

FIBERGLASS PIPE GROUP

# Estimated Man-hours for Assembly of Bondstrand® Systems

matching taper/taper and Quick-Lock® adhesive joints; Pronto-Lock®/Pronto-Lock II, and Key-Lock™ mechanical joints

**General**

The information in this bulletin may be helpful in estimating construction costs where Bondstrand products will be used. The tables estimate man-hours for making various Bondstrand joints. The estimates are based on timed tests under ideal conditions: an experienced person with all necessary materials at hand. Times do not include jiggling, measuring, planning, and other activities normally associated with piping joint fabrication. Actual times may vary due to environmental conditions, skill and experience of the fabricator, and the equipment available. These times are based on the assumption that the crew received limited training from an Ameron Certified Technician and they are familiar with basic installation procedures as recommended in standard Ameron literature. Once the crew gains familiarity with the procedure, total time may be reduced as much as 50%. The estimates are given using tools that are new or in perfect operating condition. The cutting blades are sharp and suitable for cutting glass fibers and resin materials.

**Taper/taper and Pronto-Lock/Pronto-Lock II**

Table 1 estimates installation of taper/taper adhesive joints and Pronto-Lock/Pronto-Lock II mechanical joints. (Series 3000A, 3200 and 3300 Series)

**Quick-Lock**

Table 2 estimates installation of Quick-Lock adhesive bonded joints.(Series 2000, 2000M, 2000M-FP, 4000, 5000, 7000 and PSX Series)

**Key-Lock and Quick-Lock**

Table 3 estimates man-hours required for field fabrication of piping using both Quick-Lock and Key-Lock joints. Key-Lock joint assembly times are based on a single key joining of a male end of a pipe to a coupling already mounted on a pipe end fitting. For comparison, man-hours for fabricating welded joints in selected types of metallic piping are included.

Assemblers will be experienced after a few hours of training. This gives the contractor the option to use less skilled (and less expensive) labor than certified welders. The assembly of Bondstrand piping generally does not require heavy lifting equipment, reducing the set-up and assembly time and eliminating the need for skilled equipment operators.

**Table 1 Estimated Man-hours to Assemble Taper/Taper or Pronto-Lock/Pronto Lock II Joint**

Step #	Operation	Pipe Diameter (in•mm)								
		2•50	3•75	4•100	6•150	8•200	10•250	12•300	14•350	16•400
1	<b>Cutting:</b> 1.1 Hand saw <sup>1</sup> 1.2 Power saw <sup>1</sup>	0.03	0.05	0.07	0.07	–	–	–	–	–
		0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.04	0.05
2	<b>Tapering:</b> 2.1 Hand tool <sup>2</sup> 2.2 Power tool <sup>2</sup>	0.08	0.12	0.14	0.20	–	–	–	–	–
		0.05	0.08	0.09	0.12	0.17	0.20	0.25	0.27	0.35
3	<b>Surface preparation</b>	0.05	0.08	0.10	0.14	0.15	0.18	0.22	0.26	0.30
4	<b>Mix &amp; apply adhesive:</b>	0.03	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08
5	<b>Joint make-up:</b> 5.1 Adhesive T/T bell x spigot <sup>3</sup> 5.2 Pronto-Lock/Pronto-Lock II	0.02	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.09
		0.02	0.02	0.03	0.04	0.05	0.06	0.06	0.06	0.07
6	<b>Total joint completion time:</b> 6.1 Field prepared T/T bell x spigot 6.2 Factory prepared T/T bell x spigot 6.3 Pronto-Lock/Pronto-Lock II <sup>4</sup>	0.14	0.19	0.23	0.30	0.39	0.43	0.52	0.59	0.72
		0.10	0.14	0.17	0.23	0.26	0.29	0.35	0.41	0.47
		0.02	0.02	0.03	0.04	0.05	0.06	0.06	0.07	0.08

ISO-9001



<sup>1</sup> Using a pipe cutting hacksaw blade with 26 or more teeth for 2" through 6"; pipe cutting circular saw has abrasive wheel for 8" through 16" Tripod pipe vise or strap-down fixture is used to hold pipe in place.

