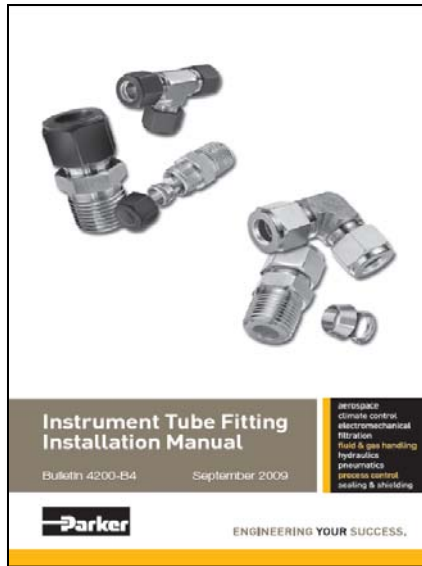


Tube Fabrication



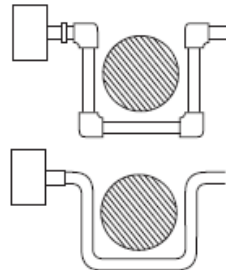
Instrumentation Tubing vs Pipe Installation

In Parker's IPD Bulletin 4200-B4 the advantages of Tubing over Pipe are outlined.



Tubing vs. Pipe

Standard fluid line systems, whether for simple household use or for the more exacting requirements of industry, were for many years constructed from threaded pipe of assorted materials and were assembled with various standard pipe fitting shapes, unions and nipples. Such systems under high pressures were plagued with leakage problems besides being cumbersome, inefficient and costly to assemble and maintain. Therefore, the use of pipe in these systems has largely been replaced by tubing because of the many advantages it offers.



Old Method – Each connection is threaded – requires numerous fittings – system not flexible or easy to install and service connections not smooth inside – pockets obstruct flow.

Modern Method – Bendable tubing needs fewer fittings – no threading required – system light and compact – easy to install and service – no internal pockets or obstructions to free flow.

Figure 1 Tubing provides simplified, free flow system.

Major Advantages of Tubing vs. Pipe

1. **Bending Quality** – Tubing has strong but relatively thin walls; is easy to bend. Tube fabrication is simple.
2. **Greater Strength** – Tubing is stronger. No weakened sections from reduction of wall thickness by threading.

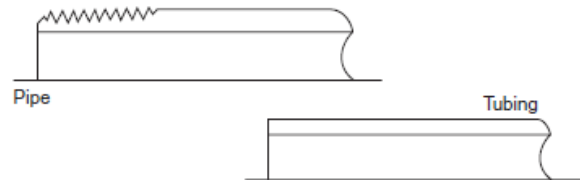


Figure 2 With no threading necessary, tubing does not require extra wall thickness

3. **Less Turbulence** – Smooth bends result in streamlined flow passage and less pressure drop.
4. **Economy of Space and Weight** – With its better bending qualities and a smaller outside diameter, tubing saves space and permits working in close quarters. Tube fittings are smaller and also weigh less.
5. **Flexibility** – Tubing is less rigid, has less tendency to transmit vibration from one connection to another.
6. **Fewer Fittings** – Tubing bends substitute for elbows. Fewer fittings mean fewer joints, fewer leak paths.
7. **Tighter Joints** – Quality tube fittings, correctly assembled, give better assurance of leak-free systems.
8. **Better Appearance** – Tubing permits smoother contours with fewer fittings for a professional look to tubing systems.
9. **Cleaner Fabrication** – No sealing compounds on tube connections. Again no threading; minimum chance of scale, metal chips, foreign particles in system.
10. **Easier Assembly and Disassembly** – Every tube connection serves as a union. Tube connections can be reassembled repeatedly with easy wrench action.
11. **Less Maintenance** – Advantages of tubing and tube fittings add up to dependable, trouble-free installations.

Parker's Distributor – Moody Price, recently updated this (comparison) information to help promote large size tubing over piping

