Assembly Instructions for Conical-Cylindrical (Quick-Lock®) Adhesive-Bonded Joints

Quick-Lock adhesive-bonded joints are used in conjunction with Operating Instructions for M74 Pipe Shaver, Instructions for Bondstrand® Heating Blankets, and Epoxy Adhesive for Bonded GRE Pipe & Fittings. All material shall be inspected for damage prior to use for quality and expiry date of the adhesives. The bonder must possess a valid Jointer/Bonder Qualification Certificate and the bonding and finishing shall be performed continuously until completion.

Requirements for Bonding Surface and Ambient Conditions

Cleaning the Bonding Surfaces

It is recommended that all bonding surfaces be cleaned before bonding. **Do not touch the bonding surfaces or allow them to become contaminated.**

Acceptable cleaning methods are as follows:

- Sand all bonding surfaces until contamination is removed. The sanding operation must be light enough to prevent changing the taper angle. Use and Emery® cup, flapper wheel or Emery cloth with a grid of Grade P40 to P60 for this process.
- Cut off contaminated surface and replace with a new taper or sleeve coupling.
- Wire brushes may be used for cleaning surfaces; however, they must be clean and free of oil contamination.

Solvent may be used if preferred by the customer. Some typical cleaning solvents available are acetone, methyl ethyl ketone (M.E.K.), and methyl iso butyl ketone (M.I.B.K.). After cleaning, be sure any residual solvent has evaporated before applying adhesive. Do not use solvents that leave an oily film on the bonding surfaces.

Warning: Some degreasers and solvents are extremely flammable. Read warning labels on containers. Never use gasoline, turpentine, or diesel fuel to clean joints. All solvent should be evaporated before applying adhesive.

Dimensioning of Conical-Cylindrical Spigot End

If a pipe with the correct length and (factory) shaved spigot end is available, continue the bonding preparation in the next section.

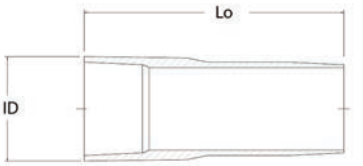

Table 1

ID		PN	
mm	in	Lo	bar
25	1	150	12
40	1½	150	
50	2	150	
80	3	150	
100	4	150	
125	5	170	16
150	6	170	
200	8	185	20
250	10	250	
300	12	250	
350	14	250	
400	16	270	

Cutting of Pipe:

1. Ensure pipe is adequately supported or clamped on a pipe vice. Use rubber padding with a minimum thickness of 2 mm or similar to protect the pipe from damage.
2. Determine required length from product drawing or by measurement.
3. Scribe a cutting guide around the pipe to ensure a perpendicular cut for proper fit. See table 1 for minimum cut length
4. Hold the pipe firmly but not to the point of crushing. If chain vises or other mechanical holding devices are used, care should be taken to prevent crushing or point loading of the pipe.
5. Saw the pipe as smoothly as possible using a diamond or carbide coated hacksaw or an abrasive wheel. The pipe ends should be square within 1/8 inch.

Shaving Pipe

Start the shaving produce using a maximum shaving feed of 1/8 inch, being careful that the pipe might have an unequal wall thickness.

Once finished and the tool has been removed, check diameter at about half of the spigot length use the table below. The wall thickness of the spigot (T) is measured at 3 or 4 equally spaced positions at the end of the pipe. If spigot is too small, cut pipe adjust tool and repeat steps for shaving pipe.