<sup>2</sup> For 2"-6", using Ameron Unique tool set; for 8"-16", using Taper Tool II set

<sup>3</sup> For 6" diameters and above, a comealong is used to pull the joint together during joint make up.

<sup>4</sup> Field installation of Pronto-Lock or Pronto-Lock II male assemblies requires approximately 75% of the times shown in Step 6.1.

Note: Recommended minimum number of crew for 2"-4", 6"-12" and 14"-16" is two, three and four respectively.

**Table 2****Estimated Man-hours to Assemble Quick-Lock Joint**

Step #	Operation	Pipe Diameter (in•mm)								
		2•50	3•75	4•100	6•150	8•200	10•250	12•300	14•350	16•400
1	Sand socket <sup>1</sup>	0.03	0.05	0.06	0.08	0.10	0.12	0.13	0.15	0.17
2	Sand spigot <sup>1</sup>	0.03	0.05	0.06	0.08	0.10	0.12	0.13	0.15	0.17
3	Mark pipe & cut to length <sup>2</sup>	0.06	0.06	0.07	0.07	0.11	0.15	0.19	0.23	0.2
4	Shave Spigot <sup>3</sup>	0.04	0.04	0.04	0.05	0.05	0.05	0.06	0.16	0.18
5	Mix & apply adhesive	0.05	0.06	0.06	0.07	0.08	0.09	0.10	0.16	0.20
6	Assemble joint, remove excess adhesive and attach heat blanket	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08
7	Total preparation time for socket & spigot joint with factory-made spigot (sum of steps 1, 2, 5 & 6)	0.13	0.19	0.21	0.27	0.33	0.38	0.42	0.53	0.62
8	Total for preparing socket & spigot joint requiring shaving of spigot (sum of steps 1, 3, 4, 5 & 6)	0.20	0.24	0.26	0.31	0.39	0.46	0.54	0.77	0.89

<sup>1</sup> Using a flapper type sanding wheel. Time may be less, depending on length of time pipe has been weathered.

<sup>2</sup> Hand hacksaw cutting. Time required may be reduced if an abrasive wheel or sabre saw is used.

<sup>3</sup> For sizes 2" through 12" based on using a standard pipe threading drive motor at 20 rpm with an M74 pipe shaver. Shaving can be done by hand at about the same speed but worker will tire. For 14" and 16" sizes, based on use of large diameter shaver (M80) at 12 rpm. Time can be reduced on 1" through 8" sizes by using a B1 shaver and ½" electric drill.

**Table 3****Estimated Man-hours Required to Fabricate Piping Assemblies**

Operation	Pipe Diameter (in•mm)									
	2•50	3•75	4•100	6•150	8•200	10•250	12•300	14•350	16•400	
<b>Quick-Lock:<sup>1</sup></b>										
Assembly of bell & spigot joint with field shaving of spigot	0.4	0.5	0.7	0.8	0.9	1.1	1.2	1.6	1.9	
<b>Key-Lock:<sup>2</sup></b>										
Joining pipe sections with Key-Lock male/female ends	0.3	0.3	0.4	0.5	0.6	0.8	1.0	1.1	1.3	
<b>Metallic Alternatives:<sup>3</sup></b>										
Welded Joints:										
Schedule 40 carbon steel	1.0	1.3	1.5	2.0	2.6	3.1	4.1	5.0	6.6	
Schedule 80 carbon steel	1.0	1.4	1.8	2.5	3.3	5.1	6.6	9.6	12.4	
Schedule 10S stainless steel	1.4	1.9	2.4	3.3	4.5	5.6	6.7	8.3	10.0	
Schedule 40 copper-nickel	1.5	2.1	2.4	3.3	4.5	5.7	8.0	10.0	14.2	

<sup>1</sup> Joining includes operations described in Table 2 plus time for various routine aligning and measuring operations discussed in text.

<sup>2</sup> Joining includes cleaning, lubricating, and placing O-ring and single locking key.

<sup>3</sup> Values are from: Page, John, S., and James G. Nation, *Estimator's Piping Man Hour Manual*, 3rd edition, Gulf Publishing Co., Houston, 1979. Estimated man-hours do not include cutting and beveling, preheating, stress relieving, coating, or wrapping the joint.

**Important Notice**

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