Metric Elbow For metric tube

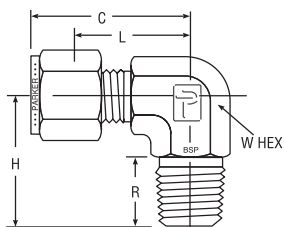
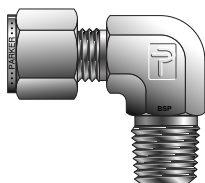


TUBE O.D.	NPT THREAD	MILLIMETERS				INCHES
		C	H	L	R	W HEX
3	1/8	23,6	17,8	17,0	9,7	7/16
3	1/4	24,6	23,4	18,0	14,2	1/2
4	1/8	25,4	18,8	19,2	9,7	1/2
4	1/4	26,2	25,4	19,6	14,2	1/2
6	1/8	27,0	18,8	19,6	9,7	1/2
6	1/4	27,0	23,4	19,6	14,2	1/2
6	3/8	29,8	26,2	22,4	14,2	11/16
6	1/2	31,8	33,0	24,4	19,0	13/16
8	1/8	28,8	19,8	21,3	9,7	9/16
8	1/4	28,8	24,4	21,3	14,2	9/16
8	3/8	30,6	26,2	23,1	14,2	11/16
8	1/2	32,7	33,0	25,2	19,1	13/16
10	1/8	31,5	21,6	23,9	9,7	11/16
10	1/4	31,5	26,2	23,9	14,2	11/16
10	3/8	31,5	26,2	23,9	14,2	11/16
10	1/2	33,5	33,0	25,9	19,0	13/16
12	1/4	36,0	28,2	25,9	14,2	13/16
12	3/8	36,0	28,2	25,9	14,2	13/16
12	1/2	36,0	33,0	25,9	19,0	13/16
12	3/4	39,8	36,8	29,7	19,0	1-1/16
15	1/2	38,0	35,1	27,9	19,0	15/16
16	3/8	38,0	30,2	27,9	14,2	15/16
16	1/2	38,0	35,1	27,9	19,0	15/16
16	3/4	39,8	36,8	29,7	19,0	1-1/16
18	1/2	39,8	36,8	29,7	19,0	1-1/16
18	3/4	39,8	36,8	29,7	19,0	1-1/16
20	1/2	44,6	41,7	34,5	19,0	1-3/8
20	3/4	44,6	41,7	34,5	19,0	1-3/8
22	3/4	44,6	41,7	34,5	19,0	1-3/8
25	3/4	49,1	41,7	36,8	19,0	1-3/8
25	1	49,1	46,5	36,8	23,9	1-3/8

NOTE: C dimension is typical finger-tight.

Dimensions for reference only, subject to change.

BSP Taper Male Elbow For fractional tube



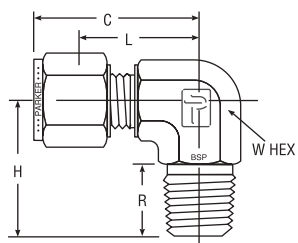
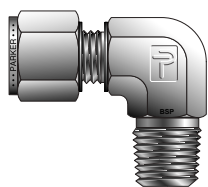
NOTE: C dimension is typical finger-tight.

TUBE O.D.	BSPT THREAD	INCHES				INCHES
		C	H	L	R	W HEX
1/4	1/8	1.06	0.75	0.77	.38	1/2
1/4	1/4	1.06	0.94	0.77	.56	9/16
1/4	3/8	1.17	1.05	0.88	.56	11/16
1/4	1/2	1.25	1.32	0.96	.75	13/16
5/16	1/4	1.13	0.98	0.84	.38	9/16
3/8	1/4	1.20	1.02	0.91	.56	5/8
3/8	3/8	1.23	1.05	0.97	.56	11/16
1/2	3/8	1.42	1.13	1.02	.56	13/16
1/2	1/2	1.42	1.32	1.02	.75	13/16

Dimensions for reference only, subject to change.

BSP Taper Male Elbow

For metric tube

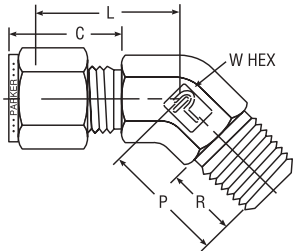
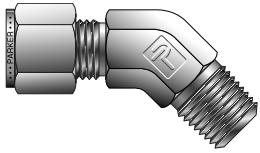


NOTE: C dimension is typical finger-tight.

TUBE O.D.	BSPT THREAD	MILLIMETERS				INCHES
		C	H	L	R	W HEX
3	1/8	23,6	17,8	17,0	9,7	7/16
3	1/4	24,6	23,4	18,0	14,2	1/2
4	1/8	25,4	18,8	18,8	9,7	1/2
4	1/4	24,6	23,4	18,8	14,2	1/2
6	1/8	27,0	18,8	19,6	9,7	1/2
6	1/4	27,0	23,4	19,6	14,2	1/2
6	3/8	29,8	26,2	22,4	14,2	11/16
6	1/2	31,8	33,0	24,4	19,0	13/16
8	1/8	28,8	19,8	21,3	9,7	9/16
8	1/4	28,8	24,4	21,3	14,2	9/16
8	3/8	30,6	26,2	23,1	14,2	11/16
8	1/2	32,7	33,0	25,2	19,1	13/16
10	1/8	31,5	21,6	23,9	9,7	11/16
10	1/4	31,5	26,2	23,9	14,2	11/16
10	3/8	31,5	26,2	23,9	14,2	11/16
10	1/2	33,5	33,0	25,9	19,0	13/16
12	1/4	36,0	28,2	25,9	14,2	13/16
12	3/8	36,0	28,2	25,9	14,2	13/16
12	1/2	36,0	33,0	25,9	19,0	13/16
12	3/4	39,8	36,8	29,7	19,1	1-1/16
16	3/8	38,0	30,2	27,9	14,2	15/16
16	1/2	38,0	35,1	27,9	19,0	15/16
18	1/2	39,8	36,8	29,7	19,0	1-1/16
18	3/4	39,8	36,8	29,7	19,0	1-1/16
20	3/4	44,6	41,7	34,5	19,0	1-3/8
25	3/4	49,0	41,7	36,8	19,1	1-3/8
25	1	49,1	46,5	36,8	23,9	1-3/8

Dimensions for reference only, subject to change.

NPT Male 45° Elbow For fractional tube

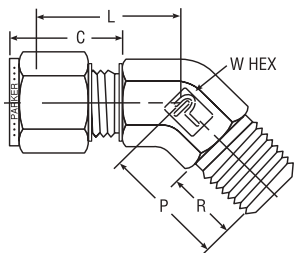
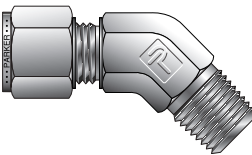


NOTE: C dimension is typical finger-tight.

INCHES						
TUBE O.D.	NPT PIPE THREAD	C	L	P	R	W HEX
1/16	1/16	0.43	0.47	0.57	.38	7/16
1/8	1/8	0.60	0.53	0.57	.38	7/16
3/16	1/8	0.64	0.56	0.58	.38	7/16
1/4	1/8	0.70	0.66	0.66	.38	9/16
1/4	1/4	0.70	0.66	0.86	.56	9/16
5/16	1/8	0.73	0.66	0.66	.38	9/16
3/8	1/8	0.76	0.72	0.67	.38	9/16
3/8	1/4	0.76	0.72	0.86	.56	9/16
3/8	3/8	0.76	0.75	0.95	.56	3/4
1/2	3/8	0.87	0.75	0.95	.56	3/4
5/8	1/2	0.87	0.84	1.20	.75	1-1/16
3/4	3/4	0.87	0.84	1.20	.75	1-1/16
7/8	3/4	0.87	1.36	1.27	.75	1-5/16
1	1	1.05	1.19	1.14	.94	1-5/16

Dimensions for reference only, subject to change.

NPT Male 45° Elbow For metric tube



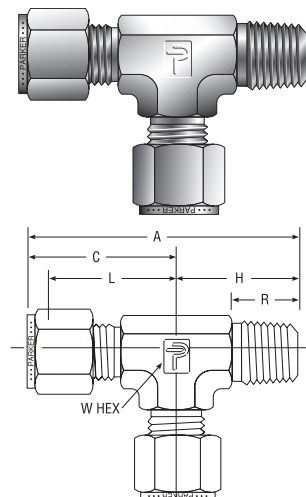
NOTE: C dimension is typical finger-tight.

MILLIMETERS						
TUBE O.D.	NPT PIPE THREAD	C	L	P	R	W HEX
6	1/8	17,7	16,0	16,8	9,5	14,0
6	1/4	17,7	16,0	21,8	14,3	14,0
8	1/8	18,6	16,8	16,8	9,5	14,0
10	1/4	19,5	19,0	24,1	14,3	19,0
12	3/8	22,0	19,0	24,1	14,3	19,0
12	1/2	22,0	20,6	29,7	19,0	22,0
16	1/2	22,0	20,6	29,7	19,0	22,0

Dimensions for reference only, subject to change.

NPT Male Run Tee

For fractional tube



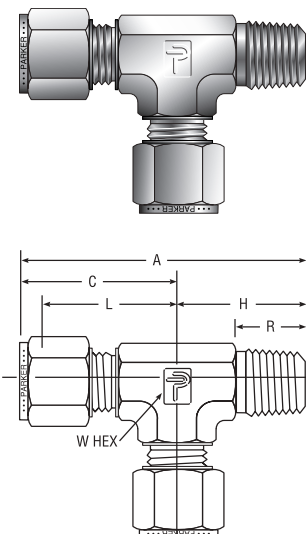
NOTE: A and C dimensions are typical finger-tight.

INCHES							
TUBE O.D.	NPT PIPE THREAD	A	C	H	L	R	W HEX
1/8	1/8	1.63	0.93	0.71	0.66	.38	7/16
1/8	1/4	1.89	0.97	0.93	0.70	.56	9/16
3/16	1/8	1.66	0.96	0.70	0.70	.38	7/16
1/4	1/8	1.80	1.06	0.74	0.77	.38	1/2
1/4	1/4	1.98	1.06	0.93	0.77	.56	1/2
5/16	1/8	1.99	1.17	0.82	0.88	.38	5/8
5/16	1/4	2.18	1.17	1.01	0.88	.56	5/8
3/8	1/4	2.20	1.20	1.01	0.91	.56	5/8
3/8	3/8	2.42	1.31	1.12	1.02	.56	13/16
1/2	3/8	2.53	1.42	1.12	1.02	.56	13/16
1/2	1/2	2.72	1.42	1.31	1.02	.75	7/8
5/8	1/2	2.88	1.50	1.39	1.10	.75	15/16
3/4	3/4	3.02	1.57	1.46	1.17	.75	1-1/16
7/8	3/4	3.41	1.76	1.65	1.36	.75	1-3/8
1	3/4	3.59	1.94	1.65	1.45	.75	1-3/8
1	1	3.78	1.94	1.84	1.45	.94	1-3/8

Dimensions for reference only, subject to change.

NPT Male Run Tee

For metric tube



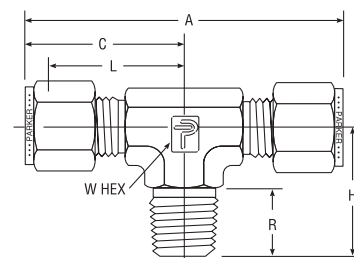
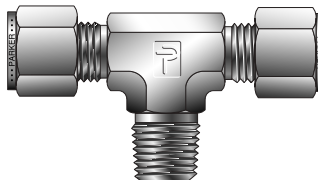
NOTE: A and C dimensions are typical finger-tight.

MILLIMETERS							INCHES
TUBE O.D.	NPT THREAD	A	C	H	L	R	W HEX
6	1/8	45,8	27,0	18,0	19,6	9,7	1/2
6	1/4	50,3	27,0	23,4	19,6	14,2	1/2
8	1/8	50,7	29,9	20,8	22,4	9,7	5/8
8	1/4	55,3	29,9	25,4	22,4	14,2	5/8
10	1/4	61,7	33,5	28,2	25,9	14,2	13/16
10	1/2	66,5	33,5	33,0	25,9	19,0	13/16
12	1/4	64,2	36,0	28,2	25,9	14,2	13/16
12	3/8	64,2	36,0	28,2	25,9	14,2	13/16
12	1/2	69,0	36,0	33,0	25,9	19,0	13/16
16	1	93,1	46,6	46,5	34,4	23,9	1-3/8

Dimensions for reference only, subject to change.

NPT Male Branch Tee

For fractional tube



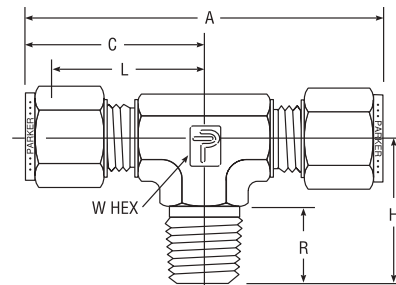
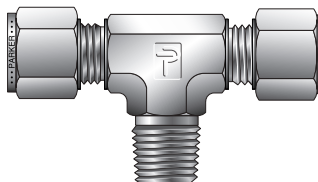
INCHES							
TUBE O.D.	NPT PIPE THREAD	A	C	H	L	R	W HEX
1/8	1/8	1.84	0.92	0.70	0.66	.38	7/16
1/8	1/4	1.96	0.98	0.93	0.72	.56	1/2
3/16	1/8	2.00	1.00	0.74	0.74	.38	1/2
1/4	1/8	2.12	1.06	0.74	0.77	.38	1/2
1/4	1/4	2.12	1.07	0.93	0.77	.56	1/2
5/16	1/8	2.34	1.17	0.82	0.88	.38	5/8
5/16	1/4	2.34	1.17	1.01	0.88	.56	5/8
3/8	1/4	2.40	1.20	1.01	0.91	.56	5/8
3/8	3/8	2.62	1.31	1.12	1.02	.56	13/16
1/2	3/8	2.84	1.42	1.12	1.02	.56	13/16
1/2	1/2	2.86	1.43	1.31	1.03	.75	7/8
5/8	1/2	2.86	1.53	1.42	1.13	.75	1
3/4	3/4	3.14	1.57	1.46	1.17	.75	1-1/16
7/8	3/4	3.52	1.76	1.65	1.36	.75	1-3/8
1	3/4	3.88	1.94	1.65	1.45	.75	1-3/8
1	1	3.88	1.94	1.84	1.45	.94	1-3/8

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

NPT Male Branch Tee

For metric tube



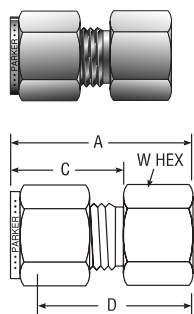
MILLIMETERS							INCHES
TUBE O.D.	NPT THREAD	A	C	H	L	R	W HEX
6	1/8	53,9	27,0	18,8	19,6	9,7	1/2
6	1/4	53,9	27,0	23,4	19,6	14,2	1/2
8	1/8	59,7	29,9	20,8	22,4	9,7	5/8
8	1/4	59,7	29,9	25,4	22,4	14,2	5/8
10	1/4	67,0	33,5	28,2	25,9	14,2	13/16
10	3/8	67,0	33,5	28,2	25,9	14,2	13/16
12	1/4	72,0	36,0	28,2	25,9	14,2	13/16
12	3/8	72,0	36,0	28,2	25,9	14,2	13/16
12	1/2	72,0	36,0	33,0	25,9	19,0	13/16
16	1/2	77,6	38,8	35,8	28,7	19,1	1

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

NPT Female Connector

For fractional tube



INCHES					
TUBE O.D.	NPT PIPE THREAD	A	C	D	W HEX
1/16	1/16	0.93	0.43	0.78	7/16
1/16	1/8	0.95	0.43	0.81	9/16
1/8	1/8	1.14	0.60	0.88	9/16
1/8	1/4	1.32	0.60	1.06	3/4
3/16	1/8	1.17	0.64	0.91	9/16
3/16	1/4	1.35	0.64	1.09	3/4
1/4	1/8	1.23	0.70	0.94	9/16
1/4	1/4	1.42	0.70	1.13	3/4
1/4	3/8	1.48	0.70	1.19	7/8
1/4	1/2	1.67	0.70	1.38	1-1/16
5/16	1/8	1.27	0.73	0.97	9/16
5/16	1/4	1.46	0.73	1.16	3/4
5/16	3/8	1.51	0.73	1.22	7/8
3/8	1/8	1.29	0.76	1.00	5/8
3/8	1/4	1.48	0.76	1.19	3/4
3/8	3/8	1.54	0.76	1.25	7/8
3/8	1/2	1.73	0.76	1.44	1-1/16
3/8	3/4	1.85	0.76	1.56	1-1/4
1/2	1/4	1.59	0.87	1.19	13/16
1/2	3/8	1.65	0.87	1.25	7/8
1/2	1/2	1.84	0.87	1.44	1-1/16
1/2	3/4	1.96	0.87	1.56	1-1/4
5/8	3/8	1.65	0.87	1.25	15/16
5/8	1/2	1.84	0.87	1.44	1-1/16
5/8	3/4	1.96	0.87	1.56	1-3/8
3/4	1/2	1.84	0.87	1.44	1-1/16
3/4	3/4	1.96	0.87	1.56	1-3/8
7/8	3/4	1.96	0.87	1.56	1-3/8
1	3/4	2.15	1.05	1.66	1-3/8
1	1	2.46	1.05	1.97	1-5/8
1-1/4	1-1/4	2.94	1.52	2.08	2
1-1/2	1-1/2	3.28	1.77	2.22	2-3/8
2	2	4.00	2.47	2.53	2-7/8

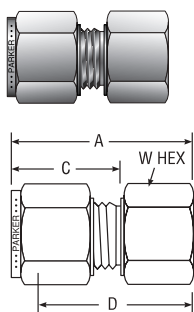
NOTE: A and C dimensions are typical finger-tight.

Sizes 20, 24, 32 require additional lubrication prior to assembly.

Dimensions for reference only, subject to change.

NPT Female Connector

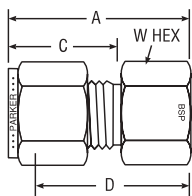
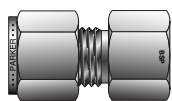
For metric tube



MILLIMETERS					
TUBE O.D.	NPT THREAD	A	C	D	W HEX
3	1/8	28,8	15,3	22,2	14,0
3	1/4	33,6	15,3	27,0	19,0
4	1/8	29,6	16,1	23,0	14,0
6	1/8	31,3	17,7	23,8	14,0
6	1/4	36,1	17,7	28,6	19,0
6	3/8	37,7	17,7	30,2	22,0
6	1/2	42,5	17,7	35,0	27,0
8	1/8	32,1	18,6	24,6	14,0
8	1/4	36,9	18,6	29,4	19,0
8	3/8	38,5	18,6	31,0	22,0
10	1/4	37,8	19,5	30,2	19,0
10	3/8	39,4	19,5	31,8	22,0
10	1/2	44,1	19,5	36,5	27,0
12	1/4	41,9	22,0	31,8	22,0
12	3/8	41,9	22,0	31,8	22,0
12	1/2	46,6	22,0	36,5	27,0
16	3/8	41,9	22,0	31,8	27,0
16	1/2	46,9	22,0	36,5	27,0
20	1/2	47,9	22,0	37,8	30,0
20	3/4	49,7	22,0	39,6	35,0
22	3/4	49,7	22,0	39,6	35,0
25	3/4	53,6	26,5	41,3	35,0
25	1	62,3	26,5	50,0	41,0

Dimensions for reference only, subject to change.

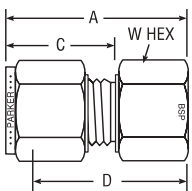
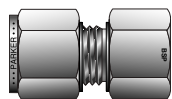
BSP Taper Female Connector *For fractional tube*



INCHES						
TUBE O.D.	BSPT THREAD	A	C	D	W HEX	BORE
1/4	1/8	1.24	.70	0.94	9/16	.19
1/4	1/4	1.42	.70	1.13	3/4	.19
1/4	3/8	1.49	.70	1.19	7/8	.19
1/4	1/2	1.68	.70	1.38	1-1/16	.19
3/8	1/4	1.48	.76	1.19	3/4	.28
3/8	3/8	1.54	.76	1.25	7/8	.28
3/8	1/2	1.73	.76	1.44	1-1/16	.28
1/2	1/4	1.59	.87	1.19	13/16	.406
1/2	3/8	1.65	.87	1.25	7/8	.406
1/2	1/2	1.84	.87	1.44	1-1/16	.406

Dimensions for reference only, subject to change.

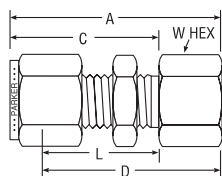
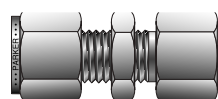
BSP Taper Female Connector *For metric tube*



MILLIMETERS						
TUBE O.D.	BSPT THREAD	A	C	D	W HEX	
3	1/8	29,2	15,3	22,6	14,0	
6	1/8	31,3	17,7	23,8	14,0	
6	1/4	35,8	17,7	28,3	19,0	
6	3/8	37,6	17,7	30,1	22,0	
6	1/2	42,5	17,7	35,0	27,0	
8	1/8	32,8	18,6	25,3	15,0	
8	1/4	37,0	18,6	29,5	19,0	
8	3/8	38,5	18,6	31,0	22,0	
8	1/2	43,3	18,6	35,8	27,0	
10	1/8	33,0	19,5	25,4	18,0	
10	1/4	37,8	19,5	30,2	19,0	
10	3/8	39,4	19,5	31,8	22,0	
10	1/2	44,2	19,5	36,6	27,0	
12	1/4	40,3	22,0	30,2	22,0	
12	3/8	41,9	22,0	31,8	22,0	
12	1/2	46,7	22,0	36,6	27,0	
16	1/2	48,4	22,0	38,3	18,0	
20	1/2	54,7	22,0	44,6	30,0	
20	3/4	49,7	22,0	39,6	35,0	
22	1	57,9	22,0	47,8	41,0	
25	3/4	54,3	26,5	42,1	35,0	
25	1	61,5	26,5	49,3	41,0	

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.



INCHES						
TUBE O.D.	NPT PIPE THREAD	A	C	D	L	W HEX
1/8	1/8	1.76	1.23	1.50	0.97	9/16
3/16	1/8	1.79	1.26	1.53	1.00	9/16
1/4	1/8	1.85	1.31	1.56	1.02	5/8
1/4	1/4	2.04	1.31	1.75	1.02	3/4
5/16	1/8	1.96	1.42	1.66	1.12	11/16
5/16	1/2	2.38	1.42	2.08	1.12	1-1/16
3/8	1/4	2.17	1.44	1.88	1.15	3/4
1/2	3/8	2.43	1.65	2.03	1.25	15/16
1/2	1/2	2.62	1.65	2.22	1.25	1-1/16
5/8	1/2	2.65	1.68	2.25	1.28	1-1/16
3/4	3/4	2.90	1.87	2.50	1.47	1-3/8
7/8	3/4	3.18	2.09	2.78	1.69	1-3/8
1	1	3.68	2.27	3.19	1.78	1-5/8

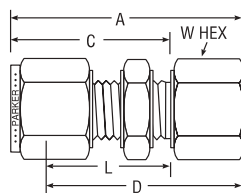
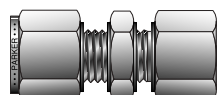
NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

For bulkhead hole drill size and maximum bulkhead thickness, see page 29, Part BC.

NPT Female Bulkhead Connector

For metric tube



MILLIMETERS								
TUBE O.D.	NPT THREAD	A	C	D	L	W HEX	B'HEAD HOLE DRILL SIZE	MAX. B'HEAD THICK.
6	1/8	47,2	33,7	39,7	26,2	16,0	11,5	10,2
6	1/4	52,0	33,7	44,5	26,2	19,0	11,5	10,2
8	1/8	49,6	36,1	42,1	28,5	18,0	13,1	11,2
10	1/4	55,2	37,0	47,6	29,4	19,0	16,3	11,2
12	3/8	60,9	41,9	50,8	31,8	24,0	19,5	12,7
12	1/2	66,4	41,9	56,3	31,8	27,0	19,5	12,7

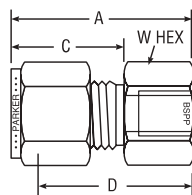
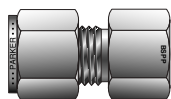
NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

For bulkhead hole drill size and maximum bulkhead thickness, see page 29, Part BC.

BSPP Gauge Connector

For fractional tube



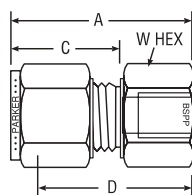
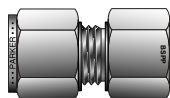
INCHES						
TUBE O.D.	BSPP THREAD	A	C	D	W HEX	BORE
1/4	1/4	1.48	.70	1.19	3/4	.19
1/4	3/8	1.48	.70	1.19	7/8	.19
1/4	1/2	1.70	.70	1.41	1-1/16	.19
5/16	1/4	1.51	.73	1.22	3/4	.21
5/16	1/2	1.59	.73	1.30	1-1/16	.28
3/8	1/4	1.55	.76	1.25	3/4	.21
3/8	3/8	1.55	.76	1.25	7/8	.26
3/8	1/2	1.63	.76	1.33	1-1/16	.28
1/2	1/4	1.65	.86	1.25	13/16	.21
1/2	3/8	1.75	.86	1.35	7/8	.26
1/2	1/2	1.90	.86	1.50	1-1/16	.28

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

See catalog 4260 Pipe/ISO Fittings for detailed information.
Sealing Washer on page 73 to be used with this fitting.

BSPP Gauge Connector For metric tube



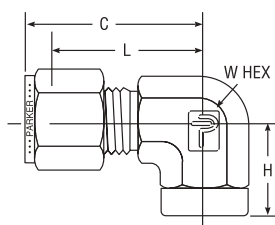
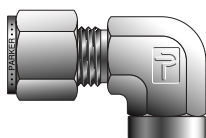
NOTE: A and C dimensions are typical finger-tight.

See Catalog 4260 Pipe/ISO Fittings for detailed information.
Sealing Washer on page 73 to be used with this fitting.

TUBE O.D.	BSPP THREAD	INCHES			
		A	C	D	W HEX
3	1/4	35,3	15,3	28,7	19,0
6	1/4	37,7	17,7	30,2	19,0
6	3/8	37,7	17,7	30,2	22,0
6	1/2	43,2	17,7	35,7	27,0
8	1/4	38,5	18,6	31,0	19,0
8	3/8	40,8	18,6	33,3	22,0
8	1/2	44,0	18,6	36,5	27,0
10	1/4	39,4	19,5	31,8	19,0
10	3/8	38,8	19,5	31,2	22,0
10	1/2	41,3	19,5	33,7	27,0
12	1/4	41,9	22,0	31,8	22,0
12	3/8	44,4	22,0	34,3	22,0
12	1/2	48,2	22,0	38,1	27,0

Dimensions for reference only, subject to change.

NPT Female Elbow For fractional tube

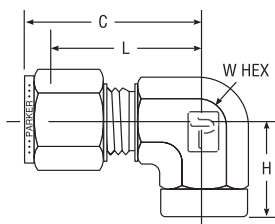


NOTE: C dimension is typical finger-tight.