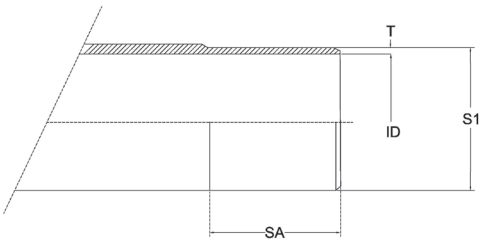

Table 2

PN	ID		T		S1 (2)		SA (3)	
			min (1)	max	min	max	min	max
bar	mm	in	mm	mm	mm	mm	mm	mm
20	25	1	2.6	3.2	32.6	32.9	25.5	28.5
	40	1 1/2	2.6	3.2	47.5	47.8	33.5	36.5
	50	2	3	3.6	59.2	59.6	49	52
	80	3	2.8	3.4	87.6	88	49	52
	100	4	3.5	4.1	112.5	112.9	49	52
16	125	5	3.7	4.3	139.5	139.9	58.5	61.5
	150	6	3.5	4.1	166.2	166.6	59	62
12	200	8	3.9	4.7	217.1	217.5	65	68
	250	10	3.9	4.9	271.3	271.7	71	74
	300	12	3.8	5	322.2	322.6	78	81
	350	14	4.2	5.6	353.8	354.2	89	92
	400	16	4.6	6.2	404.1	404.5	103	106

(1) Nominal wall thickness of the spigot (for reference only)
(2) Nominal Spigot Diameter
(3) Nominal Spigot Length

Preparing for Bonding

Sanding
All bonding surfaces must be clean and dry and must be sanded within two hours of assembly. Sand the surface with a ¼ inch drill motor or a P40 grit flapper sander. Sanded surfaces should show a dull, fresh finish, not a polished look. Don't forget to sand the end of the spigot.

Wipe the sanded surface thoroughly with a clean, dry cloth, or use a duster brush to remove dust particles. If surface become wet, warm with Bondstrand heating blanket or hot air gun until dry, then resand. Protect the bonding surface from moisture during bad weather by tenting over the work area. Do not touch the prepared surfaces with bare hands or soiled gloves that would leave an oily film.

Dry Fit and Marking
Measure back from the end of the spigot the distance shown in the following table and scribe a line using a white grease pencil or soapstone. When the spigot is bottomed to the pipe stop in the bell, the scribed line will be 25 mm (1 in) from the end of the bell. Dry fit the fittings to ensure proper alignment, match mark the mating pieces.

Pipe Size		Mark in from spigot end	
mm	in	mm	in
25	1	52	2.06
40	1½	57	4.25
50	2	71	2.81
80	3	71	2.81
100	4	71	2.81
125	5	82	3.25
150	6	82	3.25
200	8	89	3.50
250	10	95	3.75
300	12	101	4.00
350	14	114	4.50
400	16	127	5.00

Applying the Adhesive
Select the adhesive kit per the following table:

Important: Be aware of the working time available after the adhesive has been mixed. It may not be possible to achieve the listed number of bonds in the smaller sizes because of the available working time (pot life) of the adhesive. See the adhesive kit package for the approximate working times.

When the joint is ready to be bonded, add the curing agent to the resin. Stir thoroughly for at least one minute or until no streaks are visible. Apply the mixed adhesive to the bonding surfaces immediately.

If the mix has started to gel in the container, discard and start a new kit. Appearance of gelled or lumpy material indicates that the mix has started to cure.

Use the disposable spatula supplied with the kit to apply a thin layer (1 mm or 1/32 in) of adhesive to the surface of the bell including the pipe stop. Excess adhesive in the bell will restrict flow inside the joint. Apply adhesive liberally to the entire spigot surface and a thin layer to the cut end of the pipe. Excess adhesive on the spigot surface will be forces out when the bell and spigot are joined.

Joint Assembly

Without rotating the spigot, insert it into the bell until it rests firmly against the pipe stop. For 150 mm (6 in) pipe and larger, use a come-along to seat the joint and hold it in place. Support the bands on wooden blocks on each side of the joint and the joint so that the come-along can remain snug while the heating blanket is wrapped around the joint and until cured. Joints 150 mm (6 in) or less in size may be made by tapping on a wooden block placed over pipe end to seat the spigot in bell.

Join fittings to pipe using one of the two methods described above. It may be necessary to back up an elbow, tee, lateral, etc., with a sandbag or similar shock absorber while tapping pipe spigots into fittings. Check the insertion depth after making the joint. The reference mark should be 25 mm (1 in) from the end of the bell.

Caution: Never use a metal hammer directly on Bondstrand pipe or fittings.

When mounting a flange, make sure that the vertical and rotational alignment meet the requirements stated in the text. Remove excess adhesive for good appearance. Sand the inside of the flange before applying adhesive. Clean excess adhesive where the flange.

