Perry Fiberglass Products, Inc.
LEADERS IN FIBERGLASS REINFORCED PLASTIC PIPE PRODUCTS

5415 Village Drive · Rockledge, FL 32955 PHONE: 321-609-9036 FAX: 321-609-9003 www.PerryFiberglass.com

JOINING PROCEDURES FOR WET LAY-UP – PAGE 1

JOINING PROCEDURES FOR FIBERGLASS REINFORCED PLASTIC (FRP) RESIN FABRICATORS WET LAY-UP INSTRUCTION

Job Preparation: Thoroughly clean and sand area to be joined.

Joining pipe with catalyzed resin and cloth and / or mat may be effectively performed by placing cloth and / or mat on sheet of waxed film or cellophane and saturating with resin after adding catalyst. The wet lay-up may then be applied to the ends to be joined and air pockets worked out by squeezing or rolling on the firm surface.

Wet field joints (mat and resin) shall be a minimum 4” in and at least the same thickness as adjoining pipe wall.

Pipe, fitting ends and field cuts shall be completely brush coated with catalyzed resin prior to joint wrap so no raw glass fibers are exposed. Resin used shall be same type as uses in pipe fitting filament winding.

An aluminum or cloth paint roller may be used to spread resin evenly and work out air bubbles. Additional layers of mat may be used in the same manner. Care should be taken to catalyze only the amount of resin than can be used during the pot life of the resin. A little experience will quickly determine the proper handling of the resin.

Mixing: The rate of curing of the resin is dependent on temperature. At low temperatures, most resins have a longer working life and require longer curing periods; working time is decreased and curing takes place more rapidly as the temperature increases. Decreasing the amount of catalyst prolongs working time.

Table 1
The following table gives approximate pot life for various temperature and catalyst proportions

Amount Resin	Amount Hardener	Temperature	Approximate Pot Life
1 qt	2/3 oz	50-60º F	20 min.
1 qt	1/2 oz	60-70º F	20 min.
1 qt	1/3 oz	70-80º F	20 min.
1 qt	1/4 oz	80-90º F	20 min.
1 qt	1/6 oz	over 90º F	20 min. or less

The catalyst should be carefully proportioned to the amount of resin to be used, and thoroughly mixed to a uniform blend. Pipe joints or repaired parts should be allowed to cure at least 24 hours before being used.

If additional lamination is to be made over a cured area, surface should be broken by sanding before application.

Clean Up: Preferably acetone or lacquer thinner may be used for cleaning tools and hands. Soap and hot water may be used, though not as effectively as acetone. Thorough clean up must be made before resin cures. Care should be exercised to keep catalyst and resin from contact with skin. We recommend wearing rubber gloves when working with resin and catalyst.

Keep away from open flame and use with adequate ventilation.

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JOINING PROCEDURES FOR WET LAY-UP – PAGE 2

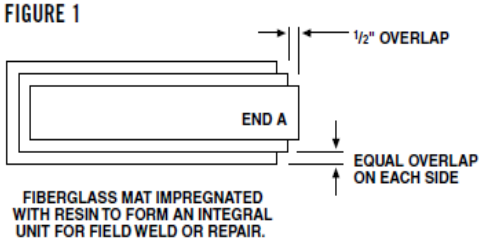
JOINING

Coat all raw edges with resin mix, cxompelety filling the joint and slightly squeezing the sections together. It is often preferable to add sufficient Cab-O Sil to resin for this step to produce a paste or light putty which will fill small voids and irregularities if there is not a good fit. It is often desirable to speed-up the hardening time for this step also be increasing the MEK peroxide required by 1 to 2 cc per pound. Insure that interior surface is relatively smooth but a light "bead" on the interior is desirable and acceptable.

Butted sections may be "hot patched" to hold alignment until complete joint can be made. A tab consist of 2-3" square of glass mat saturated with resin mix. Place prepared hot patch across joint to be made to form "tack weld." Three are usually sufficient. For this step, it is often desirable to speed-up the hardening time of the resin by increasing the MEK peroxide required by 1 to 2 cc per pound.