TUBE O.D.	NPT PIPE THREAD	INCHES			
		C	H	L	W HEX
1/16	1/16	0.75	0.50	0.60	7/16
1/16	1/8	0.79	0.75	0.64	9/16
1/8	1/8	0.97	0.75	0.71	9/16
1/8	1/4	1.10	0.88	0.84	3/4
3/16	1/8	1.00	0.75	0.74	9/16
1/4	1/8	1.06	0.75	0.77	9/16
1/4	1/4	1.20	0.88	0.91	11/16
1/4	3/8	1.25	0.88	0.96	13/16
1/4	1/2	1.36	1.13	1.07	1
5/16	1/8	1.13	0.75	0.84	9/16
5/16	1/4	1.24	0.88	0.94	11/16
3/8	1/8	1.20	0.75	0.91	5/8
3/8	1/4	1.26	0.88	0.97	11/16
3/8	3/8	1.31	0.88	1.02	13/16
3/8	1/2	1.42	1.13	1.13	1
1/2	1/4	1.42	0.88	1.02	13/16
1/2	3/8	1.42	0.88	1.02	13/16
1/2	1/2	1.53	1.13	1.13	1
5/8	3/8	1.50	0.88	1.10	15/16
5/8	1/2	1.57	1.13	1.17	1-1/16
3/4	1/2	1.57	1.13	1.17	1-1/16
3/4	3/4	1.76	1.25	1.36	1-3/8
7/8	3/4	1.76	1.25	1.36	1-3/8
1	3/4	1.93	1.25	1.45	1-3/8
1	1	2.02	1.50	1.53	1-5/8

Dimensions for reference only, subject to change.

NPT Female Elbow For metric tube



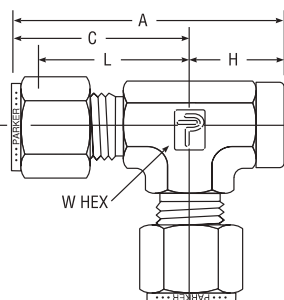
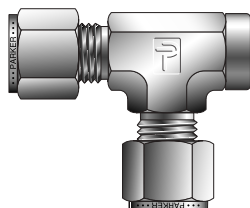
NOTE: C dimension is typical finger-tight.

TUBE O.D.	NPT THREAD	MILLIMETERS			INCHES
		C	H	L	W HEX
6	1/8	27,0	19,0	19,6	1/2
6	1/4	29,8	22,4	22,4	11/16
8	1/8	28,8	19,1	21,3	9/16
8	1/4	30,6	22,4	23,1	11/16
10	1/4	33,5	22,4	25,9	13/16
10	3/8	33,5	22,4	25,9	13/16
10	1/2	36,3	28,5	28,7	1
12	1/4	36,0	22,4	25,9	13/16
12	3/8	36,0	22,4	25,9	13/16
12	1/2	38,8	28,4	28,7	1
16	3/8	39,5	23,6	29,7	1-1/16
16	1/2	39,5	28,4	29,7	1-1/16

Dimensions for reference only, subject to change.

NPT Female Run Tee

For fractional tube



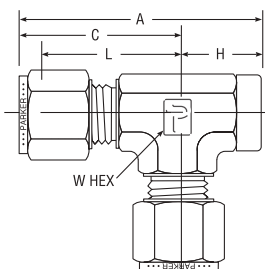
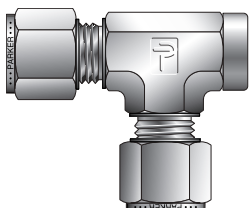
NOTE: A and C dimensions are typical finger-tight.

TUBE O.D.	NPT PIPE THREAD	INCHES				
		A	C	H	L	W HEX
1/8	1/8	1.72	0.96	0.75	0.70	1/2
3/16	1/8	1.76	1.01	0.75	0.74	1/2
1/4	1/8	1.81	1.06	0.75	0.77	1/2
1/4	1/4	2.05	1.17	0.88	0.88	11/16
5/16	1/8	1.92	1.17	0.75	0.88	5/8
3/8	1/4	2.11	1.23	0.88	0.94	11/16
1/2	1/4	2.56	1.42	0.88	1.02	13/16
1/2	3/8	2.30	1.42	0.88	1.02	7/8
1/2	1/2	2.66	1.53	1.13	1.13	1
5/8	1/2	2.70	1.57	1.13	1.17	1-1/16
3/4	3/4	3.01	1.76	1.25	1.36	1-3/8
7/8	1/2	3.01	1.76	1.25	1.36	1-3/8
7/8	3/4	3.01	1.76	1.25	1.36	1-3/8
1	3/4	3.18	1.93	1.25	1.45	1-3/8
1	1	3.52	2.02	1.50	1.65	1-5/8

Dimensions for reference only, subject to change.

NPT Female Run Tee

For metric tube

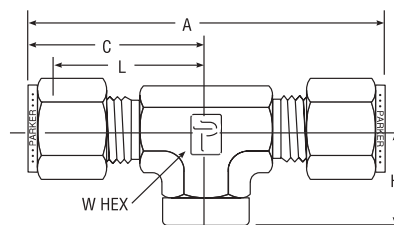


NOTE: A and C dimensions are typical finger-tight.

TUBE O.D.	NPT THREAD	MILLIMETERS				INCHES
		A	C	H	L	W HEX
6	1/8	46,0	27,0	19,0	19,6	1/2
6	1/4	52,1	29,8	22,4	22,4	11/16
8	1/8	48,9	29,9	19,0	22,4	5/8
10	1/4	55,9	33,5	22,4	25,9	13/16
12	1/4	58,4	36,0	22,4	25,9	13/16
12	3/8	58,4	36,0	22,4	25,9	13/16
12	1/2	67,3	38,8	28,5	28,7	1
16	1/2	68,2	39,8	28,4	29,7	1-1/16

Dimensions for reference only, subject to change.

NPT Female Branch Tee For fractional tube

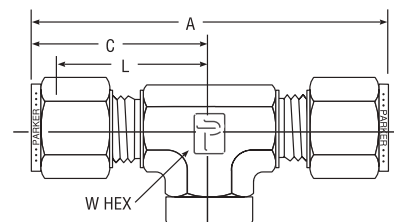
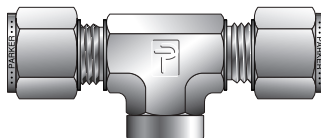


INCHES						
TUBE O.D.	NPT PIPE THREAD	A	C	H	L	W HEX
1/8	1/8	1.91	1.01	.075	0.70	1/2
3/16	1/8	2.02	1.01	0.75	0.74	1/2
1/4	1/8	2.12	1.06	0.75	0.77	1/2
1/4	1/4	2.34	1.17	0.88	0.88	11/16
5/16	1/8	2.34	1.17	0.75	0.88	5/8
3/8	1/4	2.46	1.23	0.88	0.94	11/16
1/2	1/4	2.84	1.42	0.88	1.02	13/16
1/2	3/8	2.84	1.42	0.88	1.02	7/8
1/2	1/2	3.06	1.53	1.13	1.13	1
5/8	1/2	3.06	1.53	1.13	1.13	1
3/4	3/4	3.52	1.76	1.25	1.36	1-3/8
7/8	3/4	3.52	1.76	1.25	1.36	1-3/8
1	3/4	3.86	1.94	1.25	1.45	1-3/8
1	1	4.28	2.14	1.50	1.65	1-5/8

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

NPT Female Branch Tee For metric tube



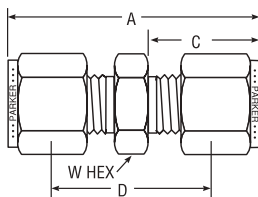
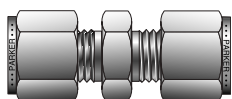
MILLIMETERS						INCHES
TUBE O.D.	NPT THREAD	A	C	H	L	W HEX
6	1/8	53,9	27,0	19,0	19,6	1/2
6	1/4	59,5	29,8	22,4	22,4	11/16
8	1/8	59,7	29,9	19,0	22,4	5/8
10	1/4	67,0	33,5	22,4	25,9	13/16
12	1/8	72,0	36,0	22,3	25,9	13/16
12	1/4	72,0	36,0	22,3	25,9	13/16
12	3/8	72,0	36,0	22,4	25,9	13/16
12	1/2	77,6	38,8	28,5	28,7	1
16	1/2	77,6	38,8	28,4	28,7	1

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Union

For fractional tube

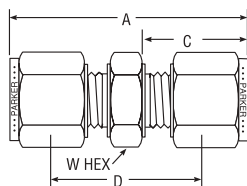
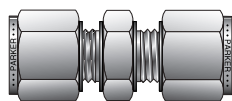


TUBE O.D.	INCHES			
	A	C	D	W HEX
1/16	0.99	0.43	0.69	5/16
1/8	1.39	0.60	0.88	7/16
3/16	1.48	0.64	0.95	7/16
1/4	1.62	0.70	1.03	1/2
5/16	1.70	0.73	1.11	9/16
3/8	1.77	0.76	1.19	5/8
1/2	2.02	0.87	1.22	13/16
5/8	2.05	0.87	1.25	15/16
3/4	2.11	0.87	1.31	1-1/16
7/8	2.18	0.87	1.38	1-3/16
1	2.57	1.05	1.59	1-3/8
1-1/4	3.61	1.52	1.89	1-3/4
1-1/2	4.23	1.77	2.11	2-1/8
2	5.88	2.47	2.94	2-3/4

Dimensions for reference only, subject to change.

Union

For metric tube



TUBE O.D.	MILLIMETERS			
	A	C	D	W HEX
2	35,6	15,3	22,4	12,0
3	35,3	15,3	22,1	12,0
4	37,4	16,1	24,2	12,0
6	41,2	17,7	26,2	14,0
8	43,2	18,6	28,2	15,0
10	46,2	19,5	31,0	18,0
12	51,2	22,0	31,0	22,0
14	52,0	22,0	31,8	24,0
15	52,0	22,0	31,8	24,0
16	52,0	22,0	31,8	24,0
18	53,5	22,0	33,3	27,0
20	55,0	22,0	34,8	30,0
22	55,0	22,0	34,8	30,0
25	65,1	26,5	40,5	35,0

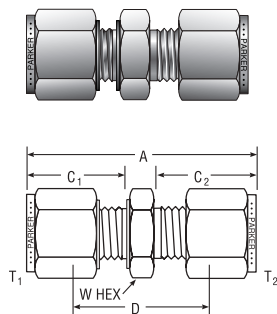
NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Conversion Union

For metric tube

Metric Tube to Inch Tube



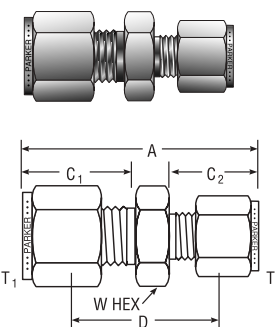
TUBE O.D.		MILLIMETERS				
T ₁ MM	T ₂ INCH	A	C ₁	C ₂	D	W HEX
3	1/8	36,3	15,3	15,3	22,6	12,0
4	1/8	36,5	16,1	15,3	23,6	12,0
4	1/4	39,3	16,1	17,7	26,4	14,0
6	1/8	38,5	17,7	15,3	24,6	14,0
6	1/4	41,1	17,7	17,7	25,9	14,0
6	5/16	42,3	17,7	18,8	27,2	14,0
8	1/4	42,3	18,6	17,7	27,2	15,0
8	3/8	44,0	18,6	19,3	29,1	15,0
10	1/8	41,8	19,5	15,3	27,9	18,0
10	1/4	44,5	19,5	17,7	29,2	18,0
10	3/8	46,0	19,5	19,3	30,7	18,0
12	3/8	48,4	22,0	19,3	30,7	22,0
12	1/2	51,1	22,0	21,8	31,0	22,0
15	1/2	52,0	22,0	21,8	32,0	24,0
16	3/8	52,0	22,0	19,3	34,3	24,0
18	3/4	53,5	22,0	21,8	33,5	27,0

NOTE: A, C₁ and C₂ dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Reducing Union

For fractional tube



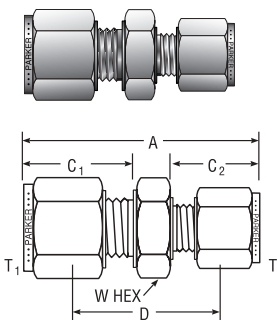
		INCHES				
T ₁ TUBE O.D.	T ₂ TUBE O.D.	A	C ₁	C ₂	D	W HEX
1/8	1/16	1.21	0.60	.43	0.81	7/16
3/16	1/16	1.27	0.64	.43	0.86	7/16
3/16	1/8	1.44	0.64	.60	0.92	7/16
1/4	1/16	1.38	0.70	.43	0.91	1/2
1/4	1/8	1.52	0.70	.60	0.97	1/2
1/4	3/16	1.55	0.70	.64	1.00	1/2
5/16	1/8	1.58	0.73	.60	1.03	9/16
5/16	1/4	1.67	0.73	.70	1.08	9/16
3/8	1/16	1.44	0.76	.43	1.00	5/8
3/8	1/8	1.61	0.76	.60	1.06	5/8
3/8	1/4	1.71	0.76	.70	1.13	5/8
3/8	5/16	1.75	0.76	.73	1.16	5/8
1/2	1/8	1.75	0.87	.60	1.09	13/16
1/2	1/4	1.85	0.87	.70	1.16	13/16
1/2	3/8	1.91	0.87	.76	1.22	13/16
5/8	3/8	1.94	0.87	.76	1.25	15/16
5/8	1/2	2.05	0.87	.87	1.25	15/16
3/4	1/4	1.95	0.87	.76	1.25	1-1/16
3/4	3/8	2.00	0.87	.76	1.31	1-1/16
3/4	1/2	2.11	0.87	.87	1.31	1-1/16
3/4	5/8	2.11	0.87	.87	1.31	1-1/16
1	1/2	2.39	1.05	.87	1.50	1-3/8
1	3/4	2.39	1.05	.87	1.50	1-3/8

NOTE: A, C₁ and C₂ dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Reducing Union

For metric tube



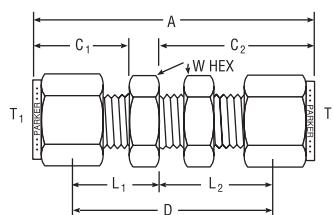
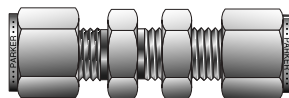
		MILLIMETERS				
T ₁ TUBE O.D.	T ₂ TUBE O.D.	A	C ₁	C ₂	D	W HEX
3	2	35,8	15,3	15,3	22,6	12,0
6	2	38,7	17,7	15,3	24,6	14,0
6	3	38,7	17,7	15,3	24,6	14,0
6	4	39,5	17,7	16,1	25,4	14,0
8	6	42,4	18,6	17,7	27,4	15,0
10	6	44,5	19,5	17,7	29,4	18,0
10	8	44,5	19,5	18,6	29,4	18,0
12	6	47,0	22,0	17,7	29,4	22,0
12	8	47,8	22,0	18,6	30,2	22,0
12	10	48,7	22,0	19,5	31,0	22,0
16	10	49,5	22,0	19,5	31,8	24,0
16	12	52,0	22,0	22,0	31,8	24,0
18	12	53,5	22,0	22,0	33,3	27,0
25	18	60,5	26,5	22,0	38,1	35,0
25	20	62,3	26,5	22,0	39,9	35,0

NOTE: A, C₁ and C₂ dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Bulkhead Union

For fractional tube

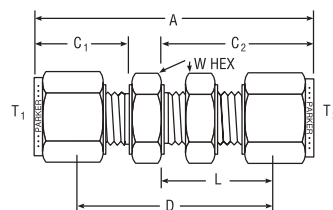
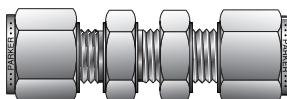


INCHES									
TUBE O.D.	A	C ₁	C ₂	D	L ₁	L ₂	W HEX	BULKHEAD HOLE DRILL SIZE	MAXIMUM BULKHEAD THICKNESS
1/16	1.23	.43	0.68	0.94	.28	0.53	5/16	13/64	1/8
1/8	2.02	.60	1.23	1.50	.34	0.97	1/2	21/64	1/2
1/8 - 1/4	2.17	.60	1.62	1.31	.34	1.02	5/8	29/64	17/32
3/16	2.11	.64	1.26	1.59	.38	1.00	9/16	25/64	1/2
1/4 - 1/8	2.18	.70	1.23	1.62	.41	0.97	1/2	21/64	1/2
1/4	2.27	.70	1.31	1.69	.41	1.02	5/8	29/64	17/32
5/16	2.40	.73	1.42	1.81	.44	1.12	11/16	33/64	9/16
3/8	2.46	.76	1.44	1.88	.47	1.16	3/4	37/64	9/16
1/2	2.80	.87	1.65	2.00	.47	1.25	15/16	49/64	19/32
5/8	2.86	.87	1.68	2.06	.47	1.28	1-1/16	57/64	19/32
3/4	3.11	.87	1.87	2.31	.47	1.47	1-3/16	1-1/64	25/32
7/8	3.33	.87	2.09	2.53	.47	1.69	1-3/8	1-9/64	15/16
1	3.78	1.05	2.27	2.81	.56	1.78	1-5/8	1-21/64	15/16

Dimensions for reference only, subject to change.

Bulkhead Union

For metric tube



MILLIMETERS								
TUBE O.D.	A	C ₁	C ₂	D	L	W HEX	B'HEAD HOLE DRILL SIZE	MAX. B'HEAD THICK.
3	51,3	15,3	31,2	38,2	24,6	14,0	8,3	12,7
4	53,7	16,1	32,0	40,5	25,4	14,0	9,9	12,7
6	57,9	17,7	33,7	42,9	26,2	16,0	11,5	10,2
8	61,0	18,6	36,0	46,0	28,5	18,0	13,1	11,2
10	63,6	19,5	37,0	48,4	29,4	22,0	16,3	11,2
12	71,0	22,0	41,9	50,8	31,8	24,0	19,5	12,7
15	72,5	22,0	42,6	52,3	32,5	27,0	22,5	12,7
16	72,6	22,0	42,6	52,4	32,5	27,0	22,5	12,7
18	78,9	22,0	47,4	58,7	37,3	30,0	26,0	16,8
20	88,2	22,0	51,0	68,0	40,9	35,0	29,0	19,0
25	95,8	26,5	54,4	71,4	42,2	41,0	33,8	24,0

NOTE: A, C₁ and C₂ dimensions are typical finger-tight.

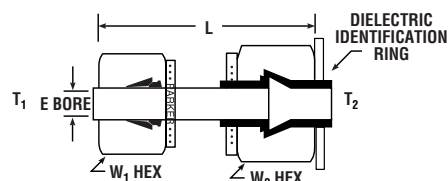
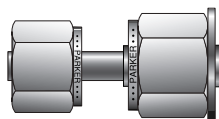
For replacement bulkhead nuts, see page 74, Part BN.
For reducer sizes call out short end first.

Dimensions for reference only, subject to change.

Dielectric Union Adapter

For fractional tube

includes nuts, machined tube with molded PEEK¹⁾ insulator, preset ferrule, and dielectric identification ring



CPI™ ADAPTER PART NO.	A-LOK® ADAPTER PART NO.	INCHES						PRESSURE RATING @ 70°F LIQUID / GAS (PSI)
		T ₁ TUBE END	T ₂ TUBE END	L	E BORE	W1 HEX	W2 HEX	
6-8 DEBTA-SS	6-8 DELTA	3/8	1/2	2.08	.30	11/16	7/8	4000 / 3000
8-10 DEBTA-SS	N/A	1/2	5/8	2.58	.38	7/8	1	3000 / 2000

*Other end connectors available upon request.

Dimensions for reference only, subject to change.

1) Polyetherether Ketone

NOTE: Makeup instructions included with parts in box when ordered as an Adapter only.

Dielectric Resistivity 10x10⁹ OHMS @ 500 volts DC (Tested on Mil-STD-202F)

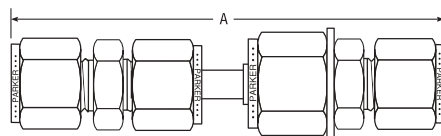
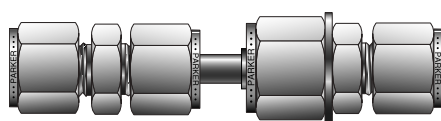
Dielectric withstanding voltage less than 100 microamps leakage @ 1500 volts AC

AMBIENT TEMPERATURE, °F	-40	-20	0	20	40	60	80	100	120	140	160	180	200
TEMPERATURE DERATING FACTOR	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.86	0.79	0.72	0.64	0.56

Dielectric Assembly

For fractional tube

includes dielectric union adapter with assembled tube fitting unions



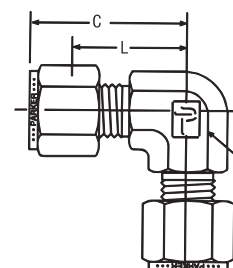
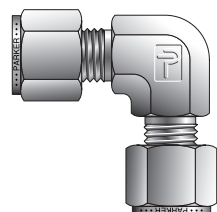
CPI™ ASSEMBLY PART NO.	A-LOK® ASSEMBLY PART NO.	INCHES	END ADAPTORS
*COMPRESSION	*COMPRESSION	A†	
4H DEBTA	4H DELTA	4.08	6RU4/8RU4
6H DEBTA	6H DELTA	4.20	6SC6/8RU6
8H DEBTA	8H DELTA	4.79	8SC8/10RU8
FEMALE PIPE	FEMALE PIPE	A	END ADAPTORS
4G DEBTA	4G DELTA	3.59	6FSC4N/8FSC4N
6G DEBTA	6G DELTA	3.71	6FSC6N/8FSC6N
8G DEBTA	8G DELTA	4.40	8FSC8N/10FSC8N
MALE PIPE	MALE PIPE	A	END ADAPTORS
4F DEBTA	4F DELTA	3.80	6MSC4N/8MSC4N
6F DEBTA	6F DELTA	3.80	6MSC6N/8MSC6N
8F DEBTA	8F DELTA	4.58	8MSC8N/10MSC8N

†Finger tight assembly dimensions.

Dimensions for reference only, subject to change.

Union Elbow

For fractional tube



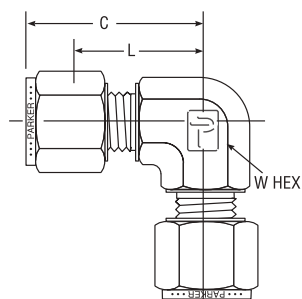
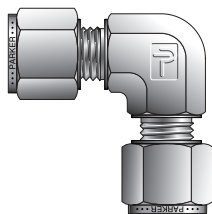
NOTE: C dimension is typical finger-tight.

Sizes 20, 24, 32 require additional lubrication prior to assembly.

TUBE O.D.	INCHES		
	C	L	W HEX
1/16	.70	.55	3/8
1/8	.88	.62	3/8
3/16	1.00	.74	1/2
1/4	1.06	.77	1/2
5/16	1.13	.84	9/16
3/8	1.20	.91	5/8
1/2	1.42	1.02	13/16
5/8	1.50	1.10	15/16
3/4	1.57	1.17	1-1/16
7/8	1.76	1.36	1-3/8
1	1.93	1.45	1-3/8
1-1/4	2.61	1.75	1-5/8
1-1/2	3.06	2.00	1-7/8
2	4.22	2.75	2-13/16

Dimensions for reference only, subject to change.

Union Elbow For metric tube

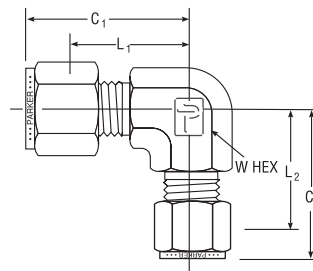
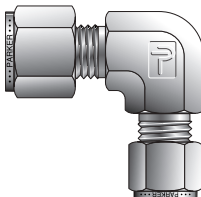


NOTE: C dimension is typical finger-tight.

TUBE O.D.	MILLIMETERS		INCHES
	C	L	W HEX
3	22,3	15,7	3/8
4	25,4	18,8	1/2
6	27,0	19,6	1/2
8	28,8	21,3	9/16
10	31,5	23,9	11/16
12	36,0	25,9	13/16
14	38,1	28,0	15/16
15	38,0	27,9	15/16
16	38,0	27,9	15/16
18	39,8	29,7	1-1/16
20	44,6	34,5	1-3/8
22	44,6	34,5	1-3/8
25	49,1	36,8	1-3/8

Dimensions for reference only, subject to change.

Drop Size Elbows For fractional tube



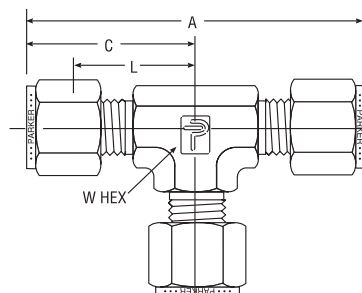
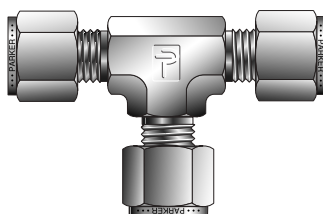
TUBE O.D.	INCHES				
	L ₁	C ₁	L ₂	C ₂	W HEX
3/16-1/8	0.74	1.01	0.70	0.96	1/2
1/4-1/8	0.77	1.06	0.70	0.96	1/2
5/16-1/8	0.88	1.17	0.78	1.04	5/8
5/16-1/4	0.88	1.17	0.85	1.14	5/8
3/8-1/8	0.91	1.20	0.78	1.04	5/8
3/8-1/4	0.91	1.20	0.85	1.17	5/8
3/8-5/16	0.91	1.20	0.88	1.17	5/8
1/2-1/4	1.02	1.42	0.96	1.25	13/16
1/2-5/16	1.02	1.42	0.99	1.28	13/16
1/2-3/8	1.02	1.42	1.02	1.31	13/16
5/8-3/8	1.10	1.50	1.10	1.39	15/16
5/8-1/2	1.10	1.50	1.10	1.50	15/16
3/4-1/4	1.16	1.56	1.10	1.39	1-1/16
3/4-3/8	1.16	1.56	1.16	1.45	1-1/16
3/4-1/2	1.16	1.56	1.16	1.56	1-1/16
7/8-1/4	1.36	1.76	1.30	1.59	1-3/8
1-1/2	1.45	1.94	1.36	1.76	1-3/8
1-3/4	1.45	1.94	1.36	1.76	1-3/8

NOTE: C dimension is typical finger-tight.

Dimensions for reference only, subject to change.

Union Tee

For fractional tube



INCHES				
TUBE O.D.	A	C	L	W HEX
1/16	1.42	0.71	0.56	3/8
1/8	1.76	0.88	0.62	3/8
3/16	1.96	0.96	0.70	7/16
1/4	2.12	1.06	0.77	1/2
5/16	2.34	1.17	0.88	5/8
3/8	2.40	1.20	0.91	5/8
1/2	2.84	1.42	1.02	13/16
5/8	3.06	1.53	1.13	1
3/4	3.14	1.57	1.16	1-1/16
7/8	3.52	1.76	1.36	1-3/8
1	3.86	1.93	1.45	1-3/8
1-1/4	5.22	2.61	1.75	1-5/8
1-1/2	6.12	3.06	2.00	1-7/8
2	8.44	4.22	2.75	2-13/16

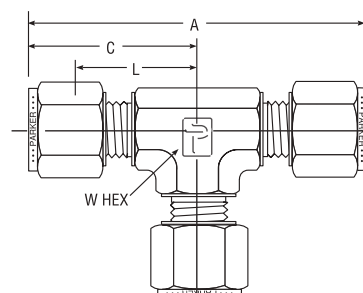
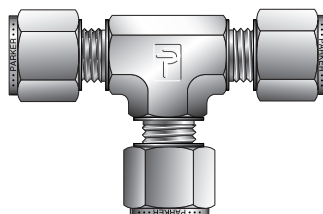
NOTE: A and C dimensions are typical finger-tight.

Sizes 20, 24, 32 require additional lubrication prior to assembly.

Dimensions for reference only, subject to change.