Align flanges, tees and other fittings to the match marks as you make the joint to avoid rotating the part while assembling. Check rotational alignment of flange bolt holes and squareness of flange faces. Flanges with bolt holes more than 1.5 mm (1/16 inch) out of rotational alignment, or faces more than 1.5 mm (1/16 inch) out of square across the flange face, or any angular errors of more than ½° in the axial or rotational alignment of bell and spigot are likely to cause subsequent assembly problems. If the joint is misaligned, pull it apart remove adhesive from the pipe stop area, reapply adhesive before adhesive starts to set up.

Bonds per Kit												
Kit Size	Nominal Pipe Size in/mm											
fl oz	1/25	1.5/40	2/50	3/80	4/100	5/125	6/150	8/200	10/250	12/300	14/350	16/400
3	10	6	4	3	2	1	1	½	½	-	-	-
5	-	10	7	5	3	2	1	1	1	½	½	-
8	-	-	10	8	6	5	3	2	1	½	½	½

Force Curing Adhesive Joints

When force curing the adhesive, place the thermostat end of the Bondstrand heating blanket against the assembled joint with the thermostat side facing out. Wrap the remainder of the blanket around the joint so that any overlap covers the thermostat. Tie the blanket in place with any nonconducting tie.

In general, FGS recommends the use of insulation around the heating blanket. This is essential when the air temperature is below 4°C (40°F). Fiberglass insulation backed with aluminum foil generally works well. Insulation should overlap the blanket sides about 100 mm (4 in) each way and be tied down near the edges to trap the heat.

Turn on the heating blanket and mark the starting time on the pipe. Check the blanket after a short period to assure it is heating.

Curing Times

Type of Joint	Standard 2000, 4000 & 7000	Marine 2000M & 7000M	Marine 2000M & 7000M
	25-400 mm (1-16 in)	≤ 150 mm (≤ 6 in)	200-400 mm (8-16 in)
Pipe to Pipe	60	60	90
Pipe to Fitting	90	90	90
Pipe to Flange	60	60	60

A 30-minute cure is recommended for joining pipe and mounting flanges and a 45-minute cure for joining fittings.

Caution: Do not move, vibrate, or otherwise disturb the joint during cure.

Force Curing Flanges

Flange mounting requires a special blanket wrap. Lay the blanket flat with the thermostat down and, starting at the thermostat end, roll it up. Insert the rolled blanket into the pipe end to the depth of the fresh joint, leaving the cord and part of the blanket exposed as shown. Fill the space inside the rolled blanket with fiberglass insulation to ensure that the blanket remains snugly against the inside joint surface.

Equipment List

1. B-1 end preparation tool 25-200 mm (1-8 in) (Tool Installation Guide), M80 Tool 250-400 mm (10-16 in) (Pipe Shaver Tool)
2. Hacksaw or power saw with abrasive wheel
3. Half-inch heavy-duty drill operating at 450-600 rpm; preferably with pistol grip, spade grip and side handles (Black & Decker® Model 1321)
4. Pipe vise (Pilot® No. 20) and 6 mm (¼ in) thick elastomeric pads.
5. Flapper wheel sander (available from FGS) with electric or air drill motor with 6 mm (¼ in) drive, 1700-2200 rpm (faster drills will produce a polished surface)
6. Rubber mallet, 1 kg (1 lb), Shore Durometer A-70-80, 3.5-75 mm (2 ½-3 in) diameter.
7. Come-along for 150 mm (6 in) pipe and larger, Dayton® No. 2Z614
8. Heating blankets (four sizes available from FGS)
9. Pipefitter's wraparound, level and white grease pencil or soapstone
10. Duster brush and clean rags
11. Dust mask, eye protection
12. Folding rule, 3 m (10 ft.)
13. Tape, 15 m (50 ft.)
14. Portable power drive, Ridgid® No. 700 or Amaz-O-Thred® 181D for M74 and M80 tools.
15. Pi Tape® measuring tape
16. Disc grinder or file (optional)

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