PREPARATION OF STRAPPING Prepare fiberglass mat (and woven roving, where required) according to vendor's specifications or cut sufficient quantity according to size and ply requirements (see Figure 1).

FIGURE 1



Tables 2 and 3 should only be used as guides for the minimum total width of joint overlays and minimum joint thickness. Joint thickness should be at least as thick as the pipe to be joined.

TABLE 2

Pipe Wall Thickness	Minimum Total Width of overlays
3/16”	3”
1/4”	4”
5/16”	5”
3/8”	6”
7/16”	7”
1/2”	8”
9/16”	9”
5/8”	10”
11/16”	11”
3/4”	12”

TABLE 3

Pipe Wall Thickness	Number of Plies of Strapping and Sequence*
1/8”	3m; v
3/16”	4m; v
1/4”	3m; 1wr; 2m; v
5/16”	3m; 1wr; 3m; v
3/8”	3m; 1wr; 2m; 1wr; 2m; v
7/16”	3m; 1wr; 3m; 1wr; 2m; v
1/2”	3m; 1wr; 3m; 1wr; 2m; 1wr; 1m; v
9/16”	3m; 1wr; 3m; 1wr; 2m; 1wr; 1m; v
5/8”	4m; 1wr; 4m; 1wr; 3m; 1wr; 1m; v
11/16”	4m; 1wr; 4m; 1wr; 3m; 1wr; 1m; v
3/4”	4m; 1wr; 4m; 1wr; 4m; 1wr; 1m; v

*From surface of pipe outward; m = 1(one) 1/2 oz. chopped strand mat; wr = 24 oz. woven roving = type c, 10 mil glass surfacing veil. Optional

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JOINING PROCEDURES FOR WET LAY-UP – PAGE 3

PREPARATION OF STRAPPING *CONTINUED*

Two lay-ups may be required to prevent sage and overheating of the resin during hardening.

Where accessible, the inside surface of the joint should be covered with 1-2 plies of fiberglass mat 4-6" wide and 1 ply of 6-8" wide surfacing veil or mat saturated with resin.

Lay the widest section of mat on a flat surface treated with release agent or covered with releasing film. Wet the entire surface with resin mix, using paint brush and / or roller.

Position next ply of glass, offsetting about 1/2" on the length. Equal overlap on width is preferable but slight offset (staggered) is acceptable.

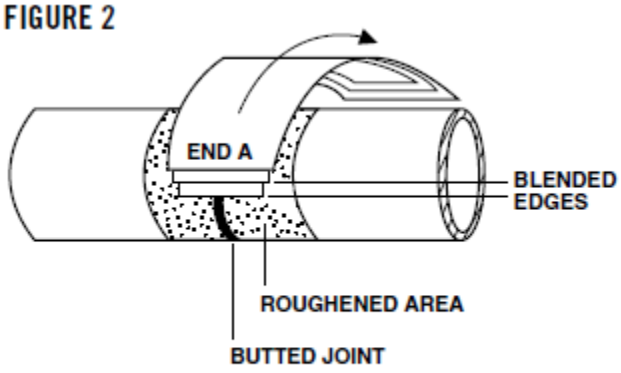
Wet out the layer with resin mix. Remove as much air as possible with brush and / or roller toward the edge of the laminate section. Care must be exercised to avoid to heavy pressure which would remove excessive resin from the area.

Repeat with proper sequence of glass until all plies have been saturated with resin and formed into one integral unit (see Figure 1).

APPLICATION OF STRAPPING

Apply resin mix with brush and / or roller over all prepared areas of the joint. Take the entire strapping with the narrowest ply to the inside and place on resin coated joint. Make sure to center and position it properly (see Figure 2) over the butt seam. Wrap around the joint using and even forward pressure to form entire joint with offset ends overlapping smoothly. The releasing film, if used, can be lifted with the strapping composite and will help to form the wrapped joint. It must be removed before the next step.