Union Tee

For metric tube



MILLIMETERS				INCHES
TUBE O.D.	A	C	L	W HEX
2	44,7	22,3	15,7	3/8
3	44,7	22,3	15,7	3/8
4	50,8	25,4	18,8	1/2
6	53,9	27,0	19,6	1/2
8	59,7	29,9	22,4	5/8
10	63,0	31,5	23,9	11/16
12	72,0	36,0	25,9	13/16
14	77,6	38,8	28,7	1
15	77,6	38,8	28,7	1
16	77,6	38,8	28,7	1
18	79,5	38,8	29,7	1-1/16
20	89,3	44,6	34,5	1-3/8
22	89,3	44,6	34,5	1-3/8
25	98,3	49,1	36,8	1-3/8

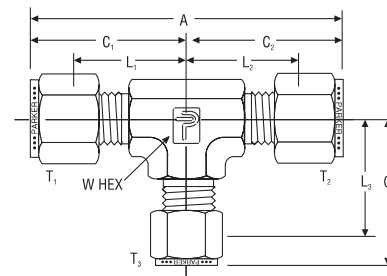
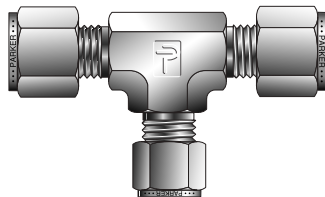
NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Drop Size Tees

For fractional tube

Eliminates the extra connection when adapting with a tube stub reducer

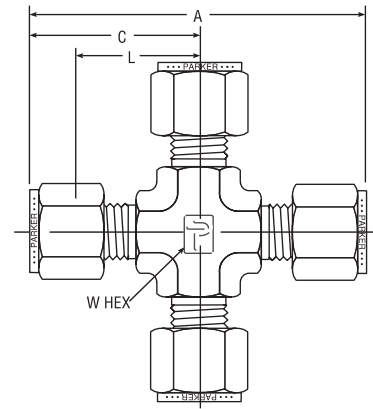
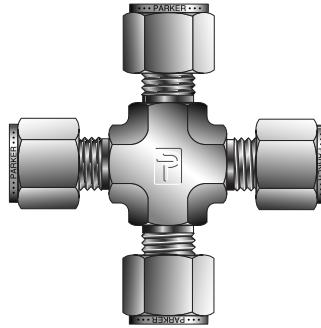


INCHES										
T ₁ TUBE O.D.	T ₂ TUBE O.D.	T ₃ TUBE O.D.	A	L ₁	C ₁	L ₂	C ₂	L ₃	C ₃	W HEX
1/4	1/4	1/8	2.10	0.76	1.05	0.76	1.05	0.70	0.96	1/2
3/8	3/8	1/4	2.40	0.91	1.20	0.91	1.20	0.85	1.14	5/8
3/8	1/4	3/8	2.34	0.91	1.20	0.85	1.14	0.91	1.20	5/8
3/8	1/4	1/4	2.34	0.91	1.20	0.85	1.14	0.85	1.14	5/8
1/2	1/2	3/8	2.84	1.02	1.42	1.02	1.42	1.02	1.31	13/16
1/2	1/2	1/4	2.84	1.02	1.42	1.02	1.42	0.96	1.25	13/16
1/2	3/8	1/2	2.73	1.02	1.42	1.02	1.31	1.02	1.42	13/16
1/2	1/4	1/2	2.67	1.02	1.42	0.96	1.25	1.02	1.42	13/16
1/2	3/8	3/8	2.73	1.02	1.42	1.02	1.31	1.02	1.31	13/16
1/2	1/4	1/4	2.67	1.02	1.42	.96	1.25	.96	1.25	13/16
5/8	5/8	1/2	3.06	1.13	1.53	1.13	1.53	1.13	1.53	7/8
5/8	5/8	3/8	3.06	1.13	1.53	1.13	1.53	1.13	1.53	7/8
5/8	1/2	1/2	3.06	1.13	1.53	1.13	1.53	1.13	1.53	7/8
5/8	1/2	3/8	3.06	1.13	1.53	1.13	1.53	1.13	1.42	7/8
5/8	3/8	3/8	2.95	1.13	1.53	1.13	1.42	1.13	1.42	7/8
5/8	3/8	1/2	2.95	1.13	1.53	1.13	1.42	1.13	1.53	7/8
3/4	3/4	5/8	3.12	1.16	1.56	1.16	1.56	1.16	1.56	1-1/16
3/4	3/4	1/2	3.12	1.16	1.56	1.16	1.56	1.16	1.56	1-1/16
3/4	3/4	3/8	3.12	1.16	1.56	1.16	1.56	1.16	1.45	1-1/16
3/4	3/4	1/4	3.12	1.16	1.56	1.16	1.56	1.10	1.39	1-1/16
3/4	5/8	5/8	3.12	1.16	1.56	1.16	1.56	1.16	1.56	1-1/16
3/4	1/2	1/2	3.12	1.16	1.56	1.16	1.56	1.16	1.56	1-1/16
3/4	3/8	3/8	3.01	1.16	1.56	1.16	1.45	1.16	1.45	1-1/16
3/4	5/8	1/2	3.12	1.16	1.56	1.16	1.56	1.16	1.56	1-1/16
3/4	5/8	3/8	3.12	1.16	1.56	1.16	1.56	1.16	1.45	1-1/16
3/4	1/2	3/8	3.12	1.16	1.56	1.16	1.56	1.16	1.45	1-1/16
7/8	7/8	3/8	3.52	1.36	1.76	1.36	1.76	1.36	1.65	1-3/8
7/8	7/8	1/4	3.52	1.36	1.76	1.36	1.76	1.30	1.59	1-3/8
7/8	3/4	3/4	3.52	1.36	1.76	1.36	1.76	1.36	1.76	1-3/8
7/8	3/4	1/2	3.52	1.36	1.76	1.36	1.76	1.36	1.76	1-3/8
7/8	3/4	3/8	3.52	1.36	1.76	1.36	1.76	1.36	1.65	1-3/8
7/8	5/8	3/8	3.52	1.36	1.76	1.36	1.76	1.36	1.65	1-3/8
7/8	1/2	3/4	3.52	1.36	1.76	1.36	1.76	1.36	1.76	1-3/8
1	1	3/4	3.88	1.45	1.94	1.45	1.94	1.36	1.76	1-3/8
1	1	5/8	3.88	1.45	1.94	1.45	1.94	1.36	1.76	1-3/8
1	1	1/2	3.88	1.45	1.94	1.45	1.94	1.36	1.76	1-3/8
1	1	3/8	3.88	1.45	1.94	1.45	1.94	1.36	1.65	1-3/8
1	1	1/4	3.88	1.45	1.94	1.45	1.94	1.30	1.59	1-3/8
1	3/4	1	3.70	1.45	1.94	1.36	1.76	1.45	1.94	1-3/8
1	7/8	7/8	3.70	1.45	1.94	1.36	1.76	1.36	1.76	1-3/8
1	7/8	3/4	3.70	1.45	1.94	1.36	1.76	1.36	1.76	1-3/8
1	7/8	1/2	3.70	1.45	1.94	1.36	1.76	1.36	1.76	1-3/8
1	7/8	3/8	3.70	1.45	1.94	1.36	1.76	1.36	1.65	1-3/8
1	7/8	1/4	3.70	1.45	1.94	1.36	1.76	1.30	1.59	1-3/8
1	1	7/8	3.88	1.45	1.94	1.45	1.94	1.36	1.76	1-3/8
1	3/4	5/8	3.70	1.45	1.94	1.36	1.76	1.36	1.76	1-3/8
1	3/4	1/2	3.70	1.45	1.94	1.36	1.76	1.36	1.76	1-3/8
1	5/8	3/8	3.70	1.45	1.94	1.36	1.76	1.36	1.65	1-3/8
1	1/2	1	3.70	1.45	1.94	1.36	1.76	1.45	1.94	1-3/8
1	1/2	1/2	3.70	1.45	1.94	1.36	1.76	1.36	1.76	1-3/8
1	1/2	3/8	3.70	1.45	1.94	1.36	1.76	1.36	1.65	1-3/8
1	1/2	1/4	3.70	1.45	1.94	1.36	1.76	1.30	1.59	1-3/8
1	3/8	3/8	3.59	1.45	1.94	1.36	1.65	1.36	1.65	1-3/8

NOTE: C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Union Cross For fractional tube

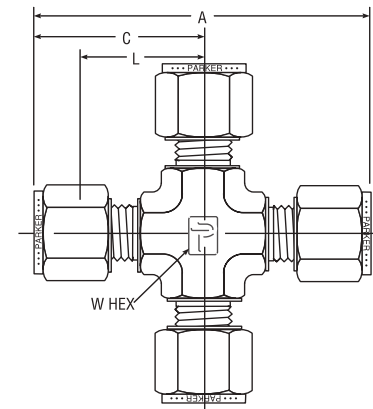
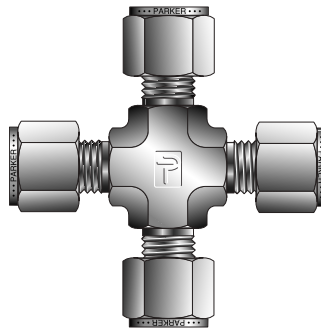


TUBE O.D.	INCHES			
	A	C	L	W HEX
1/8	1.76	0.98	0.62	7/16
3/16	1.83	0.96	0.70	7/16
1/4	2.12	1.06	0.76	1/2
5/16	2.34	1.17	0.88	5/8
3/8	2.40	1.20	0.91	5/8
1/2	2.84	1.42	1.02	13/16
5/8	3.06	1.53	1.13	1-1/16
3/4	3.12	1.57	1.16	1-1/16
7/8	3.52	1.76	1.36	1-5/16
1	3.86	1.93	1.45	1-5/16

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Union Cross For metric tube



TUBE O.D.	MILLIMETERS			INCHES
	A	C	L	W HEX
3	44,7	22,3	15,7	7/16
4	50,8	25,4	18,8	1/2
6	53,9	27,0	19,6	1/2
8	59,7	29,9	22,4	5/8
10	67,0	33,5	25,9	13/16
12	72,0	36,0	25,9	13/16
16	74,0	37,0	26,9	15/16
18	76,6	38,3	28,2	1-1/16

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Color Coding

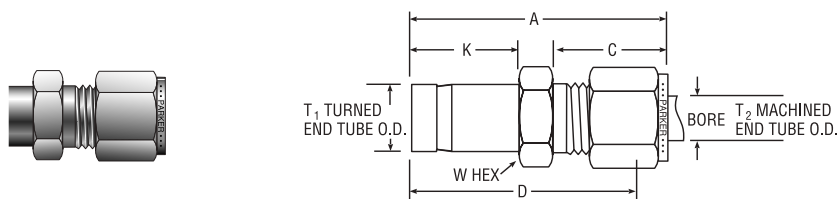
For easy reference, table column headings are color indicated as follows:

fractional



metric





INCHES							
T ₁ TURNED END TUBE O.D.	T ₂ MACHINED END TUBE O.D.	A	C	D	K	W HEX	BORE
1/8	1/16	1.10	0.43	0.95	0.53	5/16	0.05
3/16	1/16	1.13	0.43	0.98	0.58	5/16	0.05
1/4	1/16	1.24	0.43	1.09	0.63	7/16	0.05
1/16	1/8	1.18	0.60	0.92	0.38	7/16	0.09
1/8	1/8	1.34	0.43	1.09	0.54	7/16	0.07
3/16	1/8	1.35	0.60	1.09	0.58	7/16	0.09
1/4	1/8	1.42	0.60	1.16	0.63	7/16	0.09
3/8	1/8	1.48	0.60	1.22	0.69	7/16	0.09
1/2	1/8	1.74	0.60	1.48	0.91	9/16	0.09
1/8	3/16	1.37	0.63	1.11	0.53	7/16	0.08
1/4	3/16	1.46	0.63	1.20	0.63	7/16	0.13
1/8	1/4	1.45	0.70	1.16	0.53	1/2	0.08
3/16	1/4	1.48	0.60	1.19	0.56	1/2	0.12
1/4	1/4	1.54	0.70	1.25	0.63	1/2	0.16
5/16	1/4	1.57	0.70	1.28	0.66	1/2	0.16
3/8	1/4	1.60	0.70	1.31	0.69	1/2	0.19
1/2	1/4	1.82	0.70	1.53	0.91	9/16	0.19
5/8	1/4	1.89	0.70	1.60	0.97	11/16	0.19
3/4	1/4	1.88	0.70	1.59	0.97	13/16	0.19
3/8	5/16	1.65	0.73	1.36	0.69	9/16	0.25
1/2	5/16	1.87	0.73	1.58	0.91	9/16	0.25
1/4	3/8	1.63	0.76	1.34	0.63	5/8	0.19
3/8	3/8	1.70	0.76	1.41	0.69	5/8	0.28
1/2	3/8	1.91	0.76	1.62	0.91	5/8	0.28
5/8	3/8	1.98	0.76	1.69	0.97	11/16	0.28
3/4	3/8	1.98	0.76	1.69	0.97	13/16	0.28
1/4	1/2	1.77	0.87	1.37	0.63	13/16	0.19
3/8	1/2	1.84	0.87	1.44	0.69	13/16	0.19
5/8	1/2	2.12	0.87	1.72	0.97	13/16	0.41
3/4	1/2	2.12	0.87	1.72	0.97	13/16	0.41
1	1/2	2.37	0.87	1.97	1.22	1-1/16	0.41
3/4	5/8	2.15	0.87	1.75	0.97	15/16	0.50
7/8	5/8	2.21	0.87	1.81	1.03	15/16	0.50
1	5/8	2.40	0.87	2.00	1.22	1-1/16	0.50
1/2	3/4	2.15	0.87	1.75	0.91	1-1/16	0.39
1	3/4	2.46	0.87	2.06	1.22	1-1/16	0.63
1-1/2	1	3.519	1.05	3.03	2.05	1-5/8	0.88
1-1/2	1-1/4	4.10	1.52	3.23	2.05	1-7/8	1.09
2	1-1/2	5.17	1.52	4.10	2.74	2-1/4	1.34

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Size 1, 2, and 3 do not require a groove.

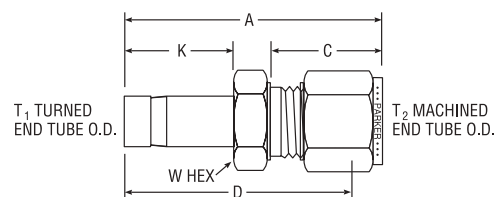
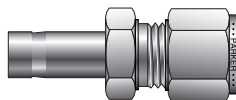
Size 4 and above tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.

Sizes 20, 24 require additional lubrication prior to assembly.

Add -Z6 for assembly of nuts and ferrules on the tube stub end.

†All tube stubs over 1" come standard with nuts and ferrule(s) pre-assembled (-Z6 option).

Tube End Converter For fractional tube to metric tube



TUBE O.D.		MILLIMETERS					
T ₁ INCH	T ₂ MM	A	C	D	K	W A/F HEX	BORE
1/8	3	34,3	15,3	27,7	13,5	12,0	1,4
1/4	3	36,1	15,3	29,5	16,0	12,0	4,8
1/4	6	39,3	17,7	31,8	16,0	14,0	4,8
5/16	6	40,0	17,7	32,5	16,8	14,0	6,4
3/8	6	40,8	17,7	33,3	17,5	14,0	7,1
1/2	6	46,4	17,7	38,9	23,1	14,0	9,9
3/8	8	42,0	18,6	34,5	17,5	15,0	7,1
1/2	8	47,5	18,6	40,1	23,1	15,0	9,9
3/8	10	44,4	19,5	36,8	17,5	18,0	7,1
1/2	10	47,6	19,5	41,4	23,1	18,0	9,9
1/2	12	52,3	22,0	42,2	23,1	22,0	9,9
3/4	12	53,8	22,0	43,7	24,6	22,0	15,1
3/4	18	57,5	22,0	47,5	24,6	27,0	15,1

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

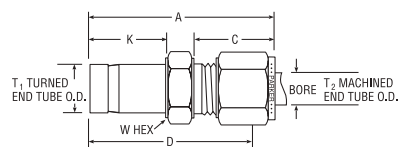
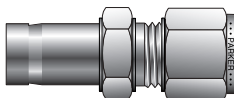
Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.

Size 1, 2, and 3 do not require a groove.

Add -Z6 for assembly of nuts and ferrules on the tube stub end.

Tube End Reducer

For metric tube



TUBE O.D.		MILLIMETERS							
T ₁	T ₂	A	C	D	K	O	W HEX	BORE	
3	2	34,3	15,3	27,7	13,5	0,6	14,0	1,4	
3	6	37,0	17,7	29,5	13,5	0,6	14,0	1,4	
4	3	35,0	15,3	28,4	14,3	1,0	12,0	2,0	
6	3	36,1	15,3	29,5	15,9	1,0	12,0	2,4	
6	4	37,1	16,1	30,5	15,9	1,0	12,0	3,0	
6	8	40,0	18,6	32,5	15,9	1,0	15,0	4,0	
6	10	41,7	19,5	34,1	15,9	1,0	18,0	4,0	
6	12	44,9	22,0	34,8	15,9	1,0	22,0	4,0	
8	6	40,0	17,7	32,5	16,7	0,8	14,0	4,8	
8	10	43,4	19,5	35,8	15,3	1,5	19,5	18,0	
10	3	38,6	15,3	32,0	17,7	2,0	15,3	12,0	
10	6	40,8	17,7	33,3	17,5	1,3	14,0	4,8	
10	8	42,0	18,6	34,5	17,5	1,3	15,0	6,4	
10	12	46,6	22,0	36,5	17,5	1,3	22,0	7,5	
12	6	46,4	17,7	38,9	23,0	1,4	14,0	4,8	
12	8	47,6	18,6	40,1	23,0	1,4	15,0	6,4	
12	10	49,7	19,5	42,1	23,0	1,4	18,0	7,9	
12	16	53,0	22,0	42,9	23,0	1,4	24,0	9,1	
12	18	54,6	22,0	44,5	23,0	1,4	27,0	9,1	
15	10	51,3	19,5	43,7	23,8	1,6	27,0	7,9	
16	12	53,8	22,0	43,7	24,6	1,7	22,0	9,5	
16	18	56,1	22,0	46,0	24,6	1,7	27,0	12,7	
16	20	57,9	22,0	47,8	24,6	1,7	27,0	12,7	
16	25	63,2	26,5	51,0	24,8	2,0	26,5	35,0	
18	12	53,8	22,0	43,7	24,6	2,0	22,0	9,5	
18	16	54,7	22,0	44,6	24,8	2,5	22,0	24,0	
18	20	57,9	22,0	47,8	24,6	2,0	30,0	13,9	
18	25	63,1	26,5	50,8	24,6	2,0	35,0	14,0	
20	12	56,1	22,0	46,0	25,4	2,5	22,0	9,5	
20	16	55,3	22,0	45,2	25,6	2,5	22,0	24,0	
20	18	57,6	22,0	47,5	25,4	2,5	27,0	15,1	
20	25	64,5	26,5	52,3	25,4	2,5	35,0	15,1	
22	18	56,1	22,0	46,0	26,2	2,5	27,0	15,1	
22	20	57,7	22,0	47,6	26,2	2,5	30,0	15,8	
25	12	60,9	22,0	50,8	31,8	2,6	27,0	9,5	
25	16	64,0	22,0	51,8	32,0	3,0	22,0	27,0	
25	18	62,5	22,0	52,4	31,8	2,6	27,0	15,1	
25	20	64,2	22,0	54,1	31,8	2,6	30,0	15,8	

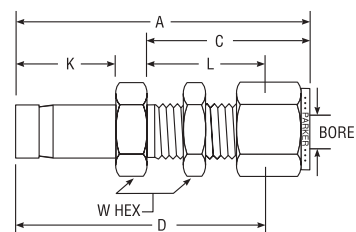
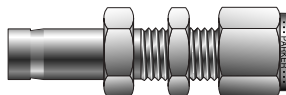
NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Tube stub is pre-grooved as standard.

Add -Z6 for assembly of nuts and ferrules on the tube stub end.

Tube End Bulkhead Adapter For fractional tube



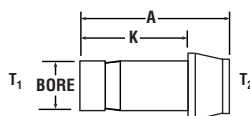
INTER-CHANGES WITH	INCHES							
	TUBE O.D.	A	C	L	K	D	BORE	W HEX
200-R1-2	1/8	1.95	1.23	0.97	.53	1.69	.093	1/2
400-R1-4	1/4	2.20	1.31	1.02	.63	1.91	.187	5/8
600-R1-6	3/8	2.42	1.44	1.16	.69	2.13	.281	3/4
810-R1-8	1/2	2.87	1.65	1.25	.91	2.47	.406	15/16

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.
Add -Z6 for assembly of nuts and ferrules on the tube stub end.

Port Connector For fractional tube



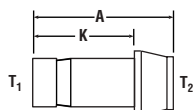
TUBE O.D.	INCHES		
	A	K	BORE
1/16	0.63	0.44	.031
1/16-1/8	0.84	0.44	.031
1/16-1/4	0.91	0.44	.031
1/8	0.95	0.54	.078
1/8-1/4	1.05	0.54	.078
1/8-3/8	1.09	0.54	.031
3/16	0.98	0.67	.116
1/4	1.07	0.76	.156
1/4-3/8	1.15	0.64	.156
1/4-1/2	1.36	0.64	.156
3/8	1.16	0.84	.281
3/8-1/2	1.40	0.72	.281
1/2	1.59	1.11	.375
1/2-3/4	1.72	0.91	.375
3/4	1.65	1.16	.578
1	2.12	1.44	.813

Dimensions for reference only, subject to change.

NOTE: Tube stub is pre-grooved as standard. (Size 1, 2, and 3 not grooved). Generic (non-grooved 4-16) can be ordered through Quick Response Department.

The machined ferrule end (T₂) requires only 1/4 turn from finger tight to assemble.
Add -Z6 for assembly of nuts and ferrules on the tube stub end.

Port Connector For metric tube



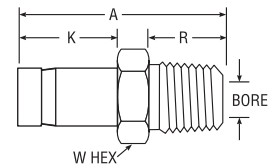
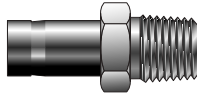
MILLIMETERS				
TUBE O.D.		A	K	BORE
T ₁	T ₂			
3	3	22,2	15,7	1,6
6	6	24,6	18,7	3,0
8	8	25,9	20,0	5,0
10	10	26,1	20,2	6,0
12	12	35,8	26,0	8,0
16	16	40,5	27,7	12,0
18	18	40,8	27,7	13,0
3	6	22,6	13,5	1,6
6	8	25,5	16,1	3,0
6	10	25,5	16,1	3,0
6	12	31,2	16,1	3,0
8	10	29,5	16,8	5,0
8	12	31,4	16,8	5,0

Dimensions for reference only, subject to change.

NOTE: Tube stub is pre-grooved as standard. (Size M2, M3, and M4 not grooved).

The machined ferrule end (T₂) requires only 1/4 turn from finger tight to assemble.
Add -Z6 for assembly of nuts and ferrules on the tube stub end.

NPT Tube End Male Adapter For fractional tube



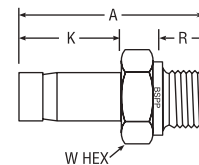
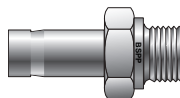
INCHES						
TUBE O.D.	NPT PIPE THREAD	A	R	K	W HEX	BORE
1/16	1/8	1.00	0.38	0.38	7/16	.031
1/8	1/8	1.16	0.38	0.54	7/16	.078
1/8	1/4	1.38	0.56	0.54	9/16	.078
3/16	1/8	1.20	0.38	0.58	7/16	.116
3/16	1/4	1.42	0.56	0.58	9/16	.116
1/4	1/8	1.25	0.38	0.63	7/16	.156
1/4	1/4	1.46	0.56	0.63	9/16	.156
1/4	3/8	1.49	0.56	0.63	11/16	.156
1/4	1/2	1.71	0.75	0.63	7/8	.156
5/16	1/8	1.29	0.38	0.66	7/16	.219
5/16	1/4	1.50	0.56	0.66	9/16	.219
5/16	3/8	1.53	0.56	0.66	11/16	.219
5/16	1/2	1.74	0.75	0.66	7/8	.219
3/8	1/8	1.32	0.38	0.69	7/16	.281
3/8	1/4	1.53	0.56	0.69	9/16	.281
3/8	3/8	1.56	0.56	0.69	11/16	.281
3/8	1/2	1.78	0.75	0.69	7/8	.281
1/2	1/4	1.75	0.56	0.91	9/16	.281
1/2	3/8	1.78	0.56	0.91	11/16	.375
1/2	1/2	2.00	0.75	0.91	7/8	.375
5/8	1/2	2.06	0.75	0.97	7/8	.469
3/4	1/2	2.06	0.75	0.97	7/8	.469
3/4	3/4	2.06	0.75	0.97	1-1/16	.578
3/4	1	2.41	0.94	0.97	1-3/8	.813
1	3/4	2.31	0.75	1.22	1-1/16	.813
1	1	2.68	0.94	1.22	1-3/8	.813
1-1/4	1-1/4	3.16	0.97	1.71	1-3/4	1.000
1-1/2	1-1/2	3.72	1.00	2.05	2-1/8	1.250
2	2	4.70	1.04	2.74	2-3/4	1.720

NOTE: Add -Z6 for assembly of nuts and ferrules on the tube stub end.

Dimensions for reference only, subject to change.

Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.
Inch sizes 1, 2, and 3 and metric sizes 2, 3, and 4mm do not have grooves.
Sizes 20, 24, 32 require additional lubrication prior to assembly.

BSPP Tube End Male Adapter For fractional tube



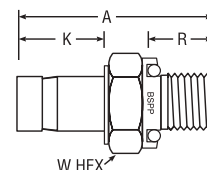
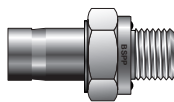
INCHES						
TUBE O.D.	BSPP THREAD	A	K	R	W HEX	BORE
1/8	1/8	1.09	0.53	.28	9/16	.05
1/8	1/4	1.31	0.53	.44	3/4	.05
1/4	1/8	1.19	0.63	.28	9/16	.16
1/4	1/4	1.50	0.63	.44	3/4	.18
3/8	1/8	1.34	0.69	.28	3/4	.05
3/8	1/4	1.47	0.69	.44	3/4	.25
3/8	3/8	1.50	0.69	.44	7/8	.28
3/8	1/2	1.69	0.69	.56	1-1/16	.28
1/2	1/4	1.69	0.91	.44	3/4	.25
1/2	3/8	1.72	0.91	.44	7/8	.31
1/2	1/2	1.94	0.91	.56	1-1/16	.39
5/8	1/2	1.97	0.97	.56	1-1/16	.47
3/4	3/4	2.09	0.97	.63	1-5/16	.578
1	1	2.53	1.22	.72	1-5/8	.80

NOTE: Add -Z6 for assembly of nuts and ferrules on the tube stub end.

Dimensions for reference only, subject to change.

Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.
Bonded sealing washer must be used with this design, see page 73..