System Review-Instrumentation Tubing vs Pipe								
		Tubing			Piping		Piping	
Item #	Qty.	Description	Unit Price	Total	316SS Unit Price	Total	304SS Unit Price	Total
1	2740	2" tubing .156 Wall Seamless	\$31.18	\$85,433.20	19.41	\$53,183.40	\$17.96	\$49,210.40
2	93	2" tube unions 32SC32	\$273.87	\$25,469.91	34.61	\$3,218.73	\$32.18	\$2,992.74
3	28	2" tube x 1 1/2 NPT 32MSC24N	\$510.50	\$14,294.00	\$510.50	\$14,294.00	\$510.50	\$14,294.00
4	36	2" tube Tees 32ET32	\$607.10	\$21,855.60	92.33	\$3,323.88	\$88.13	\$3,172.68
5	550	2" Cush-A-Clamp 032N036	\$5.67	\$3,118.50	\$5.67	\$3,118.50	\$5.67	\$3,118.50
6	18	2" tube x 2" Female 32FSC32N	\$284.86	\$5,127.48	\$284.86	\$5,127.48	\$284.86	\$5,127.48
7	3	2" tube x 1 1/4" tube unions 32RU20	\$588.08	\$1,764.24	39.76	\$119.28	\$34.99	\$104.97
8	3	2" tube x 1 1/2" tube unions 32RU24	\$632.18	\$1,896.54	46.44	\$139.32	\$42.48	\$127.44
9	16	1 1/2" x 6" s/s pipe 316SS nipple TBE s/80	\$28.31	\$452.96	53.96	\$863.36	\$49.75	\$796.00
10	12	1 1/2" x 3 s/s pipe 316SS nipple TBE s/80	\$17.89	\$214.68	24.38	\$292.56	\$23.02	\$276.24
11	10	1" x 6" s/s pipe 316SS nipple TBE s/80	\$18.75	\$187.50	29.57	\$295.70	\$27.16	\$271.60
12	18	1 1/2" x 1" s/s pipe 316SS Bushing 3000# s/s	\$21.16	\$380.88	21.89	\$394.02	\$19.59	\$352.62
13	14	2" x 1" tube rod male adaptor 31MA16N	\$487.56	\$6,825.84	\$487.56	\$6,825.84	\$487.56	\$6,825.84
1	8	5/8" tube x 1/2" tube 10RU6	\$30.00	\$240.00	19.75	\$158.00	\$18.82	\$150.56
2	12	1 1/4" tube x 1" Female 20FSC16N	\$109.95	\$1,319.40	\$109.95	\$1,319.40	\$109.95	\$1,319.40
3	8	1 1/4" tube x 1 1/4" Female 20FSC20N	\$96.54	\$772.32	\$96.54	\$772.32	\$96.54	\$772.32
4	18	5/8" tube x 1/2" NPT 10MSC8N	\$16.43	\$295.74	\$16.43	\$295.74	\$16.43	\$295.74
5	10	5/8" tube x 1/2" Steel In Rod 10TUR8	\$15.19	\$151.90	\$15.19	\$151.90	\$15.19	\$151.90
6	42	1 1/4" x 1" NPT 20MSC16N	\$83.34	\$3,500.28	\$83.34	\$3,500.28	\$83.34	\$3,500.28
7	198	1 1/4" Tube Unions 20SC20	\$103.52	\$20,496.96	22.59	\$4,472.82	\$20.93	\$4,144.14
8	14	1 1/4" Tube Tee 20ET20	\$22.89	\$320.46	84.16	\$1,178.24	\$79.26	\$1,109.64
9	900	Cush-A-Clamp 1 1/4" 020T024	\$2.78	\$2,502.00	\$2.78	\$2,502.00	\$2.78	\$2,502.00
10	4500	1 1/4" tubing 109 Wall Seamless 304	\$11.40	\$51,300.00	9.74	\$43,830.00	\$9.02	\$40,590.00
11	12	1 1/4" x 1" pipe bushing 316 s/s 3000#	\$18.18	\$218.16	20.08	\$240.96	\$19.18	\$230.16
12	10	1 1/4" x 1" pipe bushing 316 s/s 3000#	\$18.18	\$181.80	20.08	\$200.80	\$19.18	\$191.80
13	12	1 1/4" x 1 1/2" pipe bushing 316 s/s 3000#	\$21.16	\$253.92	26.12	\$313.44	\$23.94	\$287.28
Total		TOTAL - MATERIAL COSTS		\$248,574.27		\$150,131.97		\$141,915.73
Item #	Qty.	Description	Unit Price	Total	Unit Price	Total	Total	
1	2740	2" tubing .156 Wall Seamless	\$20.00	\$54,800.00	\$60.00	\$164,400.00	\$60.00	\$164,400.00
10	4500	1 1/4" tubing 109 Wall Seamless 304	\$20.00	\$90,000.00	\$60.00	\$270,000.00	\$60.00	\$270,000.00
Total		TOTAL - LABOR COSTS		\$144,800.00		\$434,400.00		\$434,400.00
Item #	Qty.	Description	Tubing		Piping		Piping	
		TOTAL - MATERIAL & LABOR		\$393,374.27		\$584,531.97		\$576,315.73
Tubing = .5 manhour/foot x \$40.00/hour = \$20.00/foot								
Pipe = 1.5 manhour/foot x \$40.00/hour = \$60.00/foot								