FIGURE 2



FOR USE WITH PROCEDURE FOR RESIN WRAPPED JOINTS

Roll out as smooth as possible blending the edges of strapping into pipe. Remove all wrinkles and entrapped air rolling from center of joint to outside edge. Additional resin may be applied to provide a resin-rich surface. Care must be taken to prevent the strapping from sagging at the bottom of the joint during hardening.

After the joint has been hardened, a layer of resin mix may be applied, if desired. If the joint is outdoors, this layer of resin may include the wax addition as per Table 1. If the pipe was made using ultraviolet screener for protection, 1% UV9 ct 5411 must be added to resin for this final coat.

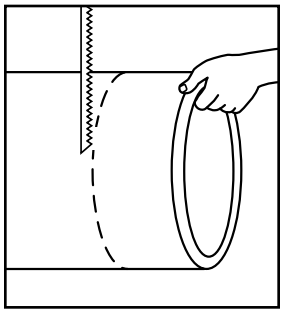
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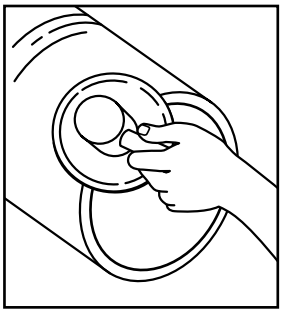
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JOINING PROCEDURES FOR WET LAY-UP — PAGE 4

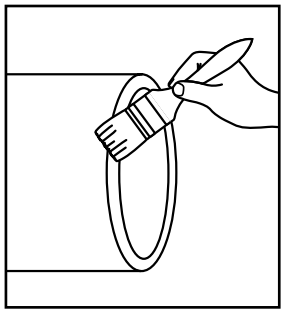
WELDING PROCEDURES



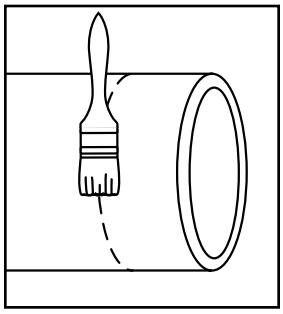
1. Firmly support pipe sections. Square the ends to be welded using saber saw.



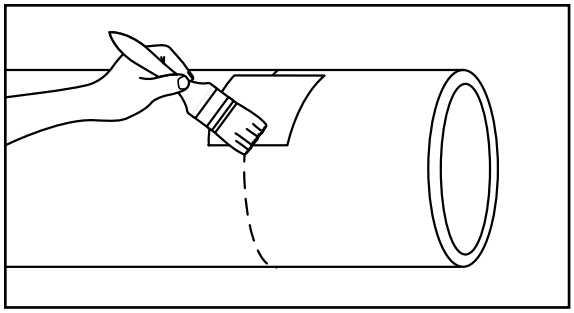
2. Rough the outside surfaces with sander approximately 1" farther in from the ends than the finished weld surface. Where inside welds are possible, interior surfaces should be sanded prior to assembly. Note: Some installations do not require sanding. Contact factory.



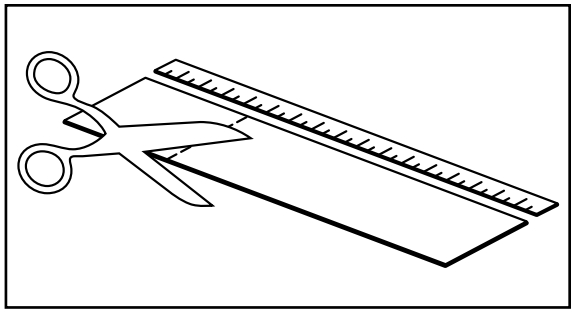
3. Coat roughened end edges of pipe with small amount of catalyzed resins. Any large voids may be filled with a silica-filled resin putty.