BSPP Tube End Male Adapter For metric tube



MILLIMETERS								
TUBE O.D.	BSPP THREAD	A	K	Q	R	X	W HEX	BORE
3	1/8	31,0	13,5	0,6	7,1	13,7	14,0	1,8
4	1/8	31,8	14,3	1,0	7,1	13,7	14,0	2,0
6	1/8	33,3	15,9	1,0	7,1	13,7	14,0	4,0
6	1/4	38,1	15,9	1,0	11,2	17,8	19,0	4,0
8	1/4	38,9	16,7	0,8	11,2	17,8	19,0	6,4
10	1/4	39,7	17,5	1,3	11,2	17,8	19,0	6,4
10	3/8	38,9	17,5	1,3	11,2	21,8	22,0	7,5
10	1/2	42,9	17,5	1,3	14,2	25,7	27,0	7,5
12	1/4	43,7	23,0	1,4	11,2	17,8	19,0	6,4
12	3/8	44,5	23,0	1,4	11,2	21,8	22,0	7,9
12	1/2	49,2	23,0	1,4	14,2	25,7	27,0	9,1
16	1/2	50,8	24,6	1,7	14,2	25,7	27,0	11,9
18	3/4	53,2	24,6	2,0	16,0	31,8	33,0	14,0
20	3/4	54,0	25,4	2,5	16,0	31,8	33,0	15,1
25	1	65,1	31,8	2,6	18,3	38,6	41,0	19,8

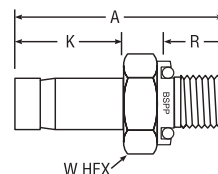
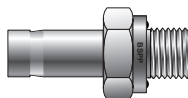
Dimensions for reference only, subject to change.

NOTE: Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.

Bonded sealing washer must be used with this design, see page 73.

Add -Z6 for assembly of nuts and ferrules on the tube stub end.

BSPP Tube End Male Adapter with ED Seal For fractional tube



INCHES							
TUBE O.D.	BSPP THREAD	A	K	R	X	W HEX	BORE
1/4	1/4	1.50	.63	.47	0.74	3/4	.18
1/4	3/8	1.50	.63	.47	0.86	3/4	.18
1/2	1/4	1.75	.91	.47	0.74	3/4	.25
1/2	3/8	1.78	.91	.47	0.86	7/8	.31
1/2	1/2	1.94	.91	.55	1.04	1-1/16	.39

Dimensions for reference only, subject to change.

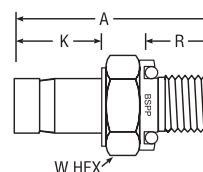
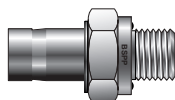
NOTE: Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.

ED fittings are supplied with sealing washers in nitrile as standard, suitable for temperatures between -35°C and +100°C (-31°F to +212°F). Fluorocarbon seals are available upon request which are suitable for temperatures between -25°C and +120°C (-13°F to +248°F).

Add -Z6 for assembly of nuts and ferrules on the tube stub end.

BSPP Tube End Male Adapter with ED Seal

For metric tube



MILLIMETERS						
TUBE O.D.	BSPP THREAD	A	K	R	W HEX	BORE
6	1/4	36,6	15,9	7,9	19,0	4,0
6	1/2	42,7	15,9	14,0	27,0	4,0
10	1/4	38,1	17,5	11,9	19,0	6,4
10	1/2	44,2	17,5	14,0	27,0	7,5
12	1/4	43,7	23,0	11,9	19,0	6,4
12	3/8	45,0	23,0	11,9	22,0	7,9
12	1/2	49,8	23,0	14,0	27,0	9,1

Dimensions for reference only, subject to change.

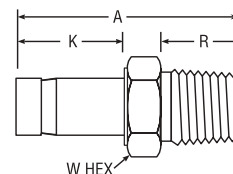
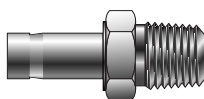
NOTE: Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.

ED fittings are supplied with sealing washers in nitrile as standard, suitable for temperatures between -35°C and +100°C (-31°F to +212°F). Fluorocarbon seals are available upon request which are suitable for temperatures between -25°C and +120°C (-13°F to +248°F).

Add -Z6 for assembly of nuts and ferrules on the tube stub end.

NPT Male Adapter

For metric tube



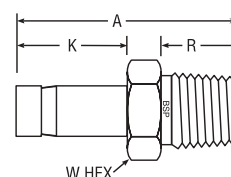
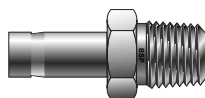
MILLIMETERS						
TUBE O.D.	NPT THREAD	A	K	R	W HEX	BORE
3	1/8	29,4	13,5	9,7	12,0	1,8
4	1/8	29,4	14,3	9,7	12,0	2,0
6	1/8	31,0	15,9	9,7	12,0	4,0
6	1/4	35,7	15,9	14,2	14,0	4,0
6	3/8	36,5	16,1	14,2	18,0	3,0
6	1/2	42,1	16,1	19,1	22,0	3,0
8	1/4	37,3	16,7	14,2	14,0	6,4
8	3/8	38,1	16,7	14,2	12,0	6,4
10	1/4	38,1	17,5	14,2	14,0	7,1
10	3/8	43,7	17,5	14,2	18,0	7,5
10	1/2	44,5	17,5	19,1	22,0	7,5
12	1/4	43,7	23,0	14,2	14,0	7,1
12	3/8	44,5	23,0	14,2	27,0	9,1
12	1/2	49,2	23,0	19,1	22,0	9,1
16	1/2	50,8	24,6	19,1	22,0	12,7
16	3/4	51,6	24,6	19,1	27,0	12,7
18	1/2	50,8	24,6	19,1	22,0	12,7
18	3/4	51,6	24,6	19,1	27,0	14,0
20	1/2	51,8	25,6	19,1	22,0	15,0
20	3/4	52,4	25,4	19,1	27,0	15,1
25	1	65,9	31,8	23,9	35,0	19,8

Dimensions for reference only, subject to change.

NOTE: Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.

Add -Z6 for assembly of nuts and ferrules on the tube stub end.

BSP Taper Male Adapter For fractional tube



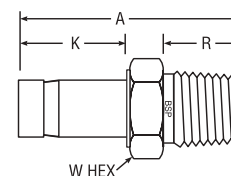
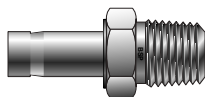
INCHES						
TUBE O.D.	BSPT THREAD	A	K	R	W HEX	BORE
1/4	1/8	1.25	.63	.38	7/16	.156
1/4	1/4	1.46	.63	.56	9/16	.156
1/4	3/8	1.44	.63	.56	11/16	.156
1/4	1/2	1.66	.63	.75	7/8	.219
5/16	1/8	1.29	.66	.38	7/16	.219
5/16	1/4	1.50	.66	.56	9/16	.219
3/8	1/4	1.50	.69	.56	9/16	.281
3/8	3/8	1.50	.69	.56	11/16	.281
3/8	1/2	1.72	.69	.75	7/8	.281
1/2	1/4	1.72	.91	.56	9/16	.375
1/2	3/8	1.75	.91	.56	11/16	.375
1/2	1/2	1.94	.91	.75	7/8	.375
5/8	1/2	2.06	.97	.75	7/8	.469

Dimensions for reference only, subject to change.

NOTE: Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.

Add -Z6 for assembly of nuts and ferrules on the tube stub end.

BSP Taper Male Adapter For metric tube



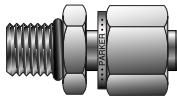
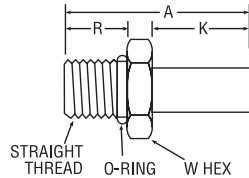
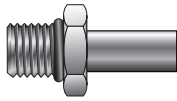
MILLIMETERS						
TUBE O.D.	BSPT THREAD	A	K	R	W HEX	BORE
3	1/8	29,4	13,5	9,7	12,0	1,8
4	1/8	29,4	14,3	9,7	12,0	2,0
6	1/8	31,0	15,9	9,7	12,0	4,0
6	1/4	35,7	15,9	14,2	14,0	4,0
8	1/4	37,3	16,7	14,2	14,0	6,4
8	3/8	38,3	16,8	14,2	18,0	5,0
10	1/4	38,1	17,5	14,2	14,0	7,1
10	3/8	38,1	17,5	14,2	18,0	7,5
10	1/2	44,5	17,5	19,1	22,0	7,5
12	1/4	43,7	23,0	14,2	14,0	7,1
12	3/8	44,5	23,0	14,2	18,0	9,1
12	1/2	49,2	23,0	19,1	22,0	9,1
16	1/2	50,8	24,6	19,1	22,0	12,7
18	3/4	51,6	24,6	19,1	27,0	14,0
20	3/4	52,4	25,4	19,1	27,0	15,1
25	1	65,9	31,8	23,9	35,0	19,8

Dimensions for reference only, subject to change.

NOTE: Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.

Add -Z6 for assembly of nuts and ferrules on the tube stub end.

Tube End to SAE Straight Thread Adapter For fractional tube



* Size 24 is preassembled with nut and ferrules.

A dimension is typical finger-tight.

Size 24 requires additional lubrication prior to assembly.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO".

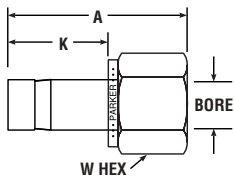
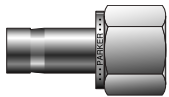
Other o-rings available upon request.

Add -Z6 for assembly of nuts and ferrules
on the tube stub end.

T TUBE O.D.	STRAIGHT THREAD SIZE	INCHES				O-RING APR UNIFORM DASH NO.
		A	K	R	W HEX	
3/8	7/16-20	1.46	0.69	.36	9/16	3-904
3/8	3/4-16	1.59	0.69	.44	7/8	3-908
1/2	9/16-18	1.74	0.91	.39	11/16	3-906
5/8	7/8-14	1.94	0.91	.50	1	3-910
1-1/2	1-7/8-12	3.28	2.05	.59	2-1/8	3-924

Dimensions for reference only, subject to change.

Tube End NPT Female Adapter For fractional tube



TUBE O.D.	NPT PIPE THREAD	INCHES			
		A	K	W HEX	BORE
1/16	1/8	1.07	0.34	9/16	.031
1/8	1/8	1.23	0.53	9/16	.093
1/8	1/4	1.38	0.53	3/4	.093
3/16	1/8	1.25	0.56	9/16	.116
3/16	1/4	1.42	0.56	3/4	.116
1/4	1/8	1.31	0.63	9/16	.188
1/4	1/4	1.47	0.63	3/4	.188
1/4	3/8	1.56	0.63	7/8	.188
1/4	1/2	1.80	0.63	1-1/16	.188
5/16	1/8	1.34	0.66	9/16	.219
5/16	1/4	1.50	0.66	3/4	.219
5/16	3/8	1.59	0.66	7/8	.219
3/8	1/8	1.36	0.69	9/16	.281
3/8	1/4	1.55	0.69	3/4	.281
3/8	3/8	1.59	0.69	7/8	.281
3/8	1/2	1.84	0.69	1-1/16	.281
1/2	1/4	1.72	0.91	3/4	.391
1/2	3/8	1.80	0.91	7/8	.391
1/2	1/2	2.10	0.91	1-1/16	.390
5/8	3/8	1.86	0.97	7/8	.469
5/8	1/2	2.09	0.97	1-1/16	.469
3/4	1/2	2.10	0.97	1-1/16	.578
3/4	3/4	2.16	0.97	1-1/4	.578
3/4	1	2.30	0.97	1-5/8	.578
7/8	3/4	2.22	1.02	1-5/16	.578
1	3/4	2.41	1.22	1-5/16	.813
1	1	2.54	1.22	1-5/8	.813
1-1/4	1-1/4	3.06	1.71	2-1/8	1.000
1-1/2	1-1/2	3.50	2.05	2-3/8	1.250
2	2	4.23	2.74	2-7/8	1.720

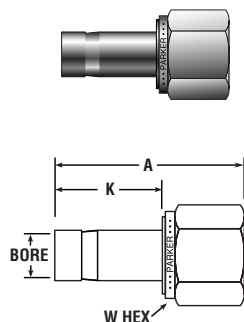
NOTE: Tube stub is pre-grooved as standard.

Dimensions for reference only, subject to change.

Generic (non-grooved) can be ordered through Quick Response Department.

Add -Z6 for assembly of nuts and ferrules on the tube stub end.

Tube End NPT Female Adapter For metric tube



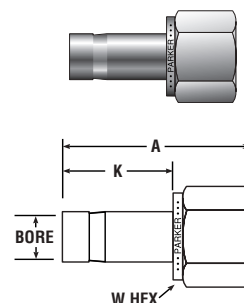
MILLIMETERS					
TUBE O.D.	NPT THREAD	A	K	W HEX	BORE
3	1/8	31,3	13,5	14,0	1,3
4	1/8	29,4	14,3	14,0	2,0
6	1/8	29,4	15,9	14,0	4,0
6	1/4	34,1	15,9	19,0	4,0
8	1/8	35,5	16,7	14,0	6,4
8	1/4	35,1	16,7	19,0	6,4
8	3/8	36,5	16,7	22,0	6,4
10	1/4	37,3	17,5	19,0	7,5
10	3/8	37,3	17,5	22,0	7,5
10	1/2	42,1	17,5	27,0	7,5
12	1/4	41,3	23,0	19,0	9,1
12	3/8	42,9	23,0	22,0	9,1
12	1/2	47,6	23,0	27,0	9,1
16	1/2	49,2	24,6	27,0	12,7
18	3/4	52,4	24,6	33,0	14,0
20	1/2	50,0	25,6	27,0	15,0
20	3/4	53,2	25,4	33,0	15,1
25	1	66,7	31,8	41,0	19,8

NOTE: Tube stub is pre-grooved as standard.

Dimensions for reference only, subject to change.

Generic (non-grooved) can be ordered through Quick Response Department.
Add -Z6 for assembly of nuts and ferrules on the tube stub end.

BSP Taper Female Adapter For fractional tube



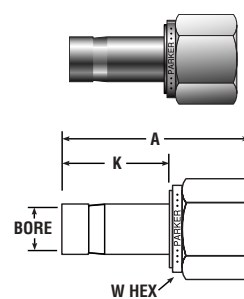
INCHES					
TUBE O.D.	BSPT THREAD	A	K	W HEX	BORE
1/4	1/8-28	1.31	.64	9/16	.156
1/4	1/4-19	1.48	.64	3/4	.156
3/8	1/4-19	1.56	.72	3/4	.281
3/8	3/8-19	1.63	.72	7/8	.281
1/2	1/4-19	1.83	.98	3/4	.375
1/2	3/8-19	1.89	.98	7/8	.375
1/2	1/2-14	2.14	.98	1-1/16	.375

NOTE: Tube stub is pre-grooved as standard.

Dimensions for reference only, subject to change.

Generic (non-grooved) can be ordered through Quick Response Department.
Add -Z6 for assembly of nuts and ferrules on the tube stub end.

BSP Taper Female Adapter For metric tube



MILLIMETERS					
TUBE O.D.	BSPT THREAD	A	K	W HEX	BORE
3	1/8	27,8	13,5	14,0	1,8
4	1/8	28,6	14,3	14,0	2,0
6	1/8	30,2	15,9	14,0	4,0
8	1/4	39,1	16,7	19,0	6,4
10	1/4	36,5	17,5	19,0	7,5
10	3/8	31,8	17,5	22,0	7,5
10	1/2	41,3	17,5	27,0	7,5
12	1/4	40,5	23,0	19,0	9,1
12	3/8	43,7	23,0	22,0	9,1
12	1/2	46,8	23,0	27,0	9,1
16	1/2	48,4	24,6	27,0	12,7
18	3/4	51,6	24,6	32,0	14,0
20	3/4	52,4	25,4	32,0	15,1
25	1	66,7	31,8	41,0	19,8

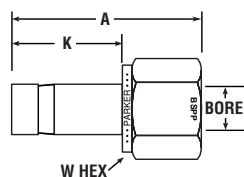
NOTE: Tube stub is pre-grooved as standard.

Dimensions for reference only, subject to change.

Add -Z6 for assembly of nuts and ferrules on the tube stub end.

BSPP Female Adapter

For fractional tube



NOTE: Copper washer must be used for this design.

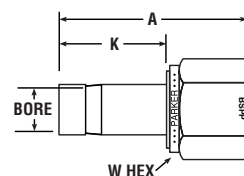
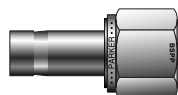
Dimensions for reference only, subject to change.

Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.
Add -Z6 for assembly of nuts and ferrules on the tube stub end.

INCHES					
TUBE O.D.	BSPP THREAD	A	K	W HEX	BORE
1/4	1/4	1.68	.63	3/4	.18
3/8	3/8	1.53	.69	7/8	.28
1/2	1/2	1.91	.91	1-1/16	.39

BSPP Female Adapter

For metric tube



NOTE: Copper washer must be used for this design.

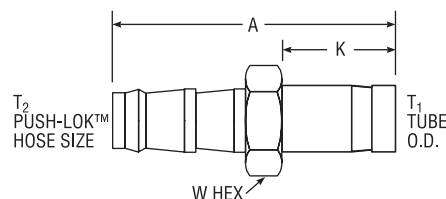
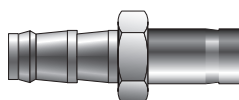
Dimensions for reference only, subject to change.

Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.
Add -Z6 for assembly of nuts and ferrules on the tube stub end.

MILLIMETERS					
TUBE O.D.	BSPP THREAD	A	K	W HEX	BORE
3	1/8	28,6	13,5	14,0	1,8
3	1/4	28,6	13,7	19,0	1,6
4	1/8	29,4	14,3	14,0	2,0
6	1/8	31,0	15,9	14,0	4,0
6	1/4	37,3	15,9	19,0	4,0
8	1/4	38,1	16,7	19,0	6,4
10	1/4	38,9	17,5	19,0	7,5
10	1/2	43,7	17,5	27,0	7,5
12	3/8	44,5	23,0	22,0	9,1
12	1/2	48,4	23,0	27,0	9,1
16	1/2	50,0	24,6	27,0	12,7
18	3/4	53,2	24,6	33,0	14,0
20	3/4	54,0	25,4	33,0	15,1
25	1	67,5	31,8	41,0	19,8

Push-Lok to Tube Adapter

For fractional tube



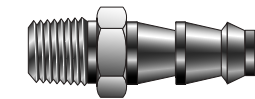
INCHES				
T ₁ TUBE O.D.	T ₂ HOSE SIZE	A	K	W HEX
1/4	—4	1.80	.64	7/16
3/8	—6	2.02	.72	9/16
1/2	—8	2.42	.98	11/16

NOTE: Drawing does not show Push-Lok collar.

Dimensions for reference only, subject to change.

Tube stub is pre-grooved as standard. Generic (non-grooved) can be ordered through Quick Response Department.
Add -Z6 for assembly of nuts and ferrules on the tube stub end.

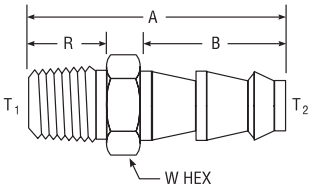
Push-Lok to
Male Adapter
For fractional tube



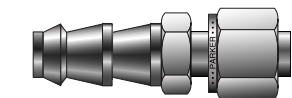
NOTE: Drawing does not show Push-Lok collar.

T ₂ NPT PIPE THREAD	INCHES				
	T ₁ HOSE SIZE	A	B	R	W HEX
1/4	-4	1.65	0.80	.56	9/16
3/8	-6	1.828	0.95	.56	11/16
1/2	-8	2.194	1.10	.75	7/8

Dimensions for reference only, subject to change.



Push-Lok to
CPI™/A-LOK®
For fractional tube

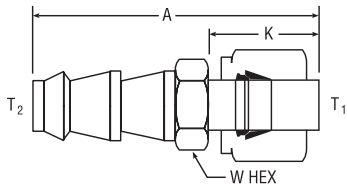


NOTE: A dimension is typical finger-tight.

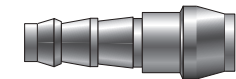
Drawing does not show Push-Lok collar. Assembly includes nut and ferrules.

T ₁ TUBE O.D.	T ₂ HOSE SIZE	INCHES		
		A	K	W HEX
1/4	-4	1.77	0.72	7/16
3/8	-6	1.98	0.78	9/16
1/2	-8	2.42	1.03	11/16

Dimensions for reference only, subject to change.



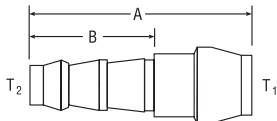
Push-Lok to
Port Connector
For fractional tube



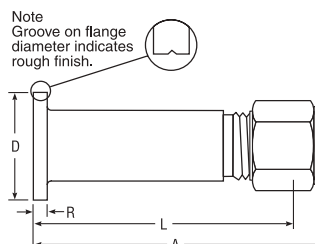
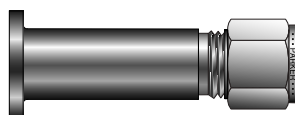
NOTE: Drawing does not show Push-Lok collar and size 6 A-LOK® nut.

Dimensions for reference only, subject to change.

T ₁ HOSE SIZE	T ₂ PORT SIZE	INCHES	
		A	B
-4	3/8	1.40	.80



Lapped Joint Tube Adapters For metric tube



MILLIMETERS						
TUBE O.D.	FLANGE SIZE	A	D	L	R	SURFACE FINISH
10	DN15(1/2"NB)	83,0	34,5	75,5	6,5	Smooth 3,2-6,3 Ra
10	DN15(1/2"NB)	83,0	34,5	75,5	6,5	Rough 6,3-12,5 Ra
12	DN15(1/2"NB)	85,0	34,5	75,4	6,5	Smooth 3,2-6,3 Ra
12	DN15(1/2"NB)	85,0	34,5	75,4	6,5	Rough 6,3-12,5 Ra

NOTE: Groove on flange diameter indicates rough finish.

Dimensions for reference only, subject to change.

The lapped joint tube adaptor is a fitting designed to be used with a lap joint flange which enables a direct hook-up to the instrument tube from the process line.

The compression fitting is incorporated into the body of the adaptor thus the number of components needed for hook-up is reduced. It is therefore cost efficient as well as space saving.

The face of the fitting forms the gasket face of the flange and comes with either a smooth or serrated surface finish.

Adaptors to suit other tube and flange sizes may be furnished upon request.

For the full line of Manifold Accessories, see Catalog 4190-FP-ACC.

DP Transmitter Calibration Adapters For fractional tube

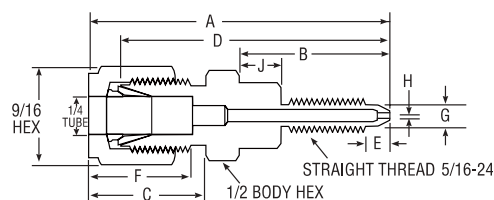
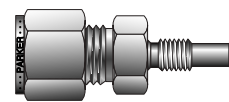
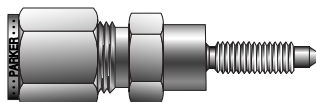
Parker CPI™/A-LOK® adapters connect directly to the bleed port of a differential pressure transmitter so that the calibration process can be simplified. Two sizes of adapters (1/4-28 Thd., 5/16-24 Thd.) are available to fit the vent ports of Rosemount, Honeywell, and Foxboro DP transmitters. Both adapters are available in 316SS.

TRANSMITTER TYPE
(1) Rosemount/Foxboro
(2) Honeywell
(3) Rosemount/Yokogawa
(4) ABB

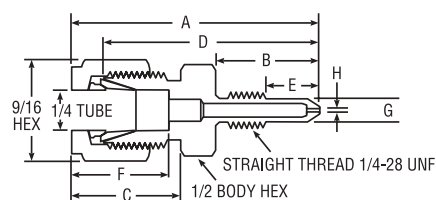
INTERCHANGES WITH
—
SS-400-1-0257
SS-400-1-0253
—

STRAIGHT THREAD	INCHES									
	A	B	C	D	E	F	G	H	J	HEX
(1) 5/16-24	2.32	1.41	.70	2.03	.24	.60	.25	.06	.41	1/2
(2) 1/4-28	1.75	.80	.70	1.46	.47	.60	.20	.03	—	1/2
(3) 5/16-24	2.32	1.41	.70	2.03	.40	.60	.25	.05	.41	1/2
(4) 1/4-28	1.74	.74	.70	1.44	.30	.60	.18	.05	—	1/2

Dimensions for reference only, subject to change.

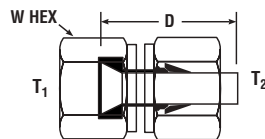
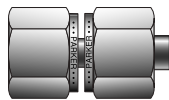


Calibration Adapter for
Rosemount/Foxboro DP Transmitters



Calibration Adapter for
Honeywell DP Transmitters

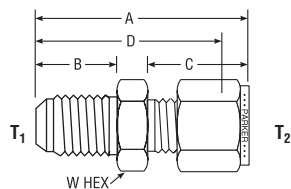
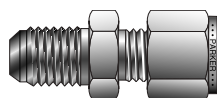
37° Flare (AN) to CPI™/A-LOK® For fractional tube



INCHES		
TUBE O.D.	D	W HEX
1/8	0.88	3/8
1/4	0.96	9/16
3/8	1.07	11/16
1/2	1.37	7/8
3/4	1.49	1-1/4
1	1.80	1-1/2

Dimensions for reference only, subject to change.

37° Flare Connector For fractional tube

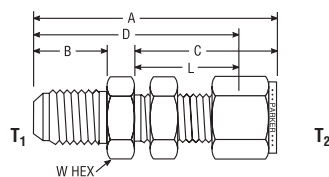
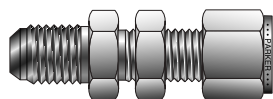


INCHES						
FLARE END	TUBE O.D.	A	B	C	D	W HEX
1/8	1/16	1.07	.45	0.43	.92	7/16
1/8	1/8	1.28	.45	0.60	1.02	7/16
1/4	1/8	1.39	.55	0.60	1.13	1/2
3/16	3/16	1.32	.48	0.64	1.06	7/16
1/4	1/4	1.48	.55	0.70	1.19	1/2
5/16	5/16	1.52	.55	0.73	1.22	9/16
1/4	3/8	1.56	.55	0.76	1.27	5/8
3/8	3/8	1.56	.56	0.76	1.27	5/8
1/2	1/2	1.81	.66	0.87	1.41	13/16
5/8	5/8	1.93	.76	0.87	1.53	15/16
3/4	3/4	2.11	.86	0.87	1.70	1-1/8
1	1	2.43	.91	1.05	1.94	1-3/8

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

37° Flare Bulkhead Connector For fractional tube



INCHES							
FLARE END	TUBE O.D.	A	D	C	L	B	W HEX
1/8	1/8	1.91	1.65	1.23	0.97	.45	1/2
3/16	3/16	1.98	1.71	1.26	1.00	.48	9/16
1/4	1/8	2.04	1.78	1.23	0.97	.55	5/8
1/4	1/4	2.12	1.83	1.31	1.02	.55	5/8
5/16	5/16	2.21	1.92	1.41	1.12	.55	11/16
1/4	3/8	2.25	1.96	1.44	1.15	.55	3/4
3/8	3/8	2.25	1.96	1.44	1.15	.56	3/4
1/2	1/2	2.59	2.19	1.65	1.25	.66	15/16
5/8	5/8	2.74	2.34	1.68	1.28	.76	1-1/16
3/4	3/4	3.11	2.71	1.87	1.47	.86	1-3/16
1	1	3.65	3.16	2.27	1.78	.91	1-9/16

NOTE: A and C dimensions are typical finger-tight.

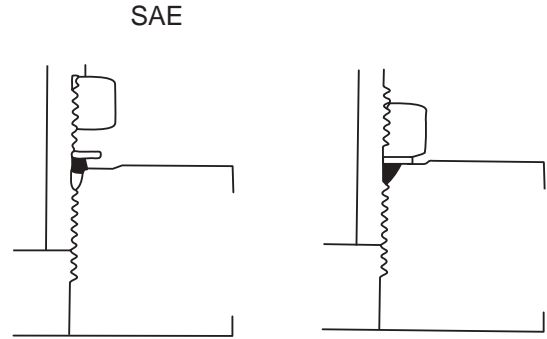
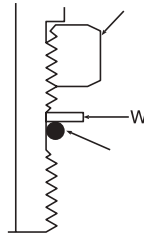
Dimensions for reference only, subject to change.

For bulkhead hole drill size and maximum bulkhead thickness, see page 29, Part BC

Introduction

BSPP / SAE Straight Thread Fittings Installation Procedure

1. Lubricate O-ring with a lubricant that is compatible with the system.
2. Screw fitting into the straight thread port until the metal back-up washer contacts the face of the port.
3. Position the fitting by backing it out no more than one turn.
4. Hold the fitting in position and tighten the locknut until the washer contacts the face of the port. (See torque chart.)

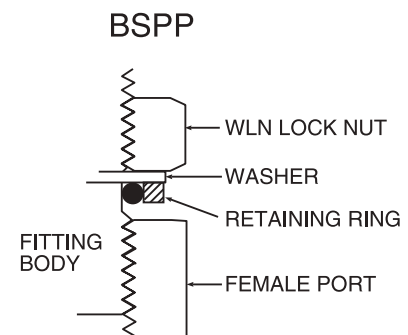


NOTE: WLN Lock Nuts are ordered separately by size and part number. Refer to page 74.

SIZE	STRAIGHT PORT		ADJUSTABLE PORT	
	TORQUE (IN-LBS)	(F.F.F.T.)	TORQUE (IN-LBS)	(F.F.F.T.)
4	245 ± 10	1.0 ± .25	200 ± 10	1.5 ± 25
6	630 ± 25	1.5 ± .25	400 ± 10	1.5 ± 25
8	1150 ± 50	1.5 ± .25	640 ± 10	1.5 ± 25
10	1550 ± 50	1.5 ± .25	1125 ± 50	1.5 ± 25
12	2050 ± 50	1.5 ± .25	1450 ± 50	1.5 ± 25
16	3000 ± 50	1.5 ± .25	2150 ± 50	1.5 ± 25
20	3400 ± 100	1.5 ± .25	2800 ± 100	2.0 ± 25
24	4500 ± 100	1.5 ± .25	3450 ± 100	2.0 ± 25

NOTES:

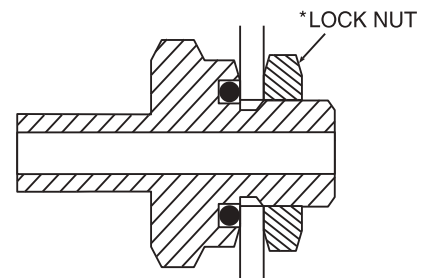
- Restrain fitting body on adjustables if necessary in installation.
- Values in charts are for assemblies with O-ring lubricated.
- Use upper limits of torque ranges for stainless steel fittings.



Face Seal O-Ring Fittings Installation Procedure

The O-ring requires a smooth, flat seating surface. This surface must be perpendicular to the axis of the threads.

1. Turn the O-ring seal fitting in the port until finger tight.
2. The “squeezing” effect on the O-ring can be felt during the last 1/4 turn.
3. Snug lightly with a wrench.



*Typical Application

The fitting can be adapted as a bulkhead fitting on thin wall tanks or vessels, eliminating welding, brazing or threading. Simply order the L5N locknut to take advantage of this option.

Notes:

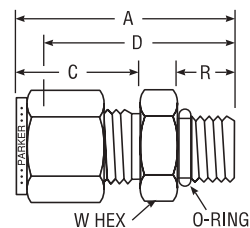
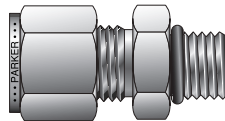
Standard O-rings are nitrile material. For other O-rings, state material after the part number.

L5N locknuts are ordered separately by size and part number. Refer to page 74.

PORT SIZE	STRAIGHT THREAD SIZE	STRAIGHT THREAD MACHINE LENGTH	L5N LOCKNUT THICKNESS	MAXIMUM TANK WALL THICKNESS
2	5/16-24	.297	.219	.078 = 5/64
3	3/8-24	.297	.219	.078 = 5/64
4	7/16-20	.360	.250	.109 = 7/65
5	1/2-20	.360	.250	.109 = 7/64
6	9/16-18	.391	.265	.125 = 1/8
8	3/4-16	.438	.312	.125 = 1/8
10	7/8-14	.500	.360	.140 = 9/64
12	1-1/16-12	.594	.406	.188 = 3/16
14	1-13/16-12	.594	.406	.188 = 3/16
16	1-5/16-12	.594	.406	.188 = 3/16

O-rings used with SAE/MS straight threads are nitrile. Other O-ring materials are available on request. Lubricate O-ring with a lubricant compatible with the system fluid, environment and O-ring material.

Male Connector to SAE Straight Thread For fractional tube



TUBE O.D.	STRAIGHT THREAD SIZE	INCHES					O-RING AS UNIFORM DASH NO.
		A	C	D	R	W HEX	
1/16	5/16-24	0.92	0.43	0.77	.30	7/16	3-902
1/8	5/16-24	1.18	0.60	0.92	.30	7/16	3-902
1/8	9/16-18	1.35	0.60	1.06	.39	11/16	3-906
3/16	3/8-24	1.20	0.64	0.94	.30	1/2	3-903
1/4	7/16-20	1.34	0.70	1.05	.36	9/16	3-904
1/4	9/16-18	1.40	0.70	1.11	.39	11/16	3-906
1/4	3/4-16	1.48	0.70	1.19	.44	7/8	3-908
1/4	7/8-14	1.60	0.70	1.31	.50	1	3-910
5/16	1/2-20	1.37	0.73	1.08	.36	5/8	3-905
3/8	7/16-20	1.40	0.76	1.11	.36	5/8	3-904
3/8	9/16-18	1.46	0.76	1.17	.39	11/16	3-906
3/8	3/4-16	1.54	0.76	1.25	.44	7/8	3-908
3/8	7/8-14	1.67	0.76	1.38	.50	1.00	3-910
1/2	9/16-18	1.54	0.87	1.14	.39	7/8	3-906
1/2	3/4-16	1.65	0.87	1.25	.44	7/8	3-908
1/2	1-1/16-12	1.93	0.87	1.53	.59	1-1/4	3-912
5/8	7/8-14	1.78	0.87	1.38	.50	1	3-910
3/4	7/8-14	1.68	0.87	1.28	.50	1-1/8	3-910
3/4	1-1/16-12	1.93	0.87	1.53	.59	1-1/4	3-912
7/8	1-3/16-12	1.93	0.87	1.53	.59	1-3/8	3-914
1	1-1/16-12	2.12	1.05	1.63	.59	1-3/8	3-912
1	1-5/16-12	2.15	1.04	1.66	.59	1-1/2	3-916
1-1/4	1-5/8-12	2.59	1.52	1.82	.59	1-7/8	3-920
1-1/2	1-7/8-12	3.05	1.77	1.99	.59	2-1/8	3-924
2	2-1/2-12	4.00	2.47	2.53	.59	2-3/4	3-932

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

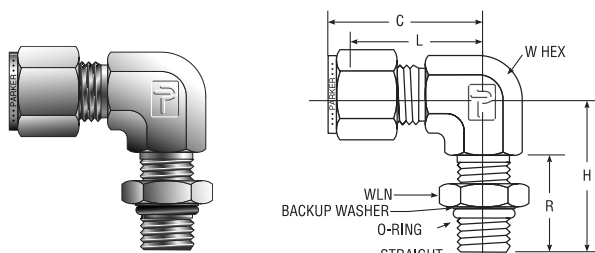
For use with SAE J.1926/1 port can also be used with MS-16142 port.

Sizes 20, 24, 32 require additional lubrication prior to assembly.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

Male SAE Straight Thread Elbow

For fractional tube



TUBE O.D.	STRAIGHT THREAD SIZE	INCHES					O-RING ARP UNIFORM DASH NO.
		C	H	L	R	W HEX	
1/4	7/16-20	1.12	1.18	0.83	0.83	9/16	3-904
3/8	9/16-18	1.26	1.27	0.97	0.84	9/16	3-906
1/2	3/4-16	1.48	1.48	1.08	0.97	3/4	3-908
3/4	1-1/16-12	1.63	1.92	1.23	1.28	1-1/16	3-912
1	1-5/16-12	1.91	2.11	1.42	1.28	1-5/16	3-916
1-1/2	1-7/8-12	3.47	2.33	2.00	1.16	1-7/8	3-924

NOTE: C dimension is typical finger-tight.

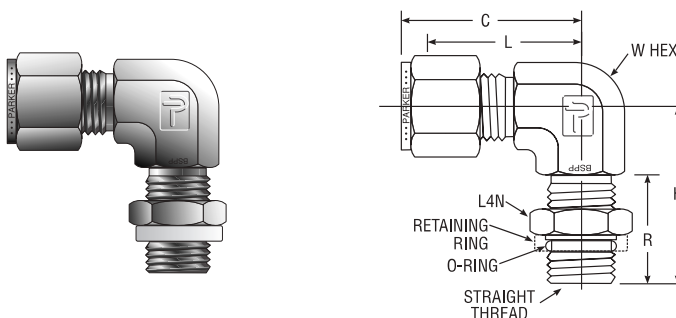
Dimensions for reference only, subject to change.

Size 24 requires additional lubrication prior to assembly.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

BSPP Male Elbow (Positionable)

For fractional tube



TUBE O.D.	BSPP THREAD	INCHES					W HEX
		C	H	L	R		
1/4	1/8-28	1.06	1.04	0.77	0.81		9/16
1/4	1/4-19	1.14	1.27	0.85	0.83		9/16
3/8	1/4-19	1.20	1.27	0.85	0.83		9/16
3/8	3/8-19	1.31	1.46	1.02	0.83		3/4
1/2	1/4-19	1.50	1.38	1.10	0.83		7/8
1/2	3/8-19	1.50	1.46	1.10	0.85		7/8
1/2	1/2-14	1.50	1.71	1.10	1.09		7/8
5/8	1/2-14	1.50	1.81	1.10	1.09		1-1/16
3/4	1/2-14	1.57	1.81	1.17	1.09		1-1/16
3/4	3/4-14	1.57	1.92	1.17	1.20		1-1/16
1	3/4-14	1.93	2.11	1.45	1.20		1-5/16
1	1-11	1.93	2.11	1.45	1.20		1-5/16

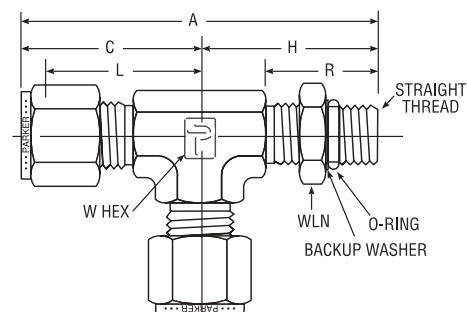
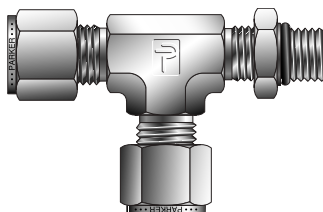
NOTE: C dimension is typical finger-tight.

Dimensions for reference only, subject to change.

Connects fractional tube to female ISO parallel thread.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

Male Run Tee SAE Straight Thread *For fractional tube*



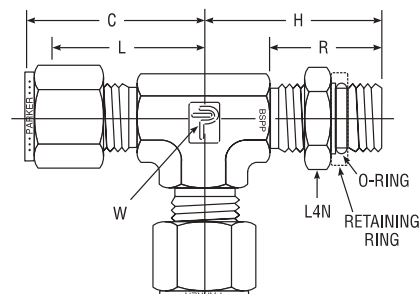
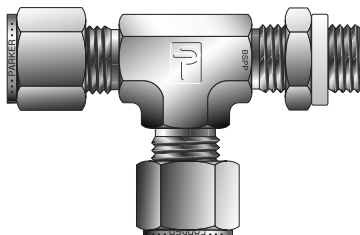
TUBE O.D.	TRAIGHT THREAD SIZE	INCHES						O-RING ARP UNIFORM DASH NO.
		A	C	H	L	R	W HEX	
1/4	7/16-20	2.24	1.12	1.18	0.83	0.83	7/16	3-904
3/8	9/16-18	2.53	1.26	1.27	0.97	0.84	9/16	3-906
1/2	3/4-16	2.97	1.48	1.48	1.08	0.97	3/4	3-908
3/4	1-1/16-12	3.55	1.63	1.92	1.23	1.28	1-1/16	3-912
1	1-5/16-12	3.74	1.87	2.11	1.38	1.28	1-5/16	3-916

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

BSPP Male Run Tee (Positionable) *For fractional tube*



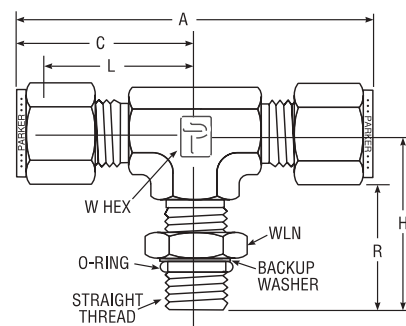
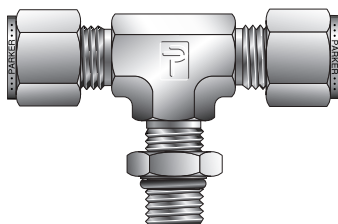
TUBE O.D.	BSPP THREAD	INCHES					W HEX
		C	H	L	R		
1/4	1/8-28	1.06	1.04	0.77	0.81		9/16
1/4	1/4-19	1.14	1.27	0.85	0.83		9/16
3/8	1/4-19	1.20	1.27	0.91	0.83		9/16
1/2	3/8-19	1.50	1.46	1.10	0.85		7/8
1/2	1/2-14	1.50	1.71	1.10	1.09		7/8
5/8	1/2-14	1.50	1.81	1.10	1.09		1-1/16
3/4	1/2-14	1.57	1.81	1.17	1.09		1-1/16
3/4	3/4-14	1.57	1.92	1.17	1.20		1-1/16
1	1-11	1.93	2.11	1.45	1.20		1-5/16

NOTE: C dimension is typical finger-tight.

Dimensions for reference only, subject to change.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

Male Branch Tee SAE Straight Thread For fractional tube



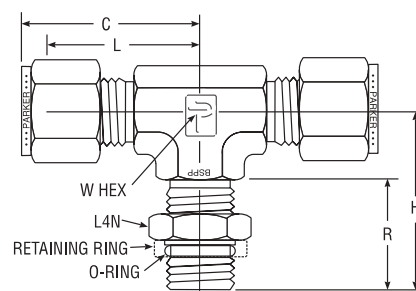
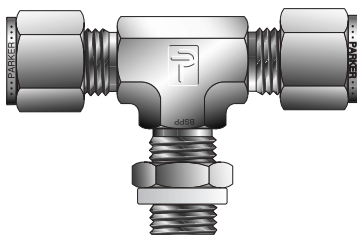
INCHES								O-RING ARP UNIFORM DASH NO.
TUBE O.D.	STRAIGHT THREAD SIZE	A	C	H	L	R	W HEX	
1/4	7/16-20	2.24	1.19	1.19	0.81	0.81	7/16	3-904
3/8	9/16-18	2.52	1.26	1.27	0.97	0.84	9/16	3-906
1/2	3/4-16	2.96	1.48	1.48	1.08	0.97	3/4	3-908
3/4	1-1/16-12	3.26	1.63	1.92	1.23	1.28	1-1/16	3-912
1	1-5/16-12	3.74	1.87	2.11	1.38	1.28	1-5/16	3-916

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

BSPP Male Branch Tee (Positionable) For fractional tube



INCHES						
TUBE O.D.	BSPP THREAD	C	H	L	R	W HEX
1/4	1/8-28	1.06	1.25	0.77	0.81	9/16
1/4	1/4-19	1.14	1.27	0.85	0.83	9/16
3/8	1/4-19	1.20	1.27	0.91	0.83	9/16
1/2	3/8-19	1.50	1.36	1.10	0.85	7/8
1/2	1/2-14	1.50	1.71	1.10	1.09	7/8
5/8	1/2-14	1.50	1.81	1.10	1.09	1-1/16
3/4	1/2-14	1.57	1.81	1.17	1.09	1-1/16
3/4	3/4-14	1.57	1.92	1.17	1.20	1-1/16
1	1-11	1.94	2.11	1.45	1.20	1-5/16

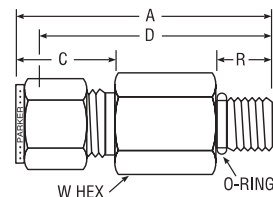
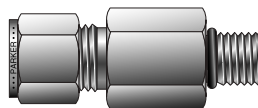
NOTE: C dimension is typical finger-tight.

Dimensions for reference only, subject to change.

Connects fractional tube to female ISO parallel thread.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

Long Male Connector SAE/MS Straight Thread *For fractional tube*



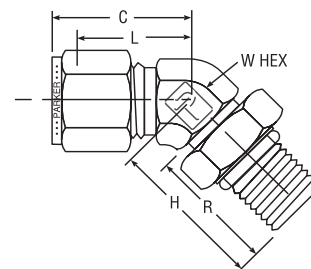
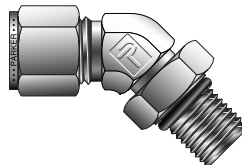
T TUBE O.D.	S-SAE/MS THREAD SIZE	INCHES						ST O-RING UNIFORM SIZE NO.
		A	R	C	D	E MIN. OPENING	W HEX	
1/4	7/16-20	2.26	.36	0.70	1.97	.19	9/16	-904
3/8	9/16-18	2.48	.39	0.76	2.19	.28	11/16	-906
1/2	3/4-16	3.01	.44	0.86	2.58	.41	7/8	-908
3/4	1-1/16-12	3.88	.59	0.86	3.48	.62	1-1/4	-912
1	1-5/16-12	4.34	.59	1.04	3.86	.88	1-1/2	-916

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

45° Positionable Male Elbow SAE/MS Straight Thread *For fractional tube*



STRAIGHT TUBE O.D.	THREAD SIZE	INCHES					O-RING UNIFORM DASH NO.
		C	H	L	R	W HEX	
1/4	7/16-20	0.93	1.02	0.65	0.75	7/16	3-904
3/8	9/16-18	1.01	1.27	0.72	0.77	9/16	3-906
1/2	3/4-16	1.15	1.48	0.75	0.88	3/4	3-908
3/4	1-1/16-12	1.63	1.92	1.23	1.16	1-1/16	3-912
1	1-5/16-12	1.87	2.11	1.39	1.16	1-5/16	3-916

NOTE: C dimension is typical finger-tight.

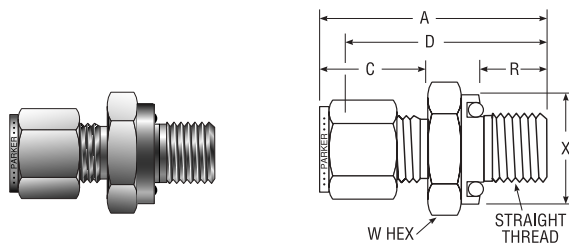
Dimensions for reference only, subject to change.

• Adapts to SAE J1926 straight thread boss and MS16142 boss.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

Male Connector to O-Ring Straight Thread

For fractional tube



TUBE O.D.	STRAIGHT THREAD SIZE	INCHES						O-RING ARP UNIFORM DASH NO.
		A	C	D	R	X DIA.	W HEX	
1/16	5/16-24	1.06	0.43	0.91	.34	.55	9/16	2-011
1/8	5/16-24	1.29	0.60	1.03	.34	.55	9/16	2-011
3/16	3/8-24	1.35	0.64	1.09	.38	.62	5/8	2-012
1/4	7/16-20	1.51	0.70	1.22	.41	.74	3/4	2-111
5/16	1/2-20	1.61	0.73	1.31	.44	.86	7/8	2-112
3/8	9/16-18	1.67	0.76	1.38	.44	.93	15/16	2-113
1/2	3/4-16	1.81	0.87	1.41	.47	1.12	1-1/8	2-116
5/8	7/8-14	1.90	0.87	1.50	.47	1.30	1-3/8	2-212
3/4	1-1/16-12	2.06	0.87	1.66	.56	1.49	1-1/2	2-215
7/8	1-1/16-12	2.06	0.87	1.66	.56	1.49	1-1/2	2-215
1	1-5/16-12	2.30	1.05	1.81	.56	1.74	1-3/4	2-219

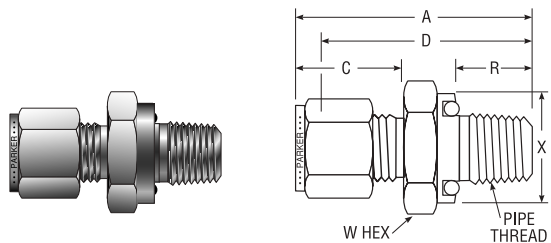
NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

Male Connector to O-Ring Pipe Thread

For fractional tube



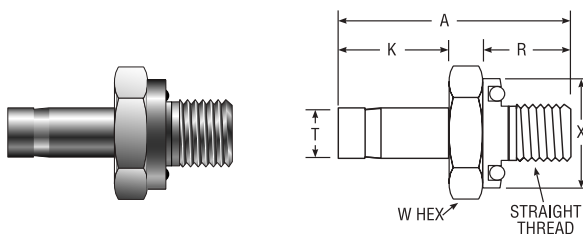
TUBE O.D.	NPT PIPE SIZE	INCHES						O-RING ARP UNIFORM DASH NO.
		A	C	D	R	X DIA.	W HEX	
1/16	1/8	1.12	0.43	0.97	.28	.74	3/4	2-111
1/8	1/8	1.29	0.60	1.03	.28	.74	3/4	2-111
1/8	1/4	1.43	0.60	1.17	.38	.93	15/16	2-113
3/16	1/8	1.32	0.64	1.06	.28	.74	3/4	2-111
3/16	1/4	1.46	0.64	1.20	.38	.93	15/16	2-113
1/4	1/8	1.38	0.70	1.09	.28	.74	3/4	2-111
1/4	1/4	1.51	0.70	1.22	.38	.93	15/16	2-113
1/4	3/8	1.57	0.70	1.28	.41	1.12	1-1/8	2-116
5/16	1/8	1.43	0.73	1.13	.28	.74	3/4	2-111
5/16	1/4	1.46	0.73	1.25	.38	.93	15/16	2-113
3/8	1/8	1.45	0.76	1.16	.28	.74	3/4	2-111
3/8	1/4	1.57	0.76	1.28	.38	.93	15/16	2-113
3/8	3/8	1.63	0.76	1.34	.41	1.12	1-1/8	2-116
3/8	1/2	1.85	0.76	1.56	.53	1.30	1-3/8	2-212
1/2	1/4	1.68	0.87	1.28	.38	.93	15/16	2-113
1/2	3/8	1.76	0.87	1.36	.41	1.12	1-1/8	2-116
1/2	1/2	1.98	0.87	1.58	.53	1.30	1-3/8	2-212
5/8	1/2	1.96	0.87	1.56	.53	1.30	1-3/8	2-212
5/8	3/4	2.06	0.87	1.66	.56	1.49	1-1/2	2-215
3/4	1/2	1.98	0.87	1.58	.53	1.30	1-3/8	2-212
3/4	3/4	2.06	0.87	1.66	.56	1.49	1-1/2	2-215
1	3/4	2.24	1.05	1.75	.56	1.49	1-1/2	2-215
1	1	2.40	1.05	1.91	.66	1.74	1-3/4	2-219

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

Tube End to O-Ring Straight Thread *For fractional tube*



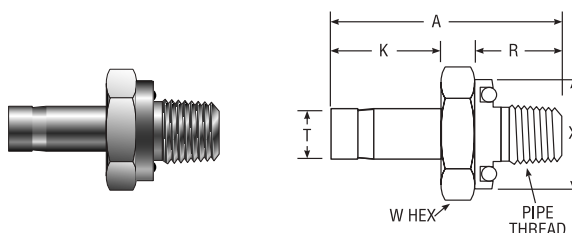
T TUBE O.D.	NPT PIPE THREAD	INCHES					O-RING ARP UNIFORM DASH NO.
		A	K	R	X DIA.	W HEX	
1/8	5/16-24	1.22	0.53	.34	0.55	9/16	2-011
3/16	3/8-24	1.38	0.56	.38	0.62	5/8	2-012
1/4	7/16-20	1.55	0.63	.41	0.74	3/4	2-111
5/16	1/2-20	1.64	0.66	.44	0.86	7/8	2-112
3/8	9/16-18	1.70	0.69	.47	0.93	15/16	2-113
1/2	3/4-16	1.95	0.91	.47	1.12	1-1/8	2-116
5/8	7/8-14	2.12	0.97	.47	1.30	1-3/8	2-212
3/4	1-1/16-12	2.16	0.97	.56	1.49	1-1/2	2-215
1	1-5/16-12	2.47	1.22	.56	1.74	1-3/4	2-219

NOTE: Add -Z6 for assembly of nuts and ferrules on the tube stub end.

Dimensions for reference only, subject to change.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

Tube End to O-Ring Pipe Thread *For fractional tube*



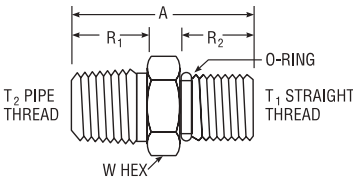
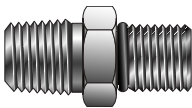
T TUBE O.D.	NPT PIPE THREAD	INCHES					O-RING ARP UNIFORM DASH NO.
		A	K	R	X DIA.	W HEX	
1/16	1/8	1.03	0.34	.28	0.74	3/4	2-111
1/4	1/8	1.31	0.63	.28	0.74	3/4	2-111
1/4	1/4	1.44	0.63	.38	0.93	15/16	2-113
1/4	3/8	1.50	0.63	.41	1.12	1-1/8	2-116
5/16	1/8	1.34	0.66	.28	0.74	3/4	2-111
5/16	1/4	1.47	0.66	.38	0.93	15/16	2-113
3/8	1/8	1.38	0.69	.28	0.74	3/4	2-111
3/8	1/4	1.50	0.69	.38	0.93	15/16	2-113
3/8	3/8	1.59	0.69	.41	1.12	1-1/8	2-116
1/2	3/8	1.78	0.91	.41	1.12	1-1/8	2-116
5/8	1/2	2.14	0.97	.53	1.30	1-3/8	2-212
3/4	3/4	2.16	0.97	.56	1.49	1-1/2	2-215
1	1	2.56	1.22	.66	1.65	1-3/4	2-219

NOTE: Add -Z6 for assembly of nuts and ferrules on the tube stub end.

Dimensions for reference only, subject to change.

Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO". Other o-rings available upon request.

NPT Thread to SAE
Straight Thread Adapter
For fractional tube

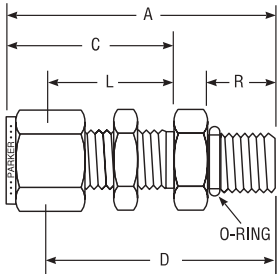
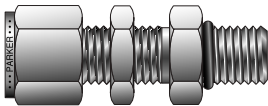


INCHES						O-RING AS UNIFORM DASH NO.
T ₂ NPT THREAD	T ₁ SAE STRAIGHT THREAD	A	R1	R2	W HEX	
1/4-18	7/16-20	1.20	.56	.36	9/16	3-904
3/8-18	9/16-18	1.26	.56	.39	11/16	3-906
1/2-14	3/4- 16	1.53	.75	.44	7/8	3-908
3/4-14	1-1/16-12	1.75	.75	.59	1-1/4	3-912
1-11-1/2	1-5/16-12	2.00	.94	.59	1-1/2	3-916

NOTE: A and C dimensions are typical finger-tight. Dimensions for reference only, subject to change.

For use with SAE J.1926/1 port can also be used with MS-16142 port.
Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO".
Other o-rings available upon request.