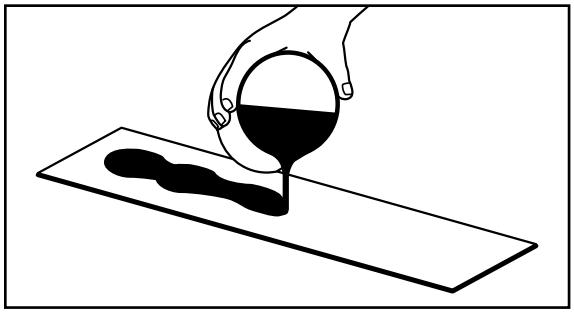
4. Support components in joint position as rigidly as possible so that no movement occurs while making the joint. Fill joint with resin.



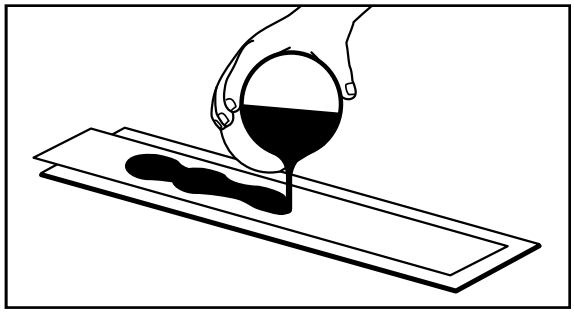
5. A “Hot Patch” technique may help prevent movement of pipe during the weld-cure period. Wet 2" squares of mat with a small amount of resin using three times normal amount of catalyst. Apply “Hot Patches” at intervals around joint. Curing or hardening in a matter of minutes, they secure pipe sections in proper alignment. Mix resin and catalyst for “Hot Patches” in a small paper cup and discard immediately after use to avoid contaminating welding resin.



6. Lay out fiberglass mat strips on the work table. Length of each strip should be 2" longer than circumference of pipe. Strips longer than 36" may be cut in half to simplify application. Mix prescribed amount of catalyst with required amount of resin in a separate clean container. Prepare only the amount of resin which can be used immediately (about 1 qt. per 6 sq. ft. of mat). Resin will harden in about 20-30 minutes.



7. After mixing in the catalyst thoroughly, pour the resin onto the widest mat first. Spread it over the entire mat strip, working it into the mat fibers manually. (Neoprene gloves are recommended.)



8. Place the next widest strip onto the first with one end of the second strip starting approximately 1" in from end of the first. Doing this with each successive strip results in a feathered edge (see Figure 1) to produce a smooth weld strip joint. Add more resin and work into the second strip.

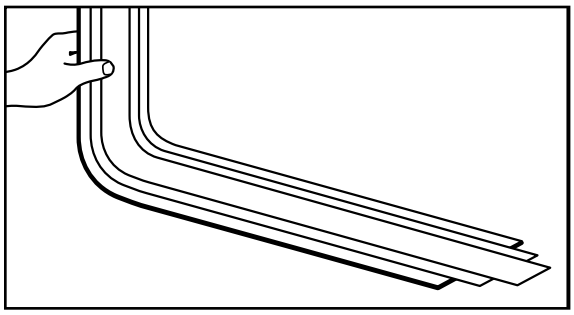
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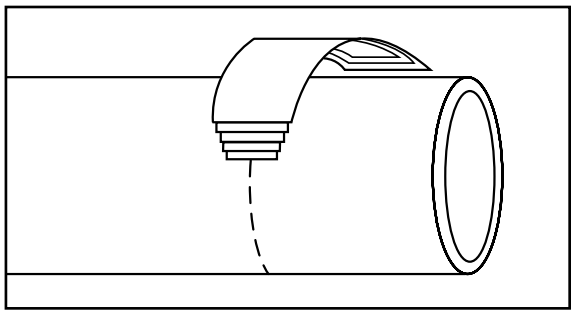
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JOINING PROCEDURES FOR WET LAY-UP — PAGE 5