Bulkhead to
Conversion Adapter
For fractional tube



INCHES									
TUBE O.D.	STRAIGHT THREAD SIZE	A	C	D	R	L	W HEX	BULKHEAD HOLE DRILL SIZE	MAXIMUM BULKHEAD THICKNESS
1/4	9/16-18	1.74	1.17	1.45	.39	.88	3/4	37/64	9/16
3/8	9/16-18	1.81	1.24	1.52	.39	.94	3/4	37/64	9/16

NOTE: A and C dimensions are typical finger-tight. Dimensions for reference only, subject to change.

For use with SAE J.1926/1 port can also be used with MS-16142 port.
Parts are supplied with nitrile o-rings as standard. For Fluorocarbon o-rings, add the suffix "-VO".
Other o-rings available upon request.

General

The weld used in joining a tube to a socket weld tube fitting is like any other type of “tee” weld. The root (i.e., the point of intersection of the outside of the tube and annular end area of the fitting) must be included in the weld zone.

Careful welding procedures are normally followed to assure that this root area is included in the weld. If penetration is not achieved, the joint will have two built-in stress risers which may greatly reduce the strength of the weld. Upon application of an extreme load, these stress risers could result in cracks which could propagate out through the weld or tube depending upon the direction of the greatest load.

Often to achieve full root penetration in TIG welding of stainless steels, a fusion pass will be made first, followed by a final pass utilizing a filler rod to achieve the desired fillet size.

Assembly

The codes applicable to the welding of socket weld fittings require that the tube be inserted into the socket until bottomed against the stop. The tube is then to be backed out approximately 1/16 of an inch and then welded.

If the tube is not backed out, but welded when against a flat bottom stop, the contraction of the weld fillet and fitting socket can combine to produce a static stress on the weld. During thermal transients, the fitting and the portion of the tube within the fitting may experience a differential rate of heating or cooling, again adding to the stress level in the weld.

Tacking

If the weld joint is to be “tacked” before welding, it is recommended that the “Tack” weld build-up be held to a minimum.

Excessive build-up on the “tack” may cause an interrupted final bead and a stress riser or lack of complete fusion.

Backing Gas

Backing gas is an inert gas used to flood the interior of the fittings and tube system during welding. It serves the same purpose internally as the shielding gas used in TIG or MIG welding. By reducing the interior oxygen level to as low as practicable, it also serves to control the combustion of contaminants that could affect weld quality.

When a backing gas is not used and nearly 100% weld penetration is achieved, blisters will tend to form on the internal tube wall. This will result in scale which may later break loose. Therefore, in 0.050 wall or thinner tube or where the wall thickness is such that the selected weld process may burn through, the use of a backing gas is mandatory.

In most cases the backing gas will be argon or helium connected to the system through a control regulator. Flow rates, while small, should be high enough to purge the system. Welds should be made in downstream sequence from the gas connection.

Note that the entire system should be purged to insure that there are no openings that will allow air to be drawn into the system.

The use of backing gas, while often not mandatory, will give a better weld joint. This is because the effects of contaminate combustion by-products are eliminated and because the welds are made and cooled under a shielded atmosphere, thus eliminating internal scaling or blistering.

Welding Methods

300 Series Stainless Steels

May be welded by the TIG, MIG, or stick arc-weld process.

TIG welding is recommended as being best for welding Weld-lok® systems because it allows better operator control of heat penetration and filler material deposition.

Stick arc welding is not recommended in many cases because of the likelihood of excessive burn-through and improper root penetration. In all cases where stick welding is used, it is recommended that backing gas be used.

MIG welding gives the same characteristics as stick electrode welding with faster deposition of the filler material. As this process runs “hotter” than the stick process, the use of a backing gas is mandatory. It should be noted that in welding the relatively small fitting sizes found in the Weld-lok® line, filler deposition rate economies are not a factor and therefore the MIG method is not commonly applied.

C1018 Steel Fittings

May be welded by the TIG, MIG, stick and oxyacetylene methods. As scale formation remains a problem, the use of a backing gas is still recommended.

Carbide Precipitation

When unstabilized stainless steels are heated to 800°–1500°F during welding, the chromium in the steel combines with the carbon to form chrome carbides which tend to form along the grain boundaries of the metal (carbide precipitation). This lowers the dissolved chromium content in these areas and thus lowers their corrosion resistance, making them vulnerable to intergranular corrosion. Carbide precipitation is reduced by holding the carbon content of the material to a very low value. This limits the amount of carbon available to combine with the chromium. The “L” series (extra low carbon) stainless steels are often used for this purpose, but their use reduces system design stress by approximately 15%. Parker Weld-lok® fittings are made from a select 316 series with carbon content in the low range of 0.04 to 0.07 percent. This results in a welded fitting with good corrosion resistance and a high strength factor.

All Parker Weld-lok® fittings in stainless steel are supplied in the solution treated condition, capable of passing ASTM-A-262 Tests for Detecting Susceptibility to Intergranular Corrosion.

Arc Polarity

When welding Weld-lok® fittings, best results will be obtained by the following arc polarities:

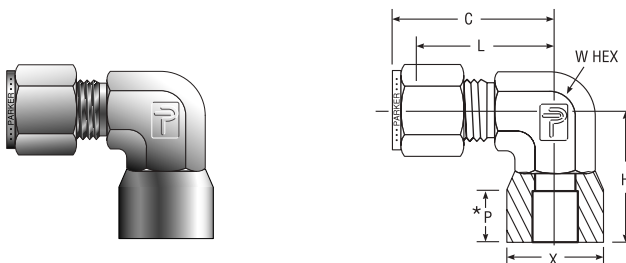
- TIG – Direct Current, straight polarity
- MIG – Direct Current, reverse polarity
- STICK – Polarity dependent on rod used

For further information on Parker's Welded Fittings refer to Parker's Welded Fittings Catalog 4280 or contact Parker's Instrumentation Products Division – Product Engineering at 256-881-2040.

Socket Weld Elbow

For fractional tube

- for CPI™/A-LOK® to tubing socket weld connection



INCHES						
TUBE O.D.	C	L	H	P*	X	W HEX
1/8	0.92	0.66	0.63	.16	.38	5/16
3/16	0.98	0.72	0.69	.20	.44	7/16
1/4	1.06	0.78	0.84	.25	.50	9/16
3/8	1.31	1.02	1.08	.34	.63	3/4
1/2	1.42	1.02	1.14	.41	.76	3/4
5/8	1.57	1.17	1.35	.49	.94	1-1/16
3/4	1.57	1.17	1.39	.50	1.09	1-1/16
1	1.93	1.65	1.84	.56	1.38	1-5/8

NOTE: C dimension is typical finger-tight.

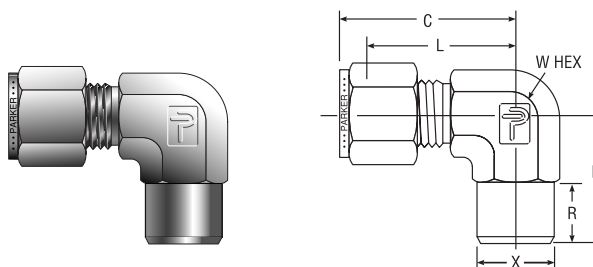
Dimensions for reference only, subject to change.

*Socket Depth

Butt Weld Elbow

For fractional tube

- for CPI™/A-LOK® to pipe butt weld connection



INCHES							
TUBE O.D.	BUTTWELD PIPE SIZE	C	H	L	R	X BUTTWELD O.D.	W HEX
1/8	1/8	0.93	0.70	0.67	.38	.405	7/16
3/16	1/8	1.01	0.74	0.74	.38	.405	7/16
1/4	1/8	1.06	0.74	0.77	.38	.405	7/16
1/4	1/4	1.10	0.97	0.78	.56	.540	9/16
3/8	1/4	1.20	1.00	0.91	.56	.540	5/8
1/2	3/8	1.42	1.11	1.02	.56	.675	13/16
1/2	1/2	1.42	1.30	1.02	.75	.840	7/8
5/8	1/2	1.50	1.39	1.10	.75	.840	15/16
3/4	3/4	1.57	1.45	1.17	.75	1.050	1-1/16
1	3/4	1.94	1.64	1.45	.75	1.050	1-3/8
1	1	1.94	1.84	1.45	.94	1.315	1-5/16

NOTE: C dimension is typical finger-tight.

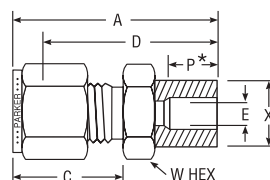
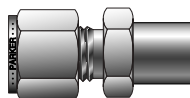
Dimensions for reference only, subject to change.

Pipe butt weld end will conform to Schedule 80 unless otherwise noted.

Socket Weld Connector

For fractional tube

- for CPI™/A-LOK® to tubing socket weld connection



INCHES							
TUBE O.D.	A	C	D	P*	X	E BORE	W HEX
1/8	1.16	0.60	0.90	.16	0.38	.094	7/16
3/16	1.24	0.64	0.98	.20	0.44	.141	1/2
1/4	1.36	0.70	1.07	.25	0.50	.188	9/16
3/8	1.53	0.76	1.24	.34	0.63	.313	11/16
1/2	1.74	0.87	1.34	.41	0.78	.438	13/16
5/8	1.86	0.87	1.46	.47	0.94	.500	1
3/4	1.92	0.87	1.52	.50	1.09	.656	1-1/8
1	2.31	1.05	1.82	.56	1.44	.906	1-5/8

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

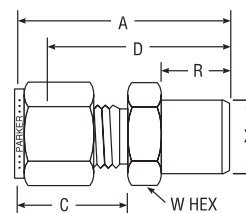
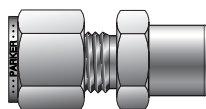
See Catalog 4280, Welded Fittings, for additional sizes.

*Socket Depth

Buttweld Connector

For fractional tube

- for CPI™/A-LOK® to pipe buttweld connection



INCHES							
TUBE O.D.	BUTTWELD PIPE SIZE	A	C	D	R	X BUTTWELD O.D.	W HEX
1/8	1/8	1.20	0.60	0.94	.38	.405	7/16
3/16	1/8	1.24	0.64	0.97	.38	.405	7/16
1/4	1/8	1.29	0.70	1.00	.38	.405	1/2
1/4	1/4	1.46	0.70	1.17	.56	.540	9/16
5/16	1/8	1.48	0.73	1.22	.38	.405	1/2
5/16	1/4	1.49	0.76	1.23	.56	.540	9/16
3/8	1/4	1.49	0.76	1.20	.56	.540	9/16
3/8	3/8	1.60	0.76	1.31	.56	.675	3/4
3/8	1/2	1.82	0.76	1.53	.75	.840	7/8
3/8	3/4	1.88	0.76	1.59	.75	1.050	1-1/8
1/2	3/8	1.71	0.87	1.31	.56	.675	13/16
1/2	1/2	1.93	0.87	1.53	.75	.840	7/8
1/2	3/4	1.99	0.87	1.59	.75	1.050	1-1/8
5/8	1/2	1.93	0.87	1.53	.75	.840	15/16
3/4	3/4	1.99	0.87	1.59	.75	1.050	7/8
1	1	2.46	1.05	1.97	.94	1.310	1-1/16

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

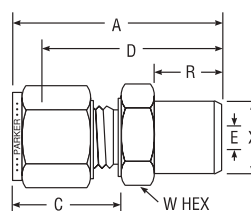
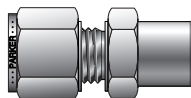
Pipe Buttweld end will conform to Schedule 80 unless otherwise noted.

See Catalog 4280, Welded Fittings, for additional sizes.

Buttweld Connector

For metric tube

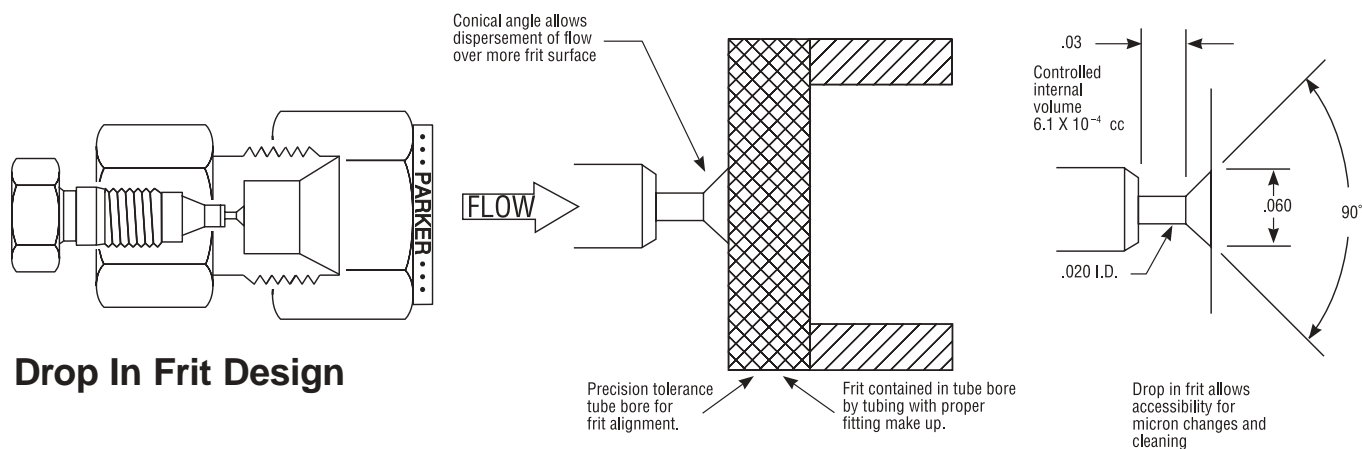
- for CPI™/A-LOK® to pipe
buttweld connection



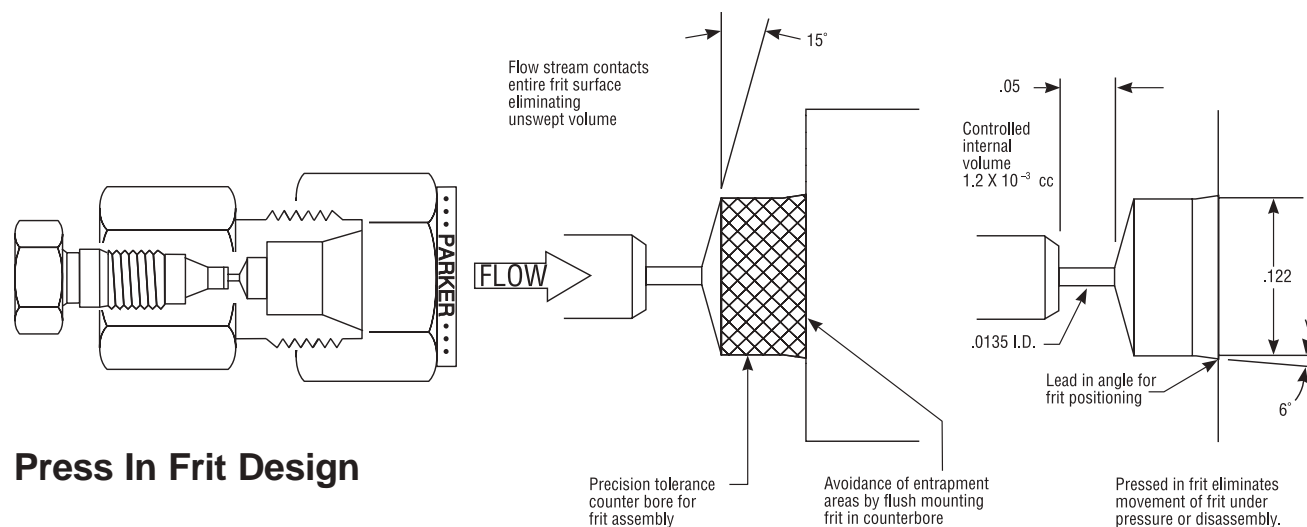
MILLIMETERS								
TUBE O.D.	BUTTWELD PIPE N.B.	A	C	D	R	X	E BORE	W HEX
3	1/8	29,7	15,3	23,1	9,7	10,3	2,4*	12,0
4	1/8	30,7	16,1	24,1	9,7	10,3	2,4*	12,0
6	1/8	32,9	17,7	25,4	9,7	10,3	4,8	14,0
6	1/4	37,7	17,7	30,2	14,2	13,7	4,8*	14,0
8	1/8	34,2	18,6	26,7	9,7	10,3	5,1	15,0
8	1/4	38,7	18,6	31,2	14,2	13,7	6,4	15,0
8	1/2	44,8	18,6	37,3	19,1	21,3	6,4*	22,0
10	1/4	40,9	19,5	33,3	14,2	13,7	7,1	18,0
10	3/8	40,1	19,5	32,5	14,2	17,2	7,9*	18,0
10	1/2	45,7	19,5	38,1	19,1	21,3	7,9*	22,0
12	1/4	43,4	22,0	33,3	14,2	13,7	7,1	22,0
12	3/8	43,4	22,0	33,3	14,2	17,2	9,5	22,0
12	1/2	48,2	22,0	38,1	19,1	21,3	9,5*	22,0
	1/2	48,2	22,0	38,9	19,1	21,3	9,5*	24,0
16	1/2	49,0	22,0	38,9	19,1	21,3	12,7*	24,0
18	1/2	50,5	22,0	40,4	19,1	21,3	13,5	27,0

NOTE: *E dimension is minimum opening.
 Fittings of this group may be back-drilled to larger I.D. at pipe end.
 A and C dimensions are typical finger-tight.
 Pipe Buttweld end will conform to Schedule 80 unless otherwise noted.

Dimensions for reference only, subject to change.



Drop In Frit Design



Press In Frit Design

Parker Hannifin's Instrumentation Products Division offers a full line of analytical tube fittings. These fittings range from elbows, tees, and male connectors to low dead volume unions and column end fittings. Parker incorporates various features in the column end fittings to effectively address various industry concerns.

- Peak symmetry for critical analysis
- Internal volume reduction

As the observed media/substance migrates through the HPLC column, a "peak" or "band" is created that denotes the level of concentration. It is critical to maintain peak symmetry in order to get an accurate reading when processing the observed media/substance. Parker Hannifin, in the development of a line of column end fittings, has incorporated some key features that help to maintain this "peak symmetry" in HPLC columns.

"Under most circumstances in liquid chromatography (LC), the flow through the tube is laminar, the so-called Poiseuille flow, and in this situation the velocity at all points is parallel to the tube axis."

Due to the importance of maintaining smooth laminar flow after injection of the sample into the HPLC column, Parker

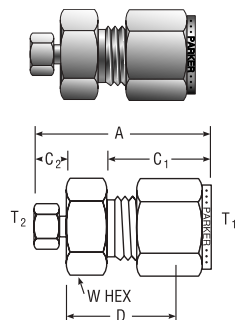
incorporated a small conical angle on the fitting body internals. This conical angle helps to equally disperse the sample into the column tube. One of the key requirements of an effective column end fitting is not to delay or disturb the flow of the sample through the instrument (HPLC column).

A second area to address is the minimizing of tube fitting internal "cavities". A cavity is a short section of the flow path where the flow-channel diameter increases. It can occur where tubes are connected to each other (low dead volume connector) or to injectors, columns (column end fittings), and detectors. Large cavities can seriously degrade the resolution of any chromatogram, but they can be easily avoided through awareness of the geometric design details of the fittings and connecting parts manufactured by various companies.

Parker Hannifin has incorporated those critical features in both a low dead volume union connector and the column end fitting bodies. First, the utilization of inverted 1/16" connections to greatly reduce internal volume or cavities. To eliminate any confusion or occurrence of incorrect effective tube make-up, the port depths (body bore dimensions) are identical by size throughout the entire Parker Hannifin instrumentation line. Second, Parker closely monitors the dimensions of the small through-hole utilized in these low dead volume connectors.

Column End Fitting – Low Internal Volume with Frit

For fractional tube



INCHES							INTERNAL VOLUME
T ₁ TUBE O.D.	T ₂ TUBE O.D.	A	C	D	W HEX	INTERNAL OPENING	
1/8	1/16	1.25	.60	.78	7/16	.013	5.4 x 10-4cc
1/4	1/16	1.35	.70	.84	1/2	.013	1.2 x 10-3cc
3/8	1/16	1.43	.76	.92	5/8	.013	3.8 x 10-3cc

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

FRIT DESIGNATOR	
* MICRON DASH NO.	MICRON SIZE
-1	0.5 μ
-2	2 μ
-3	5 μ
-4	10

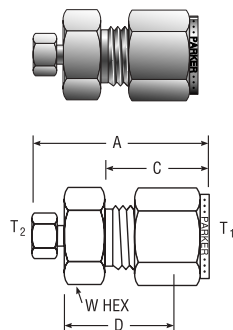
HOW TO ORDER
EXAMPLE: 4-1Z2HLZ7-2*-SS To order with 2μ frit for 1/4" O.D. column

Features:

- Inverted 1/16" end substantially reduces internal volume
- Flow stream contacts entire frit surface reducing plugging and eliminating unswept volume
- Can be used as a low volume final filter

Column End Fitting – Low Internal Volume

For fractional tube



INCHES							INTERNAL VOLUME
T ₁ TUBE O.D.	T ₂ TUBE O.D.	A	C	D	W HEX	INTERNAL OPENING	
1/4	1/16	1.28	0.70	0.77	1/2	.020	6.1 x 10-4cc
3/8	1/16	1.37	0.76	0.86	5/8	.020	8.1 x 10-4cc
1/2	1/16	1.62	0.87	1.00	13/16	.030	2.8 x 10-3cc
1	1/16	2.00	1.05	1.31	1-3/8	.030	2 x 10-2cc

NOTE: A and C dimensions are typical finger-tight.

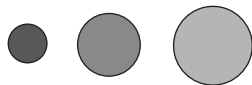
Dimensions for reference only, subject to change.

Features:

- Inverted 1/16" end substantially reduces internal volume
- Drop in frit for use with L.C.* columns or G.C.* columns
- Conical angle below frit directs flow over more frit surface
- Available for up to 1" columns

*G.C. = Gas Chromatograph
L.C. = Liquid Chromatograph

Di-Frit (drop in)

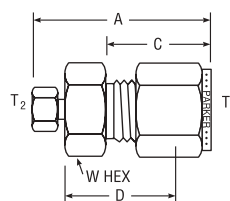
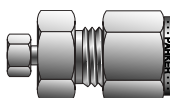


Replaceable frit for preparatory column end fitting Z3HLZ7. Frits are available in 2, 5 and 10 micron sizes.

MICRON SIZE	COLUMN O.D.
5	1/4"
10	1/4"
2	3/8"
5	3/8"
10	3/8"

MICRON SIZE	COLUMN O.D.
5	1/2"
10	1/2"
2	1"
5	1"
10	1"

Column End Fitting – Low Internal Volume (without Frit) *For fractional tube*



INCHES							INTERNAL VOLUME
T ₁ TUBE O.D.	T ₂ TUBE O.D.	A	C	D	W HEX	INTERNAL OPENING	
1/8	1/16	1.16	.60	.70	7/16	.013	1.0 x 10-4cc
1/4	1/16	1.24	.70	.77	1/2	.013	1.1 x 10-4cc
3/8	1/16	1.35	.76	.86	5/8	.013	1.3 x 10-4cc

NOTE: A and C dimensions are typical finger-tight.

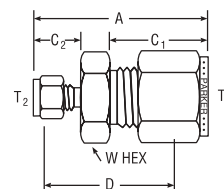
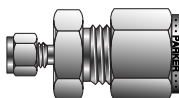
Dimensions for reference only, subject to change.

Features:

- Inverted 1/16" end substantially
- No frit for use with G.C.* columns or L.C.* columns with screens
- Can be used as a low volume reducing union

*G.C. = Gas Chromatograph
L.C. = Liquid Chromatograph

Column End Fitting – with Frit *For fractional tube*



T ₁ TUBE O.D.	T ₂ TUBE O.D.	INCHES					INTERNAL OPENING	INTERNAL VOLUME
		A	C1	C2	D	W HEX		
1/8	1/16	1.21	.60	.43	.81	7/16	.020	2.1 x 10 ⁻³ cc
1/4	1/16	1.35	.70	.43	.91	1/2	.020	1.8 x 10 ⁻³ cc
3/8	1/16	1.44	.76	.43	1.00	5/8	.020	5.4 x 10 ⁻³ cc

NOTE: A and C dimensions are typical finger-tight.

Dimensions for reference only, subject to change.

FRIT DESIGNATOR	
* MICRON DASH NO.	MICRON SIZE
-1	0.5μ
-2	2.0μ
-3	5.0μ
-4	10.0μ

NOTE: Size 1 not silver-plated.

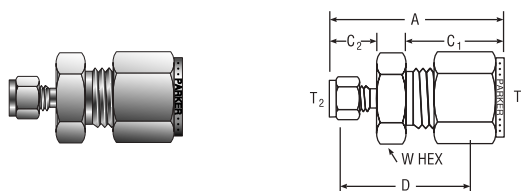
HOW TO ORDER
EXAMPLE: 4-1Z2HLZ-2*-SS To order with 2μ frit for 1/4" O.D. column

Features:

- Flow stream contacts entire frit surface reducing plugging and eliminating unswept volume
- Can be used as a low volume final filter with drop-in frit

Column End Fitting – (without Frit)

For fractional tube



INCHES								INTERNAL VOLUME
T ₁ TUBE O.D.	T ₂ TUBE O.D.	A	C ₁	C ₂	D	W HEX	INTERNAL OPENING	
1/8	1/16	1.21	.60	.43	0.81	7/16	.020	2.1 x 10 ⁻³ cc
1/4	1/16	1.35	.70	.43	0.91	1/2	.020	2.1 x 10 ⁻³ cc
3/8	1/16	1.44	.76	.43	1.00	5/8	.020	2.3 x 10 ⁻³ cc

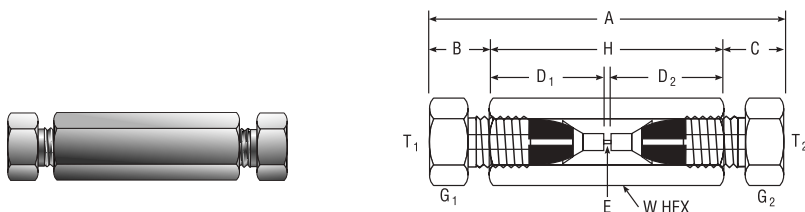
NOTE: A and C dimensions are typical finger-tight.

Size 1 Nut is not silver plated

Dimensions for reference only, subject to change.

Union Connector – Low Dead Volume

For fractional tube

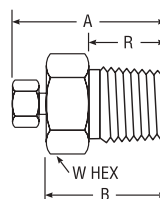
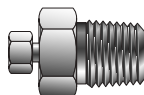


INTER- CHANGES WITH	INCHES												INTERNAL VOLUME
	T ₁ TUBE O.D.	T ₂ TUBE O.D.	†A	†B	†C	D ₁	D ₂	E INTERNAL OPENING	G ₁	G ₂	H	W HEX	
IFO-6GC	1/16	1/16	1.26	.21	.21	.41	.41	.013	.25	.25	.84	1/4	8.7 x 10 ⁻⁵ cc
–	1/8	1/16	1.53	.31	.21	.56	.41	.013	.38	.25	1.02	7/16	8.7 x 10 ⁻⁵ cc
–	1/8	1/8	1.81	.31	.31	.56	.56	.052	.38	.38	1.19	7/16	9.7 x 10 ⁻² cc

†Average Value

Dimensions for reference only, subject to change.

Male Connector – Low Dead Volume For fractional tube

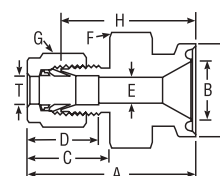
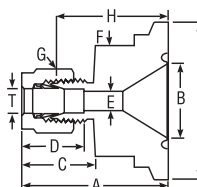


INCHES							INTERNAL VOLUME
NPT TUBE O.D.	PIPE THREAD	†A	B	R	W HEX	INTERNAL OPENING	
1/16	1/16	.75	.55	.38	5/16	.013	3.1 x 10-4cc
1/16	1/8	.79	.59	.38	7/16	.013	4.4 x 10-4cc
1/16	1/4	1.01	.81	.56	5/8	.013	8.8 x 10-4cc

†Average Value

Dimensions for reference only, subject to change.