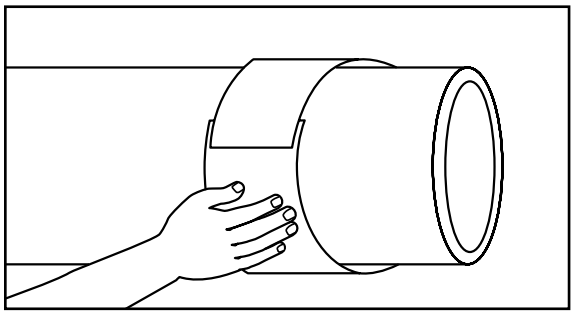
WELDING PROCEDURES *continued*



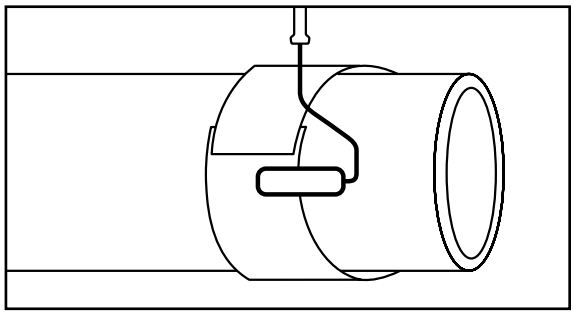
9. Add other strips in the same manner. In wetting each strip, it is best to be a little "lean" on resin at this stage rather than over-wetting. More resin may be added later, if necessary. After laying the final strip, compress strips together with glove-protected hand to remove large air bubbles and to make sure all layers are wetted with the resin.



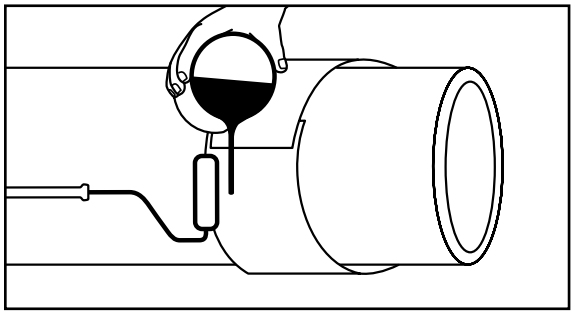
10. Pick up the completed weld strip by one end and center it carefully on the pipe joint. Apply the tapered end first with the narrowest strip on the pipe weld.



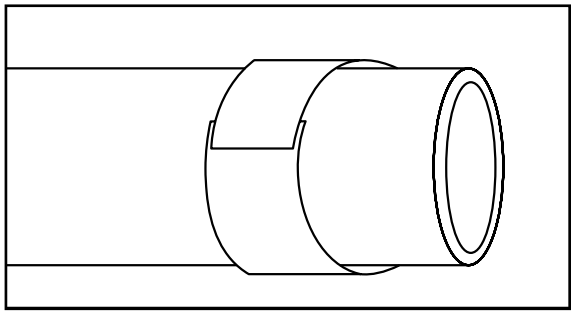
11. Be sure the weld is centered, with care taken to avoid wrinkles on the under or back side of the weld. Continue applying the strip around the joint until the free end overlaps the beginning. Lightly press out the air bubbles with gloved hands. (See Figure 2.)



12. Finish the application of the weld with the roller. Any remaining air bubbles will appear as light spots. These should be rolled to the edge of the weld where they will be released and disappear. If weld is not a straight butt joint, a little extra rolling and hand work to shape mat strips to structure configuration will eliminate bumps and ridges.



13. At this stage, resin may be added where necessary if any mat appears to be not thoroughly wetted. It is better to have too little resin on the weld strip, when initially applied, than too much. Over-wetting makes it difficult to keep the weld strips in place. Also coat the remaining sanded surface with resin.



14. Allow the completed weld to cure thoroughly tack free. Do not move or disturb weld until it is thoroughly cured. If temperature is below 55°F, keep weld area warm with heat lamps. For exterior installation, protect the weld from the weather.