Sanitary Flange Fitting For fractional tube



INCHES										
TUBE O.D.	SANITARY FLANGE	A	B	C	D	E MIN. OPENING	F	G HEX FLAT	H	I
1/4	1/2	1.57	.37	.70	.60	.19	1.00	9/16	1.34	.98
1/4	3/4	1.57	.62	.70	.60	.19	1.00	9/16	1.34	.98
1/4	1	1.57	.87	.70	.60	.19	1.38	9/16	1.34	1.98
1/4	1 1/2	1.57	1.37	.70	.60	.19	1.38	9/16	1.28	1.98
3/8	1/2	1.63	.37	.76	.66	.28	1.00	11/16	1.34	.98
3/8	3/4	1.63	.62	.76	.66	.28	1.00	11/16	1.34	.98
3/8	1	1.63	.87	.76	.66	.28	1.38	11/16	1.34	1.98
3/8	1 1/2	1.63	1.37	.76	.66	.28	1.38	11/16	1.34	1.98
1/2	1/2	1.74	.37	.90	.86	.37	1.00	7/8	1.40	.98
1/2	3/4	1.74	.62	.90	.86	.41	1.00	7/8	1.34	.98
1/2	1	1.74	.87	.90	.86	.41	1.38	7/8	1.34	1.98
1/2	1 1/2	1.74	1.37	.90	.86	.41	1.38	7/8	1.34	1.98

NOTE: A, C, and D dimensions are typical finger tight.

Dimensions for reference only, subject to change.

Sanitary flange fittings combine the reliability and versatility of Parker tube fittings with conventional sanitary flanges.

The fittings permit direct downstream connections for hookups and sampling.

Flange sizes are 1/2, 3/4, 1, and 1-1/2 in.

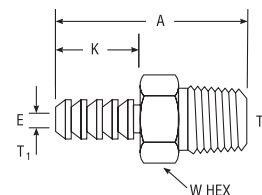
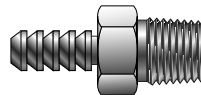
Parker tube fitting ends are available in 1/4, 3/8, and 1/2 in. Parker tube fittings allow use of a variety of tubing materials including metal, hard plastic, and soft plastic.

For a Thermocouple/"Bored-Thru" version of the above Sanitary Adapter fittings, add a "4" to the part number. Example: A 4-12 ZHLS-SS becomes a 4-12 ZH4LS-SS for a 3/4" Sanitary Flange with a 1/4" diameter bored through on the A-LOK® fitting end.

For the full line of Sanitary Fittings and Flow Components, see Catalog 4270-Sanitary/ASME-BPE Fittings.

Barbed Connector to Male Pipe

For fractional tube

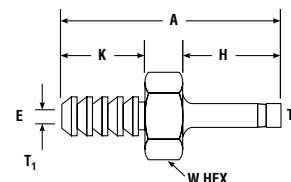
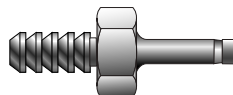


INCHES					
T HOSE I.D.	T ₂ MALE PIPE SIZE	A	E BORE	K	W HEX
1/8	1/8	1.00	.078	0.41	7/16
1/8	1/4	1.22	.078	0.41	9/16
1/4	1/8	1.41	.188	0.75	7/16
1/4	1/4	1.59	.188	0.78	9/16
5/16	1/8	1.50	.188	0.88	7/16
5/16	1/4	1.69	.250	0.88	9/16
3/8	1/4	1.72	.281	0.88	9/16
3/8	3/8	1.72	.297	0.88	11/16
1/2	3/8	1.81	.375	0.94	3/4
1/2	1/2	2.00	.375	0.94	7/8
3/4	3/4	2.13	.625	1.03	1-1/16

Dimensions for reference only, subject to change.

Barbed Connector to Tube Adapter

For fractional tube



INCHES						
T ₁ TUBE I.D.	T ₂ TUBE O.D.	A	E BORE	H	K	W HEX
1/8	1/8	1.16	.078	.53	.41	5/16
1/8	1/4	1.26	.078	.64	.41	3/8
1/4	1/4	1.64	.156	.64	.78	3/8
3/8	3/8	1.75	.156	.72	.78	7/16

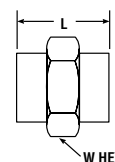
Dimensions for reference only, subject to change.

NOTE: Tube adapter end is designed for use with Parker fittings or valves. Simply insert the tube adapter end until it bottoms and tighten the Parker nut 3/4 turns for sizes 3 and below, for sizes 4 and above 1-1/4 turns from finger tight.

Add -Z6 for assembly of nuts and ferrules on the tube stub end.

Hose Connector Sleeve

For fractional tube



INCHES			
HOSE I.D.	HOSE O.D.	L	W HEX
1/8	1/4	0.41	3/8
1/4	3/8	0.78	9/16
1/4	7/16	0.78	5/8
1/4	1/2	0.78	11/16
1/4	9/16	0.78	3/4
5/16	7/16	0.88	5/8
3/8	1/2	0.88	11/16
3/8	9/16	0.88	3/4
1/2	11/16	0.94	7/8
3/4	1	1.06	1-1/4

Dimensions for reference only, subject to change.

Insert

For fractional tube



INCHES		
TUBE O.D.	TUBE I.D.	TUBE WALL
3/16	.125	.031
1/4	.125	.062
1/4	.170	.040
1/4	.188	.031
5/16	.125	.094
5/16	.188	.062
5/16	.250	.031
3/8	.188	.094
3/8	.250	.062
1/2	.250	.125
1/2	.375	.062
5/8	.375	.125
5/8	.500	.062
3/4	.500	.125
3/4	.625	.062
1	.750	.125
1	.875	.062

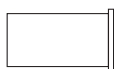
Dimensions for reference only, subject to change.

NOTE: Tubing wall thickness and corresponding minimum I.D. flow paths are listed so the system designer can properly match the insert to the tubing.

Example: 4 TIZ .125 is used with tubing having a wall thickness of .062 and I.D. of .125.

Insert

For metric tube



MILLIMETERS		
TUBE O.D.	TUBE I.D.	TUBE WALL
6	4	1,0
8	6	1,0
10	6	2,0
10	8	1,0
12	8	2,0
12	10	1,0
15	10	2,5

Dimensions for reference only, subject to change.

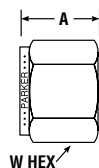
NOTE: Tubing wall thickness and corresponding minimum I.D. flow paths are listed so the system designer can properly match the insert to the tubing.

Example: TIZ 6 (4) is used with tubing having a wall thickness of 1mm and I.D. of 4mm.

TIZ inserts allow CPI™/A-LOK® fittings to be used with soft plastic tubing.

Tube Nut

For fractional tube



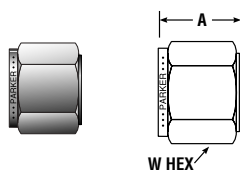
INCHES		
TUBE O.D.	A	W HEX
1/16	0.31	5/16
1/8	0.47	7/16
3/16	0.47	1/2
1/4	0.50	9/16
5/16	0.53	5/8
3/8	0.56	11/16
1/2	0.69	7/8
5/8	0.69	1
3/4	0.69	1-1/8
7/8	0.69	1-1/4
1	0.81	1-1/2
1-1/4	1.25	1-7/8
1-1/2	1.50	2-1/4
2	2.06	3

Dimensions for reference only, subject to change.

NOTE: All size 20, 24 and 32 silver plated nuts should have a system compatible lube (Permatex Anti-seize – Parker Catalog 4290-INST) or equivalent applied to the fitting body threads and the inside back of nuts. This will minimize the effort required to assemble the fitting properly.

Tube Nut

For metric tube

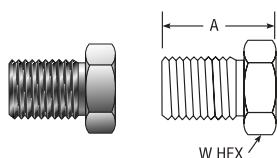


UN THREAD	MILLIMETERS		
	TUBE O.D.	A	W HEX
5/16-20	2	11,9	12,0
5/16-20	3	11,9	12,0
3/8-20	4	11,9	12,0
7/16-20	6	12,7	14,0
1/2-20	8	13,5	16,0
5/8-20	10	15,1	19,0
3/4-20	12	17,5	22,0
7/8-20	14	17,5	25,0
7/8-20	15	17,5	25,0
7/8-20	16	17,5	25,0
1-20	18	17,5	30,0
1.1/8-20	20	17,5	32,0
1.1/8-20	22	17,5	32,0
1.5/16-20	25	20,6	38,0

Dimensions for reference only, subject to change.

Inverted Tube Nut

For fractional tube

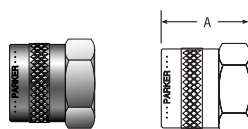


INCHES		
TUBE O.D.	A	W HEX
1/16	.39	1/4
1/8	.44	7/16

Dimensions for reference only, subject to change.

Knurled Nut

For fractional tube



INCHES	
TUBE O.D.	A
1/16	.32
1/8	.47
3/16	.47
1/4	.51
5/16	.54
3/8	.57
1/2	.69
5/8	.69

Dimensions for reference only, subject to change.

HOW TO ASSEMBLE BZP

1. Replaces BZ/NU nuts on Parker CPI™/A-LOK® fitting bodies.
2. Insert plastic tubing until it bottoms in fitting body.
3. Tighten finger tight.

The knurled nut is designed for use with soft plastic tubing on low pressure applications where a finger tight assembly procedure is satisfactory.

Example: Laboratory test hook-ups. Nylon or PTFE ferrules are frequently used instead of metal ferrules in this type of application.

Ferrules



INCHES TUBE O.D.
1/16
1/8
3/16
1/4
5/16
3/8
1/2
5/8
3/4
7/8
1
1-1/4
1-1/2
2

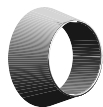
Dimensions for reference only, subject to change.

MILLIMETER TUBE O.D.
3
6
8
10
12
16
20
25

Dimensions for reference only, subject to change.

Note: Ferrules are available in standard metal materials as well as standard plastics like PTFE and nylon. Please consult the factory for availability.

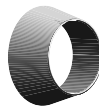
INCH Front Ferrule *For fractional tube*



INTER-CHANGES WITH	INCHES TUBE O.D.
103-1	1/16
203-1	1/8
303-1	3/16
403-1	1/4
503-1	5/16
603-1	3/8
813-1	1/2
1013-1	5/8
1213-1	3/4
1413-1	7/8
1613-1	1
2013-1	1-1/4
2413-1	1-1/2
3213-1	2

Note: Ferrules are available in standard metal materials as well as standard plastics like PTFE and nylon. Please consult the factory for availability.

METRIC Front Ferrule *For metric tube*



INTER-CHANGES WITH	MM TUBE O.D.
2M3-1	2
3M3-1	3
4M3-1	4
6M3-1	6
8M3-1	8
10M3-1	10
12M3-1	12
14M3-1	14
15M3-1	15
16M3-1	16
18M3-1	18
20M3-1	20
22M3-1	22
25M3-1	25

Note: Ferrules are available in standard metal materials as well as standard plastics like PTFE and nylon. Please consult the factory for availability.

INCH Back Ferrule *For fractional tube*



For stainless steel, sizes 4-32 are Suparcase ferrules.

INTER-CHANGES WITH	INCHES TUBE O.D.
104-1	1/16
204-1	1/8
304-1	3/16
404-1	1/4
504-1	5/16
604-1	3/8
814-1	1/2
1014-1	5/8
1214-1	3/4
1414-1	7/8
1614-1	1
2014-1	1-1/4
2414-1	1-1/2
3214-1	2

Note: Ferrules are available in standard metal materials as well as standard plastics like PTFE and nylon. Please consult the factory for availability.

METRIC Back Ferrule *For metric tube*



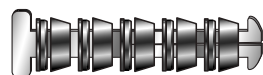
For stainless steel, sizes 6mm–25mm are Suparcase ferrules.

INTER-CHANGES WITH	MM TUBE O.D.
2M4-1	2
3M4-1	3
4M4-1	4
6M4-1	6
8M4-1	8
10M4-1	10
12M4-1	12
14M4-1	14
15M4-1	15
16M4-1	16
18M4-1	18
20M4-1	20
22M4-1	22
25M4-1	25

Note: Ferrules are available in standard metal materials as well as standard plastics like PTFE and nylon. Please consult the factory for availability.

Ferrule Holder

Package simplifies ordering, stocking, and assembling



INCHES TUBE O.D.
1/8
1/4
3/8
1/2
3/4
1

MM TUBE O.D.
6
8
10
12

*Material designator – 316-SS, B-Brass, S-Steel

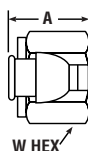
*Material designator – 316-SS, B-Brass, S-Steel

The Parker ferrule holder offers a new convenience. The holder contains individual ferrule sets. Ferrule sets may be dispensed one at a time.

Plug

For fractional tube

For plugging open ended CPI™/A-LOK® fitting ends



INCHES			
TUBE O.D.	THREAD	A	W HEX
1/16	10-32	0.31	5/16
1/8	5/16-20	0.47	7/16
3/16	3/8-20	0.47	1/2
1/4	7/16-20	0.50	9/16
5/16	1/2-20	0.53	5/8
3/8	9/16-20	0.56	11/16
1/2	3/4-20	0.69	7/8
5/8	7/8-20	0.69	1
3/4	1-20	0.69	1-1/8
7/8	1-1/8-20	0.69	1-1/4
1	1-5/16-20	0.81	1-1/2
1-1/4	1-5/8-20	1.35	1-7/8
1-1/2	1-15/16-20	1.72	2-1/4
2	2-5/8-20	2.27	3

HOW TO ASSEMBLE

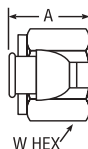
Wrench tighten only 1/4 turn from finger tight position. Assembly includes machined ferrule with lock ring.

Dimensions for reference only, subject to change.

Plug

For metric tube

For plugging open ended CPI™/A-LOK® fitting ends



MILLIMETERS			
TUBE O.D.	THREAD	A	W HEX
2	5/16-20	11,9	12,0
3	5/16-20	11,9	12,0
4	3/8-20	11,9	12,0
6	7/16-20	12,7	14,0
8	1/2-20	13,5	16,0
10	5/8-20	15,1	19,0
12	3/4-20	17,5	22,0
14	7/8-20	17,5	25,0
15	7/8-20	17,5	25,0
16	7/8-20	17,5	25,0
18	1-20	17,5	30,0
20	1-1/8-20	17,5	32,0
22	1-1/8-20	17,5	32,0
25	1-5/16-20	20,6	38,0

HOW TO ASSEMBLE

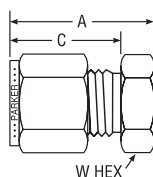
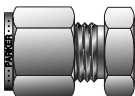
Wrench tighten only 1/4 turn from finger tight position. Assembly includes machined ferrule with lock ring.

Dimensions for reference only, subject to change.

Cap

For fractional tube

For capping open ended tubing



INCHES			
TUBE O.D.	A	C	W HEX
1/16	0.56	0.43	5/16
1/8	0.79	0.60	7/16
3/16	0.84	0.64	7/16
1/4	0.92	0.70	1/2
5/16	0.96	0.73	9/16
3/8	1.01	0.76	5/8
1/2	1.15	0.87	13/16
5/8	1.18	0.87	15/16
3/4	1.25	0.87	1-1/16
7/8	1.31	0.87	1-3/16
1	1.52	1.05	1-3/8
1-1/4	2.09	1.52	1-3/4
1-1/2	2.53	1.77	2-1/8
2	3.41	2.47	2-3/4

NOTE: For body only specify PNZ.

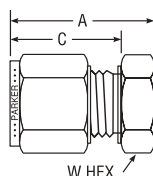
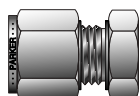
Dimensions for reference only, subject to change.

A and C dimensions are typical finger-tight.

Cap

For metric tube

For capping open ended tubing



CPI™ PART NO.	A-LOK® PART NO.	INTER- CHANGES WITH	MILLIMETERS			
			TUBE O. D.	A	C	W HEX
PNBZ 2	BLENM2	2MO-C	2	13,5	15,3	12,0
PNBZ 3	BLENM3	3MO-C	3	13,5	15,3	12,0
PNBZ 4	BLENM4	4MO-C	4	14,3	16,1	12,0
PNBZ 6	BLENM6	6MO-C	6	15,9	17,7	14,0
PNBZ 8	BLENM8	8MO-C	8	17,1	18,6	15,0
PNBZ 10	BLENM10	10MO-C	10	19,1	19,5	18,0
PNBZ 12	BLENM12	12MO-C	12	19,1	22,0	22,0
PNBZ 14	BLENM14	14MO-C	14	19,8	22,0	24,0
PNBZ 15	BLENM15	15MO-C	15	19,8	22,0	24,0
PNBZ 16	BLENM16	16MO-C	16	19,8	22,0	24,0
PNBZ 18	BLENM18	18MO-C	18	21,3	22,0	27,0
PNBZ 20	BLENM20	20MO-C	20	23,9	22,0	30,0
PNBZ 22	BLENM22	22MO-C	22	23,9	22,0	30,0
PNBZ 25	BLENM25	25MO-C	25	26,2	26,5	35,0

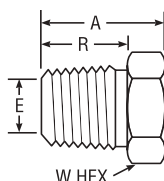
NOTE: For body only specify PNZ.

Dimensions for reference only, subject to change.

A and C dimensions are typical finger-tight.

Vent Protector NPT Male Pipe Thread

For fractional tube



CPI™ PART NO.	INTER- CHANGES WITH	INCHES				
		THREAD SIZE	A	R	E MINIMUM OPENING	W HEX
2 MDF	MS-MD-2M	1/8-27	0.63	.38	.19	9/16
4 MDF	MS-MD-4M	1/4-18	0.81	.56	.28	9/16
6 MDF	MS-MD-6M	3/8-18	0.81	.56	.41	11/16
8 MDF	MS-MD-8M	1/2-14	1.06	.75	.50	7/8
12 MDF	MS-MD-12M	3/4-14	1.13	.75	.63	1-1/16
16 MDF	MS-MD-16M	1-11-1/2	1.31	.95	.94	1-3/8

Dimensions for reference only, subject to change.

Parker Instrumentation vent protectors (mud dauber fittings) protect open ends of instruments, tubing, outlet vents, etc.

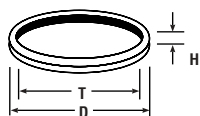
The mesh wire screen prevents foreign bodies such as insects or debris from entering and clogging various systems and causing damage.

- pipe plug, bored-thru design
- 40 x 40 mesh, .010 diameter wire screen
- designed to vent female pipe, straights, elbows or tees.

Sealing Washers

Bonded Seals

Consists of an outer stainless steel ring with a fluorocarbon inner ring used to seal a male ISO parallel thread.



T BSPP THREAD	D	H
1/8	0.63	.08
1/4	0.81	.08
3/8	0.94	.08
1/2	1.12	.10
3/4	1.38	.10
1	1.69	.10

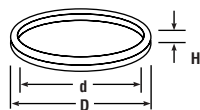
Simply replace Suffix SS with S

These seals are also available in steel with a nitrile inner ring.

PRESSURE RATINGS FOR SEALING WASHER		
THREAD SIZE	PSI	BAR
1/8	5300	370
1/4	5500	380
3/8	4400	300
1/2	4000	280
3/4	3700	260
1	2800	190

Dimensions for reference only, subject to change.

Copper Washers



For BSPP male thread sealing

THREAD	D	d	H
1/8	0.71	0.39	.09
1/4	0.87	0.55	.09
3/8	0.94	0.67	.09
1/2	1.18	0.87	.10
3/4	1.38	1.06	.09
1	1.65	1.34	.09

For BSPP female thread sealing

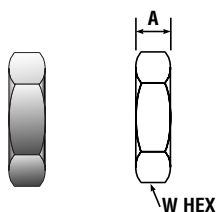
THREAD	D	d	H
1/8	0.322	.188	.062
1/4	0.436	.250	.062
3/8	0.574	.375	.062
1/2	0.719	.500	.062
3/4	0.935	.719	.062
1	1.178	.969	.093

Dimensions for reference only, subject to change.

Used to provide a seal with male or female parallel ISO threads.

Please note the pressure ratings are based on taper threaded ends. The pressure rating for the BSPP ends are dependent on the type of sealing washer used.

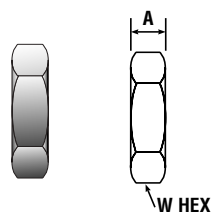
Bulkhead Locknut For fractional tube



INCHES			
A-LOK® THREAD	TUBE O.D.	A	W HEX
10-32	1/16	.13	5/16
5/16-20	1/8	.19	1/2
3/8-20	3/16	.22	9/16
7/16-20	1/4	.22	5/8
1/2-20	5/16	.23	11/16
9/16-20	3/8	.25	3/4
3/4-20	1/2	.28	15/16
7/8-20	5/8	.31	1-1/16
1"-20	3/4	.34	1-3/16
1-1/8-20	7/8	.38	1-3/8
1-5/16-20	1	.38	1-5/8

Dimensions for reference only, subject to change.

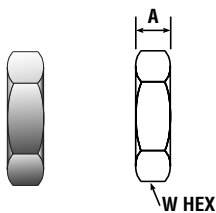
Bulkhead Locknut For fractional tube



INCHES			
SAE ADJ. STR. THREAD	TUBE O.D.	A	W HEX
7/16-20	1/4	.28	11/16
9/16-18	3/8	.27	13/16
3/4-16	1/2	.31	1
1-1/16-12	3/4	.41	1-3/8
1-5/16-12	1	.41	1-5/8

Dimensions for reference only, subject to change.

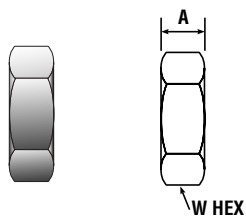
Bulkhead Locknut For metric tube



MILLIMETERS			
SAE ADJ. STR. THREAD	TUBE O.D.	A	W HEX
5/16-20	2 & 3	4,8	13,0
3/8-20	4	5,6	14,0
7/16-20	6	5,6	16,0
1/2-20	8	5,6	17,0
5/8-20	10	6,4	21,0
3/4-20	12	7,1	24,0
7/8-20	14, 15 & 16	7,9	27,0
1-20	18	8,6	30,0
1-1/8-20	20 & 22	9,7	33,0
1-5/16-20	25	9,7	41,0

Dimensions for reference only, subject to change.

Accessory Locknut

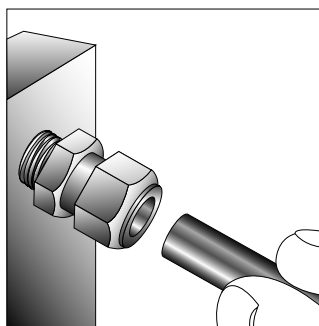


INCHES		
STRAIGHT THREAD	A	W HEX
5/16-24	.22	7/16
3/8-24	.22	1/2
7/16-20	.28	9/16
1/2-20	.28	5/8
9/16-18	.28	11/16
3/4-16	.31	7/8
7/8-14	.36	1
1-1/16-12	.41	1-1/4
1-3/16-12	.41	1-3/8
1-5/16-12	.41	1-1/2

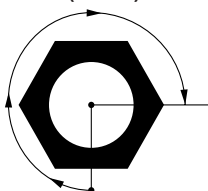
Dimensions for reference only, subject to change.

NOTE: For use with M2SC and M2TU fittings on pages 55 and 56.

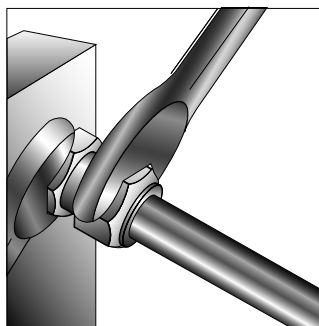
Assembly & Remake Instructions



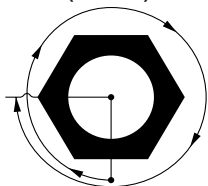
INCH SIZE 1 thru 3
(1/16" - 3/16")
METRIC SIZE 2 thru 4
(2-4mm)



Only 3/4 turn from finger tight is necessary to seal and will result in additional remakes of the fitting



INCH SIZE 4 thru 16
(1/4" - 1")
METRIC SIZE 6 thru 25
(6-25mm)



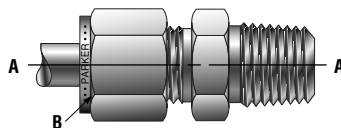
1-1/4 Turns from Finger Tight

1. Parker instrument tube fittings are sold completely assembled and ready for immediate use. Simply insert the tube as illustrated until it bottoms in the fitting body. (If the fitting is disassembled, note that the small tapered end of the ferrule(s) go into the fitting body.)
2. Tighten nut finger tight. Then tighten nut with wrench an additional 3/4 or 1-1/4 turns indicated at left. Hold fitting body with a second wrench to prevent body from turning. It is helpful to mark the nut to facilitate counting the number of turns.

For maximum number of remakes, mark the fitting and nut before disassembly. Before retightening, make sure the assembly has been inserted into the fitting until the ferrule seats in the fitting. Retighten the nut by hand. Rotate the nut with a wrench to the original position as indicated by the previous marks lining up. (A noticeable increase in mechanical resistance will be felt indicating the ferrule is being re-sprung into sealing position.)

Only after several remakes will it become necessary to advance the nut slightly past the original position. This advance (indicated by B) need only be 10°-20° (less than 1/3 of a hex flat).

For Sizes above 16 (1"), the Parker IPD Hydraulic Presetting Tool or Rotary Wrench Tool should be used. Cat. 4290-INST.

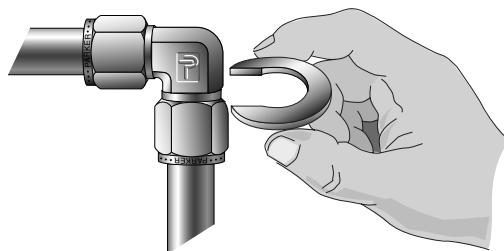
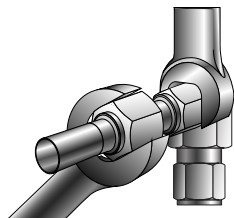


Parker CPI™/A-LOK® Tube Fitting part numbers use symbols to identify the size, style, and material. Tube and pipe thread sizes begin with a number indicating their size in sixteenths of an inch. For example, 4=4/16" or 1/4"; 16=16/16" or 1.

NOTE: Lubrication of the nut is **REQUIRED** for proper assembly on all **LARGER** size fittings in both inch and metric sizes. This requirement applies to:

- inch sizes of 20 and higher
- metric sizes of 25 and higher

Gaugeability Instructions*



1. From "finger tight" position, wrench 1-1/4 turns for 1/4" to 1" size fittings (6mm to 25mm) (1/16", 1/8", 3/16", 2mm 3mm and 4mm size tube fittings only wrench 3/4 turn from finger tight position). Hold fitting body hex with second wrench to prevent body from turning as you tighten. It is a good idea to mark the nut (scribe or ink) to help you count the turns.
2. Now select the proper size inspection gauge and try to place it, as shown, between the nut and the body hex. If gauge **DOES NOT FIT AT ANY POINT** between them, you have correctly tightened the nut. If you can slip the gauge into the space, the fitting is not properly made up, and you must repeat the assembly procedure.

*For initial make up only.

Instrument Tubing Selection Guide

Parker's instrument tube fittings have been designed to work in a wide variety of applications that demand the utmost in product performance.

Although Parker's Instrument tube fittings have been engineered and manufactured to consistently provide this level of reliability, no systems integrity is complete without considering the critical link, tubing.

This booklet is intended to assist the designer to properly select and order quality tubing.

Proper tube selection and installation, we believe, are key ingredients in building leak-free reliable tubing systems.

General Selection Criteria

The most important consideration in the selection of suitable tubing for any application is the compatibility of the tubing material with the media to be contained. Table 1 lists common materials and their associated general application. Table 1 also lists the maximum and minimum operating temperature for the various tubing materials.

In addition, Parker instrument fittings are designed to work on like materials. Stainless steel fittings should be used only with stainless steel tubing, aluminum fittings with aluminum tubing, etc. The practice of mixing materials is strongly discouraged. The only exception is brass fittings with copper tubing.

Dissimilar materials in contact may be susceptible to galvanic corrosion. Further, different materials have different levels of hardness, and can adversely affect the fittings ability to seal on the tubing.

Table 1

TUBING MATERIAL	GENERAL APPLICATION	RECOMMENDED TEMPERATURE RANGE
Stainless Steel (Type 316)	High Pressure, High Temperature, Generally Corrosive Media	-425°F to 1,200°F (-255°C to 605°C)
Carbon Steel	High Pressure, High Temperature Oil, Air, Some Specialty Chemicals	-20°F to 800°F (-29°C to 425°C)
Copper	Low Temperature, Low Pressure Water, Oil, Air	-40°F to 400°F (-40°C to 205°C)
Aluminum	Low Temperature, Low Pressure Water, Oil, Air, Some Specialty Chemicals	-40°F to 400°F (-40°C to 205°C)
Monel® 400	Recommended for Sour Gas Applications Well Suited for Marine and General Chemical Processing Applications	-325°F to 800°F (-198°C to 425°C)
Hastelloy® C-276	Excellent Corrosion Resistance to Both Oxidizing and Reducing Media and Excellent Resistance to Localized Corrosion Attack	-325°F to 1000°F (-198°C to 535°C)
Carpenter® 20	Applications Requiring Resistance to Stress Corrosion Cracking in Extreme Conditions	-325°F to 800°F (-198°C to 425°C)
Inconel® Alloy 600	Recommended for High Temperature Applications with Generally Corrosive Media	-205°F to 1200°F (-130°C to 650°C)
Titanium	Resistant to Many Natural Environments such as Sea Water, Body Fluids and Salt Solutions	-75°F to 600°F (-59°C to 315°C)

1. For operating temperatures above 800°F (425°C), consideration should be given to media. 300 Series Stainless Steels are susceptible to carbide precipitation which may lead to intergranular corrosion at elevated temperatures.

2. Consideration should be given to maximum temperature ratings if fittings and/or tubing are coated or plated. All temperature ratings based on temperatures per ASME B31.3 Chemical Plant and Petroleum Refinery Piping Code, 1999 Edition.

The information listed in Table 1 is general in scope. For specific applications, please contact Parker's Instrumentation Products Division, Product Engineering Department (256) 881-2040.

NOTE: Hastelloy® is a registered trademark of Haynes International. Inconel®, and Monel® are registered trademarks of Special Metals Corporation. Carpenter® is a registered trademark of CRS Holdings Inc.

Gas Service

Special care must be taken when selecting tubing for gas service. In order to achieve a gas-tight seal, ferrules in instrument fittings must seal any surface imperfections. This is accomplished by the ferrules penetrating the surface of the tubing. Penetration can only be achieved if the tubing provides radial resistance and if the tubing material is softer than the ferrules.

Thick walled tubing helps to provide resistance. Tables 2–7 indicate the minimum acceptable wall thickness for various materials in gas service. The ratings in white indicate combination of diameter and wall thickness which are suitable for gas service.

Acceptable tubing hardness for general application is listed in Table 9. These values are the maximum allowed by ASTM. For gas service, better results can be obtained by using tubing well below this maximum hardness. For example, a desirable hardness of 80 Rb is suitable for stainless steel. The maximum allowed by ASTM is 90 Rb.

System Pressure

The system operating pressure is another important factor in determining the type, and more importantly, the size of tubing to be used. In general, high pressure installations require strong materials such as steel or stainless steel. Heavy walled softer tubing such as copper may be used if chemical compatibility exists with the media. However, the higher strength of steel or stainless steel permits the use of thinner tubes without reducing the ultimate rating of the system. In any event, tube fitting assemblies should never be pressurized beyond the recommended working pressure.

The following tables (2–7) list by material the maximum suggested working pressure of various tubing sizes. Acceptable tubing diameters and wall thicknesses are those for which a rating is listed. Combinations, which do not have a pressure rating, are not recommended for use with instrument fittings.

MAXIMUM ALLOWABLE WORKING PRESSURE TABLES

Table 2 316 or 304 STAINLESS STEEL (Seamless)																
Tube O.D. Size	Wall Thickness															
	0.010	0.012	0.014	0.016	0.020	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.134	0.156	0.188
1/16	5600	6900	8200	9500	12100	16800										
1/8						8600	10900									
3/16						5500	7000	10300								
1/4						4000	5100	7500	10300							
5/16							4100	5900	8100							
3/8							3300	4800	6600							
1/2							2600	3700	5100	6700						
5/8								3000	4000	5200	6100					
3/4								2400	3300	4300	5000	5800				
7/8								2100	2800	3600	4200	4900				
1									2400	3200	3700	4200	4700			
1-1/4										2500	2900	3300	3700	4100	4900	
1-1/2											2400	2700	3000	3400	4000	4500
2												2000	2200	2500	2900	3200

Table 3 316 or 304 STAINLESS STEEL (Welded)																
Tube O.D. Size	Wall Thickness															
	0.010	0.012	0.014	0.016	0.020	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.134	0.156	0.188
1/16	4800	5900	7000	8100	10300	14300										
1/8						7300	9300									
3/16						4700	6000	8700								
1/4						3400	4400	6400	8700							
5/16							3400	5000	6900							
3/8							2800	4100	5600							
1/2							2200	3200	4300	5700						
5/8								2500	3400	4500	5200					
3/4								2100	2800	3700	4200	4900				
7/8								1800	2400	3100	3600	4200				
1									2100	2700	3100	3600	4000			
1-1/4										2100	2400	2800	3100	3500	4200	
1-1/2											2000	2300	2600	2900	3400	4200
2												1700	1900	2100	2500	3000

Tube O.D. Size	Wall Thickness											
	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.134	0.148	0.165	0.180
1/8	8100	10300										
3/16	5200	6700	9700									
1/4	3800	4900	7100	9700								
5/16		3800	5500	7700								
3/8		3100	4500	6200								
1/2		2300	3300	4500	6000							
5/8		1800	2600	3500	4600	5400						
3/4			2200	2900	3800	4400	5100					
7/8			1800	2500	3200	3700	4300					
1			1600	2100	2800	3200	3700	4100				
1-1/4				1700	2200	2500	2900	3200	3700	3800		
1-1/2					1800	2100	2400	2700	3000	3400	3800	4000
2						1600	1800	2000	2200	2500	2800	3000

Tube O.D. Size	Wall Thickness				
	0.035	0.049	0.065	0.083	0.095
1/8	8700				
3/16	5600	8100			
1/4	4100	5900			
5/16	3200	4600			
3/8	2600	3800			
1/2	1900	2800	3800		
5/8	1500	2200	2900		
3/4		1800	2400	3200	
7/8		1500	2100	2700	
1		1300	1800	2300	2700

Tube O.D. Size	Wall Thickness									
	0.010	0.020	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120
1/16	1700	3800	5400							
1/8			2800	3600						
3/16			1800	2300	3500					
1/4			1300	1700	2600	3500				
5/16				1300	2000	2800				
3/8				1100	1600	2300				
1/2				800	1200	1600	2200			
5/8					900	1300	1700	2000		
3/4					800	1000	1400	1600	1900	
7/8					600	900	1100	1300	1600	
1					600	800	1000	1200	1400	1500
1-1/8					500	700	900	1000	1200	1300
1-1/4							800	900	1100	1200
1-1/2							650	750	850	950

Table 7 MONEL 400 (Seamless)										
Tube O.D. Size	Wall Thickness									
	0.010	0.020	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120
1/16	5500	11800	16300							
1/8			8100	10400						
3/16			5100	6600	9600					
1/4			3800	4800	7000	9600				
5/16				3800	5500	7500				
3/8				3100	4500	6100				
1/2				2300	3300	4500	5900			
5/8					2700	3700	4900	5600		
3/4					2300	3100	4000	4600	5400	
1						2300	2900	3400	3900	4400

- NOTE:**
- All working pressures have been calculated using the maximum allowable stress levels in accordance with ASME B31.3, Chemical Plant and Petroleum Refinery Piping Code, 1999 Edition.
 - All calculations are based on maximum outside diameter and minimum wall thickness.
 - All working pressures are ambient (72°F or 22°C) temperature.

System Temperature

Operating temperature is another factor in determining the proper tubing material. Copper and aluminum tubing are suitable for low temperature media. Stainless steel and carbon steel tubing are suitable for higher temperature media. Special alloys such as Alloy 600 are recommended for extremely high temperatures (see Table 1). Table 8 lists derating factors which should be applied to the working pressures listed in Tables 2–7 for elevated temperature conditions. Simply locate the correct factor in Table 8 and multiply this by the appropriate value in Tables 2–7 for elevated temperature working pressure.

Temperature		Copper	Aluminum	316 SS	304 SS	Steel	Monel 400
°F	(°C)						
100	(38)	1.00	1.00	1.00	1.00	1.00	1.00
200	(93)	.80	1.00	1.00	1.00	.96	.88
300	(149)	.78	.81	1.00	1.00	.90	.82
400	(204)	.50	.40	.97	.94	.86	.79
500	(260)			.90	.88	.82	.79
600	(316)			.85	.82	.77	.79
700	(371)			.82	.80	.73	.79
800	(427)			.80	.76	.59	.76
900	(486)			.78	.73		.43
1000	(538)			.77	.69		
1100	(593)			.62	.49		
1200	(649)			.37	.30		

EXAMPLE: 1/2 inch x .49 wall seamless 316 stainless steel tubing has a working pressure of 3700 psi @ room temperature. If the system were to operate @ 800°F (425°C), a factor of 80% or (.80) would apply (see Table 8 above) and the “at temperature” system pressure would be 3700 PSI x .80 = 2960 PSI.

Tubing Ordering Suggestions

Tubing for use with Parker instrument fittings must be carefully ordered to insure adequate quality for good performance. Each purchase order must specify the material nominal outside diameter, and wall thickness. Ordering to ASTM specifications insures that the tubing will be dimensionally, physically, and chemically within strict limits. Also, more stringent requirements may be added by the user. All tubing should be ordered free of scratches and suitable for bending.

A purchase order meeting the above criteria would read as follows:

“1/2 x .049 316 stainless steel, seamless, or welded and redrawn per ASTM A-249. Fully annealed, 80 Rb or less.

Must be suitable for bending; surface scratches, and imperfections (incomplete weld seams) are not permissible.”

Table 9 lists specific ordering information for each material.

Table 9				
Material	Type	ASTM Tubing Spec.	Condition	Max. Recommended Hardness
Stainless Steel	304, 316, 316L	ASTM-A-269, A-249, A-213, A632	Fully Annealed	90 Rb
Copper	K or L	ASTM-B75 B68, B88 (K or L)*	Soft Annealed Temper 0	60 Max. Rockwell 15T
Carbon Steel	1010	SAE-J524b, J525b ASTM-A-179	Fully Annealed	72 Rb
Aluminum	Alloy 6061	ASTM B-210	T6 Temper	56 Rb
Monel® 400	400	ASTM B-165	Fully Annealed	75 Rb
Hastelloy® C-276	C-276	ASTM-B-622, B-626	Fully Annealed	90 Rb
Inconel® Alloy 600	600	ASTM B-167	Fully Annealed	90 Rb
Carpenter® 20	20CB-3	ASTM B-468	Fully Annealed	90 Rb
Titanium	Commercially Pure Grade 2	ASTM B-338	Fully Annealed	99 Rb 200 Brinell Typical

*B88 Copper Tube to be ordered non-engraved

NOTE: Hastelloy® is a registered trademark of Haynes International. Inconel®, and Monel® are registered trademarks of Special Metals Corporation. Carpenter® is a registered trademark of CRS Holdings Inc.

Pipe Pressure Ratings

NPT / BSPT Pipe Size	BRASS			
	Male		Female	
	Straight ^a	Shape ^b	Straight ^a	Shape ^b
1/16	6000	5500	4500	3800
1/8	5600	5000	4000	2900
1/4	4100	4100	4300	3000
3/8	4000	4000	3500	2700
1/2	3900	3100	3600	2500
3/4	3800	3400	3000	2000
1	2700	2700	3100	2300
1-1/4	2000	2000	2300	1900
1-1/2	1800	1800	2100	1700
2	1600	1600	2000	1500

NPT / BSPT Pipe Size	STAINLESS STEEL			
	Male		Female	
	Straight ^a	Shape ^b	Straight ^a	Shape ^b
1/16	10000	9500	7500	7000
1/8	9100	9100	6400	5500
1/4	7500	7500	6600	5600
3/8	7200	7200	5300	5000
1/2	6600	5800	5200	4500
3/4	6400	6400	4300	3500
1	4600	4600	4500	3900
1-1/4	3500	3500	3500	3100
1-1/2	2900	2900	3200	2500
2	2600	2600	2700	2300

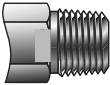
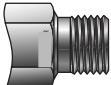

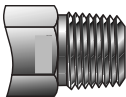
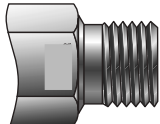

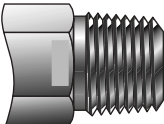
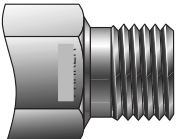

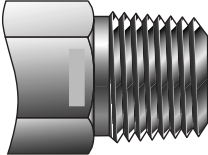
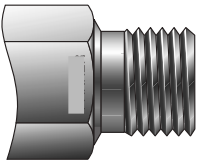

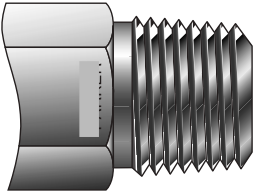
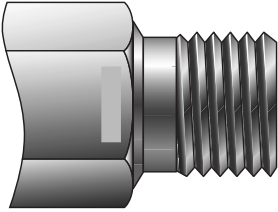

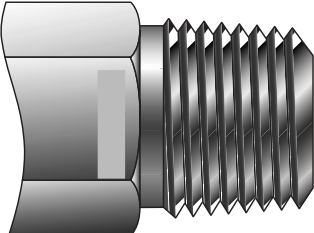
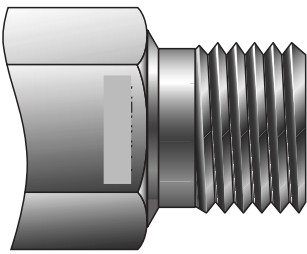

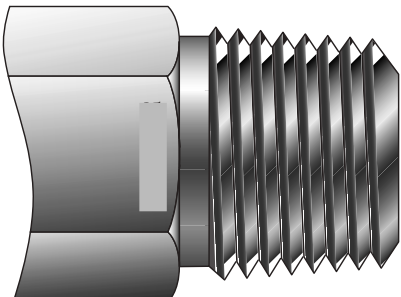
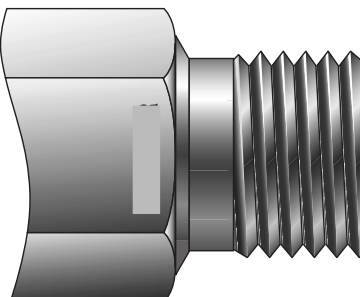


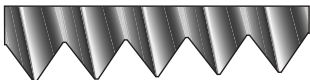
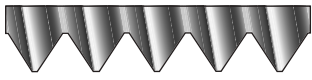

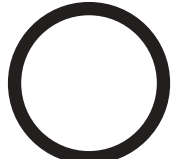
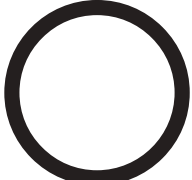
NPT / BSPT Pipe Size	CARBON STEEL			
	Male		Female	
	Straight ^a	Shape ^b	Straight ^a	Shape ^b
1/16	10500	10100	8000	7500
1/8	9700	9700	6800	5900
1/4	8000	8000	7000	6000
3/8	7600	7600	5600	5300
1/2	7000	6200	5500	4800
3/4	6800	6800	4600	3700
1	4900	4900	4800	4200
1-1/4	3700	3700	3700	3300
1-1/2	3100	3100	3400	2600
2	2800	2800	2800	2400

Notes:

- Fittings manufactured from bar stock.
- Fittings manufactured from forgings.
- Material of construction in accordance with Parker Catalog 4230/4233, Table 1.
- Pressure ratings for fittings with both tube and pipe ends are rated to the lower pressure.

Thread & Tube End Size Chart (USA)

Catalog 4230/4233

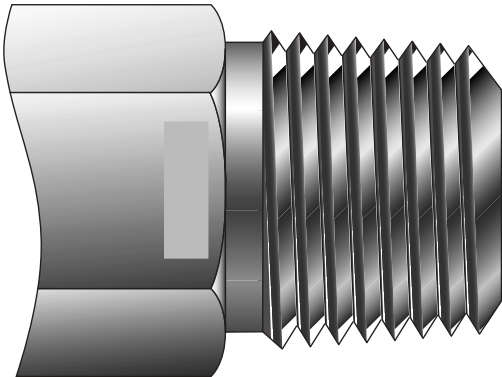
NPT Thread		Straight Thread		Tubing O.D. Size	
	1/16"		5/16-24		1/16"
	1/8" (1/8-27)		7/16-20		1/8"
	1/4" (1/4-18)		1/2-20		3/16"
	3/8" (3/8-18)		9/16-18		1/4"
	1/2" (1/2-14)		3/4-16		5/16"
	3/4" (3/4-14)		7/8-14		3/8"
	1" (1"-11 1/2)		1-1/16-12		1/2"
American Standard Pipe Thread (NPT)		American Standard Unified Thread (Straight)			5/8"
					3/4"
60° thread angle • Pitch measured in inches • Truncation of root and crest are flat • Taper angle 1°47'		60° thread angle • Pitch measured in inches • Truncation of root and crest are flat • Diameter measured in inches			7/8"
					1"

Thread & Tube End Size Chart (USA)

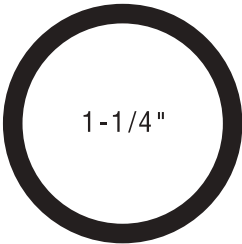
NPT Thread

Tubing O.D. Size

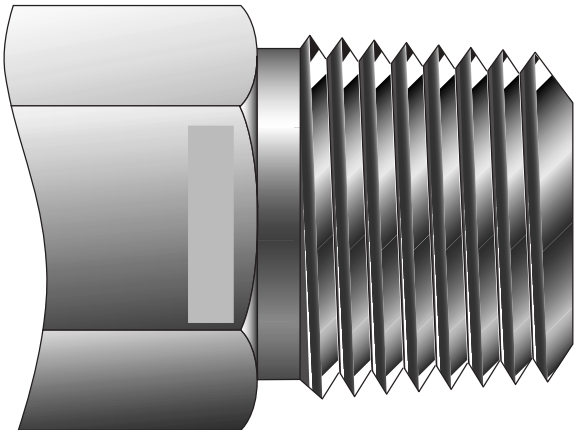
Tubing O.D. Size



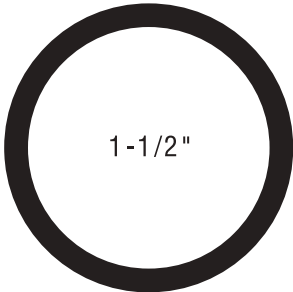
1-1/4"
(1-1/4" - 11-1/2")



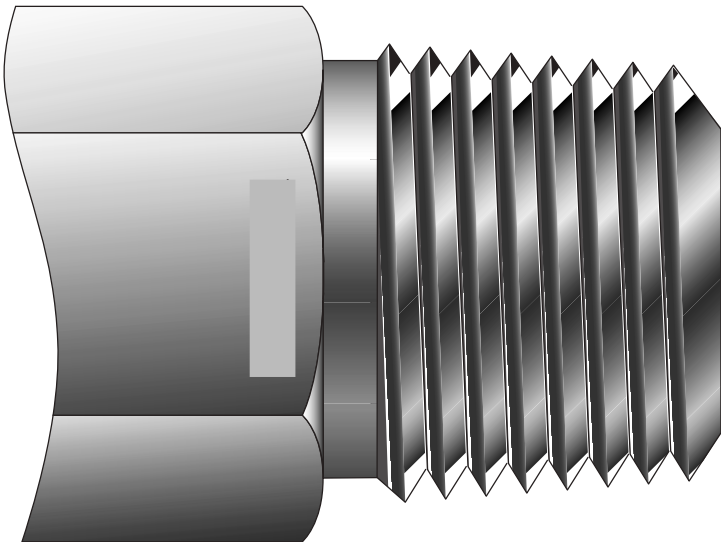
1-1/4"



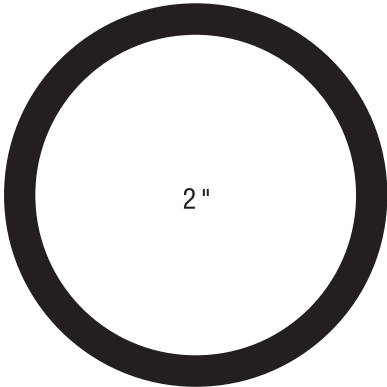
1-1/2"
(1-1/2" - 11-1/2")



1-1/2"



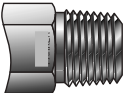
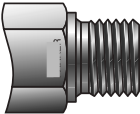



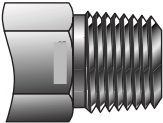
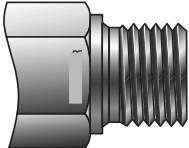


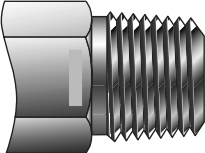
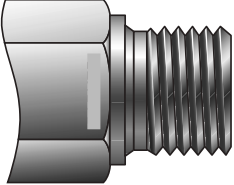


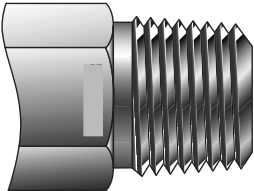
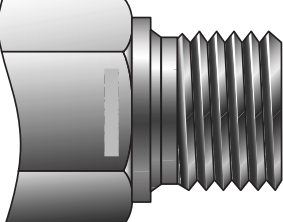


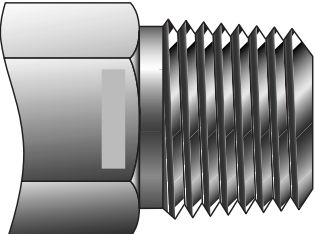
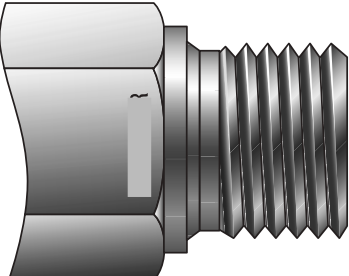


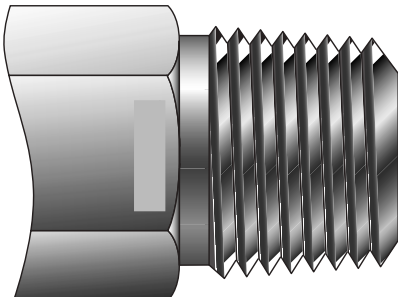
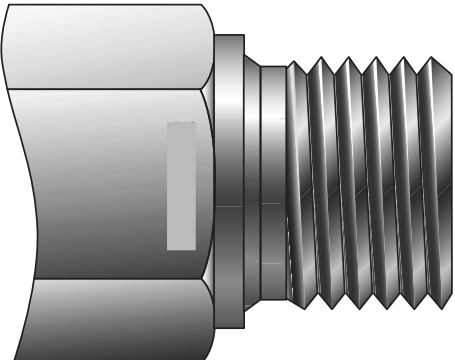

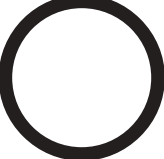
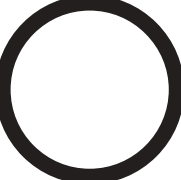
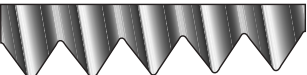
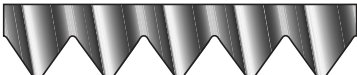
2"
(2" - 11-1/2")



2"

Thread & Tube End Size Chart (USA)

Catalog 4230/4233

BSPT Tapered Thread		BSPP Parallel Thread		Tubing O.D. Size	
	1/8" (1/8-28)		1/8" (1/8-28)		2 m m
					3 m m
					4 m m
	1/4" (1/4-19)		1/4" (1/4-19)		6 m m
					8 m m
	3/8" (3/8-19)		3/8" (3/8-19)		10 m m
					12 m m
	1/2" (1/2-14)		1/2" (1/2-14)		14 m m
					15 m m
	3/4" (3/4-14)		3/4" (3/4-14)		16 m m
					18 m m
	1" (1"-11)		1" (1"-11)		20 m m
					22 m m
International Organization for Standards (ISO 7/1)		International Organization for Standards (ISO 228/1)			25 m m
					
55° thread angle • Pitch measured in inches • Truncation of root and crest are round • Taper angle 1°47'		55° thread angle • Pitch measured in inches • Truncation of root and crest are round • Diameter measured in inches			

Offer of Sale

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods or work described will be referred to as "Products".

1. Terms and Conditions. Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is expressly conditioned on Buyer's assent to these Terms and Conditions and to the terms and conditions found on-line at www.parker.com/saleterms/. Seller objects to any contrary or additional term or condition of Buyer's order or any other document issued by Buyer.

2. Price Adjustments; Payments. Prices stated on the reverse side or preceding pages of this document are valid for 30 days. After 30 days, Seller may change prices to reflect any increase in its costs resulting from state, federal or local legislation, price increases from its suppliers, or any change in the rate, charge, or classification of any carrier. The prices stated on the reverse or preceding pages of this document do not include any sales, use, or other taxes unless so stated specifically. Unless otherwise specified by Seller, all prices are F.O.B. Seller's facility, and payment is due 30 days from the date of invoice. After 30 days, Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. Delivery Dates; Title and Risk; Shipment. All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon tender to the carrier at Seller's facility (i.e., when it's on the truck, it's yours). Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's changes in shipping, product specifications or in accordance with Section 13, herein.

4. Warranty. Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of twelve months from the date of delivery to Buyer or 2,000 hours of normal use, whichever occurs first. This warranty is made only to Buyer and does not extend to anyone to whom Products are sold after purchased from Seller. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

5. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will

be allowed unless asserted in writing within 60 days after delivery or, in the case of an alleged breach of warranty, within 30 days after the date within the warranty period on which the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for any amount due to Seller from Buyer) must be commenced within thirteen months from the date of tender of delivery by Seller or, for a cause of action based upon an alleged breach of warranty, within thirteen months from the date within the warranty period on which the defect is or should have been discovered by Buyer.

6. LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.

7. Contingencies. Seller shall not be liable for any default or delay in performance if caused by circumstances beyond the reasonable control of Seller.

8. User Responsibility. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

9. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

10. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products.

Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

11. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer.

12. Improper use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

13. Cancellations and Changes. Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

14. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

15. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of the agreement. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

16. Waiver and Severability. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidity of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

17. Termination. This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may

by written notice immediately terminate this agreement for the following: (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custodian for all or any part of Buyer's property (c) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by a third party (d) an assignment for the benefit of creditors, or (e) the dissolution or liquidation of the Buyer.

18. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both parties expressly agree in writing to arbitrate the dispute.

19. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

20. Taxes. Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of Products.

21. Equal Opportunity Clause. For the performance of government contracts and where dollar value of the Products exceed \$10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRAA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated.