WrapMaster
Installation Manual
"Pass-the-Wrap" Method

"The Next Generation Repair System"

WrapMaster

Composite Solutions for Piping and Structures

2701 State Highway 322 Longview, Texas 75603

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….Application Steps and Procedure….

Step 1 – Access Defect

Access defect and determine the number of PermaWrap™ Kits required for the pipe repair. **The PermaWrap™ sleeve (is available in 5 standard widths – 6”, 9”, 12”, 15” & 18” x 8 layers or ¾-inch) The WeldWrap™ sleeve (available in 12”& 18” Widths x 10 layers)** There must be a minimum clearance of 2” on either side of the defect or $\sqrt[2.5]{Dt/2}$ whichever is greater. For **permanent external repairs**, the **defect area** must fit the following criterion:

- Wall Loss **can not be greater than 80%**
- The defect **must be “blunt”** – all sharp edges must be removed.
- **No cracks** or cracking present in the defect. All cracks must be removed by sanding or grinding prior to repair.

For longer defects, “butt” units together as necessary. The interface between units is reinforced by “edge effect”. **The maximum gap allowed between units on straight pipe is ¼-inch.**

Step 2 – Check Kit Items & Tools

The WrapMaster Corporation recommends the application of the WrapMaster™ Pipe Reinforcement System to be made *ONLY* by Certified WrapMaster™ Installers

Use the following check list to ensure all kit items and tools are accounted for prior to initiating the repair. The tools supplied by the installers are minimal but will be required.

WrapMaster™ Kit items

WrapMaster™ Composite Sleeve
2-part Adhesive Kit (adhesive & activator)
Application Kit (listed are the items in the kit)

- 2 ea. – Plastic Putty Knives
- 1 ea. – Paint Can Scraper
- 2 ea – Mixing stix per resin set-up
- 1 ea. – Plastic Trash Bag
- 1 ea. – Plastic Paint Tray
- 1 ea. – Paint Roller
- 1 ea. – Paint Roller Handle
- 2 ea. – Paint Brushes
- 2 ea. – Anchor Pads
- 1 ea. – Velcro Strip
- 1 ea. – Securing Tape

Recommended Installer Tools

Cordless Drill (3/8” chuck)
Pipe Marker
Solvent (Acetone, MEK or Toluene)
Adjustable Torque Bar Assembly
Rubber Mallet
Files (rat-tail & half round)
Contact Spray Adhesive
Sandpaper (24-80 grit)
Tarp (12ft x 12 ft)
Ratchet-Action Tie Down Straps
Off-Set Fixture (if required)

Step 3 – Prep Pipe Surface

Grit-blast the pipe surface to a (NACE #3 or SA 2-1/2) finish or use a hand grinder with 24-80 grit sanding disks to provide an anchor pattern extending 3”-5” beyond the width of the sleeve. **Solvent wipe surface with Acetone, MEK or Toluene (review appropriate SDS). Do not use any solvents other than ACETONE, MEK (methyl ethyl ketone) or Toluene.**

Ensure that all soft coatings, paint, corrosion residue, and weld splatter have been removed.

Remove all “sharp edges” - defects must be “blunt”.

NOTE: ***Wire brushing the surface is NOT a recommended method for final surface preparation!***

MODIFIED PROCEDURE FOR FUSION BONDED EPOXY COATING (FBE)

a.) **Abrade the entire “work area” using 24-80 grit sandpaper removing all high spots and the “sheen” from the fusion bonded coating.** The entire surface must be “etched” with a minimum of a 1 mil Anchor Pattern.

b.) **Solvent clean surface with Acetone, MEK or Toluene** (review appropriate SDS).

The WrapMaster™ Pipe Reinforcement Systems **shall not** be applied to any surface having an elastomeric coating (urethane, mastic, rubber-based, etc.). **The effectiveness of the systems is to restore "hoop strength" is dependent on the “instantaneous load-transfer” of stresses from the pipe wall to the composite sleeve.** “Soft” coatings delay or inhibit the transfer of load.

Step 4 – “Mark” the Repair Area

Dry apply 2 wraps of the Wrapmaster™ sleeves around the repair area and using a pipe marker – circumferentially “mark” the sides of the composite sleeve.

Prior to removing the entire sleeve, position and “mark” the “leading edge” of the sleeve.

These identification “marks” indicate the adhesive coverage area and the location for the Anchor Pad placement.

NOTE: **For a single unit repair** – center the sleeve over the defect prior to dry wrapping the sleeve.

For multi-unit repairs – position the sleeve edge a minimum of 2” beyond the beginning of the defect.

Step 5 – Apply the Anchor Pad

Remove the “backing” from one side of the Anchor Pad, then center and attach to the pipe using the “leading edge reference mark”. Secure the Anchor Pad by pressing with the plastic putty knife.

For optimal attachment of the Anchor Pad, the pipe surface should be dry and clean.

Step 4a – “Measure” the WeldWrap™

Although the WeldWrap™ sleeve is typically 12” or 18” (17-1/2”) wide, measure actual width for repair area marking preparations.

Step 5a – “Mark” Wrap Width Area

Center the measured WeldWrap™ width from the girth weld and “mark” a reference points in three (3) locations.

Step 6 a– "Mark" the Repair Area

Dry apply 2 wraps of the WeldWrap™ sleeve around the repair area and using a pipe marker – circumferentially "mark" the sides of the composite sleeve.

NOTE: The sides of the two (2) layers are independent of each other to accommodate the girth weld. Use the width "marks" from step #5 to properly position the layers.

Prior to removing the entire sleeve, position and "mark" the "leading edges" of the sleeve.

The WeldWrap™ sleeve edges should be centered in relation to the girth weld zone.

Step 7a – Attach Guide Blocks

Remove the "Backing" from the Guide Blocks. Attach the equally spaced Guide Blocks along each "Edge Reference Line". Use three (3) blocks per side.

Pipe Surface should clean and dry. Solvent wipe as necessary.

Step 8a – Apply the Anchor Pads

Cut the anchor pad in half. Remove the "backing" from one side of the anchor pad, then center between girth weld and WeldWrap™ "side reference mark". Attach to the pipe using the "leading edge reference mark". Secure the anchor pad by pressing with the plastic putty knife. Repeat Step for opposing side.

NOTE: **Listed below are instructions for application of the Anchor Pad under adverse conditions.**

For condensing or "sweaty" pipe

1. **If permissible , use a "rose bud" or heat gun and apply just enough heat to flash the moisture from the pipe surface.**

-or-

2. **Solvent wipe the pipe surface. Attach the Anchor Pad when the solvent "flashes off" the condensate.**

-or-

3. Wipe the surface with a dry cloth. Apply the aerosol spray contact adhesive (3M – Super 77 or High 90) to the area. Allow 3-5 minutes for the contact adhesive to "gel", then attach the Anchor Pad.

For Temperatures below 40°F (5°C)

1. Keep the Anchor Pad warm (inside coat pocket or in a vehicle). If permissible, use a "rose bud" or heat gun to warm the area. Solvent wipe and allow to flash, then attach the Anchor Pad.

-or-

2. Keep the Anchor Pad warm (inside coat pocket or in a vehicle). Solvent wipe pipe surface and allow to flash. Apply the aerosol spray contact adhesive to area. Allow 3-5 minutes for the contact adhesive to "gel", then attach the Anchor Pad.

For 360° Corrosion

The natural pipe geometry under the Anchor Pad will need to be restored prior to attaching the Anchor Pad. Mix-up a small batch of putty material. Apply the putty to the surface. Using the putty knife, smooth and remove excess putty material. Allow the putty to cure **(heat will accelerate the curing time).** Abrade the area with 24-80 grit sandpaper and solvent wipe. Attach the Anchor Pad per procedure.

Step 6 – Mix the Adhesive/Putty

Mixing of the Adhesive/Filler Putty. The WM-3000 is an all and one, 2-Part epoxy that actes as a filler putty and adhesive

PRECAUTION: The "working time" begins once the materials are mixed, so remember to take the time to ensure all items are readily available (including the Adjustable Torque Bar Assembly) prior to mixing materials.

Mixing the Adhesive: (Mix each throuly on its own prior to mixing together)
Mix the **(WM-3000-B) activator (White/Tan)** quantity into the **(MW-3000-A) adhesive (Blue)** .
The adhesive is provided in pre-portioned quantities with the quantity dependent on the size of the sleeve to be installed. Once the all of activator can has been added to the adhesive, mix the material for approximately 2-3 minutes until completely mixed.
(Note: For filler material add the "Thickening Fiber" until you have reached the desired consistency.)

RECOMMENDATION: Keep both the adhesive container and the Plastic Paint Tray out of direct sunlight until ready for use. This will prevent "heat build-up" which may affect "working time".

View of the Adhesive Mixing process

Adding the Thickening Fiber

Step 7 – Apply the Adhesive/Filler Putty

Apply the thickened WM-3000 in "slight" excess to the entire defect area, across the "leading edge" of the anchor pad and on both sides of pipe seam. On WeldWrap™ apply to the girth weld and fill the cavity over the weld. This will ensure a "load-transfer" path to the WrapMaster™ sleeves.

Using the putty knife scrape off excess putty to smooth the putty to the original pipe configuration making sure putty is pressed into any voids.

Filler applied to the "leading edge" of the anchor pad should span to both "sleeve width marks".

NOTE: For "sweaty" pipe or frost on pipe surface – Solvent wipe pipe surface, allow to flash, then apply the filler putty.

Step 8 – Apply the Adhesive to Pipe

Pour the adhesive into the paint tray and begin to apply adhesive with the paint roller Apply in "slight" excess the adhesive to the entire pipe surface spanning to both "sleeve width marks".

DO NOT REMOVE BACKING FROM ANCHOR PAD PRIOR TO OR DURING THE ADHESIVE APPLICATION

NOTE: For "Sweaty" pipe or frost on pipe surface – Solvent wipe pipe surface, allow solvent to flash, then apply the adhesive.

NOTE: In the event, the anchor pad "backing" inadvertantly becomes detached and adhesive is applied directly to the anchor pad surface – Use a rag to wipe off the adhesive, then wipe again with a "damp" solvent rag to remove remaining adhesive residue. Allow the solvent to flash for 2-3 minutes, verify that the anchor pad has regained its' tackiness, then proceed to the installation step.

ALTERNATE METHOD - Use a rag to wipe off the adhesive, then wipe again with a "damp" solvent rag to remove remaining Adhesive residue. Allow the solvent to flash for 2-3 minutes. Spray the anchor pad surface with the aerosol contact adhesive (3M – Super 77 or HIGH 90), allow the contact adhesive to "tackify" for 3-4 minutes, then proceed to the installation step. FOR COLD WEATHER – Allow 5-6 minutes for the contact adhesive to "tackify" before proceeding to the next step.

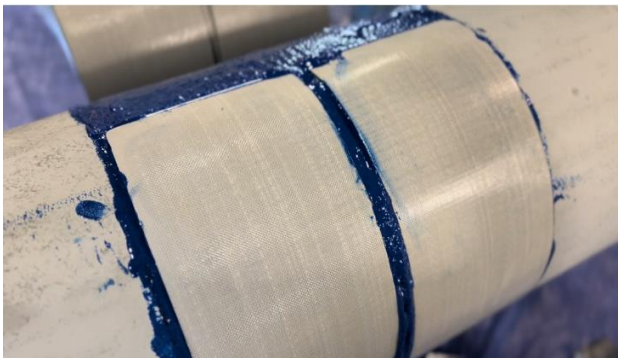
Step 9 – Attach Sleeve to Pipe

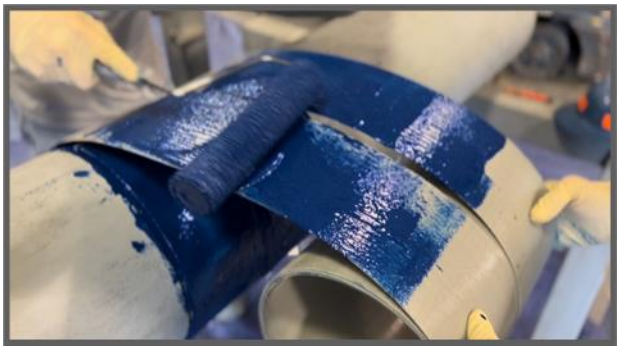
Remove the “Backing” from the anchor pad. **Inspect the “leading edge” of the sleeve for cleanliness prior to attaching the sleeve to the anchor pad.** Using the anchor pad as a reference - Attach the “leading edge” of the sleeve to the anchor pad (1/8” –1/4” from pad edge), then firmly secure the sleeve to the anchor pad by “tapping” the sleeve with the rubber mallet.

Remove the “Backing”of anchor pad

Securing the WeldWrap™ to Anchor Pad

After securing the Wrapmaster™ sleeve apply adhesive beginning at the “leading edge” of the sleeve.





Step 10 – Wrapping the Sleeve

Continue applying Adhesive to the Wrapmaster™ sleeve and begin wrapping the sleeve around the pipe. Proceed as required until the "Stop Reference Line" is visible. Apply Adhesive 1" – 2" past the "Stop Reference Line".

NOTE: The "Stop Reference Line" is provided on all WrapMaster™ sleeves to identify the termination of the adhesive application.

Wrap the remaining portion of WrapMaster™ sleeve around the pipe section.

Adhesive Application

"Stop Reference Line"

Step 11 – Tightening the Sleeve

Remove the "backing" from the Velcro pad and attach it to the Wrapmaster™ sleeve. **Position the pad in the center of the sleeve and in the "best location" for engaging the Adjustable Torque Bar Assembly.** Attach the Torque Strap to the Velcro pad tapping lightly with the rubber mallet. Position the Adjustable Torque Bar, then apply steady pressure to the Torque Bar while striking the sleeve with the rubber mallet, until excess material (adhesive/putty) begin to exude from the edges.

Attaching the Torque Strap to the Velcro Pad

Positioning the Adjustable Torque Bar

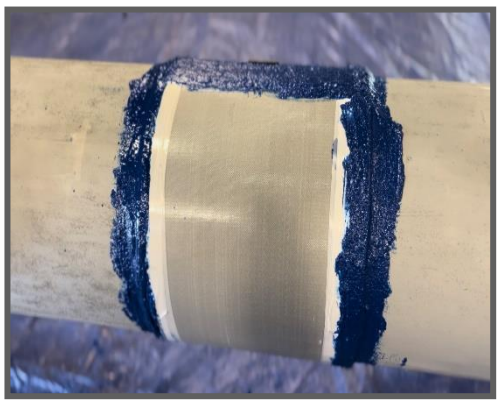
Apply steady pressure to the Torque Bar

Strike the sleeve using the rubber mallet

Hold the Torque Bar until excess material exudes.

While maintaining pressure with the Torque Bar and after adhesive and putty has been exuded, "Tightly" apply 2-3 wraps of the Securing Tape around the sleeve edges. **<u>NOTE</u>: The Securing Tape should be placed approximately 1" from the WrapMaster™ edges and applied in the same direction as the Wrapmaster™ sleeve.**

WARNING: Should the sleeve spin during the tightening process, remove it immediately from the pipe and discard.



Step 12 – Seal Sleeve Edges

<u>To protect the repair from moisture, seal both side-edges and the "trailing" edge of the WrapMaster™ sleeve with the remaining Adhesive.</u> Provide a "transition taper" on the side-edges. **<u>Allow to cure *(10-15 Shore "A" in approximately 2 hours @75-Deg), then apply a pipe coating and back-fill.</u>**

<u>If the sleeve fails to attain a cure within 2-4 hours. Contact the manufacturer. You may be able to use heat lamps to assist in curing. The sleeve must be removed if the minimum hardness is not attained.</u>
<u>When buried, the sleeves must be coated to protect the sleeve from moisture.</u>
<u>Above ground the sleeve is UV sensitive and should be coated.</u>

View of Several Sleeves "Butted" together

View of "Staggered" PermaWrap™ Sleeves

General Guidelines for Adhesive /Putty Materials:

- **Keep materials away from Open Flames** – materials are flammable. Review Safety Data Sheets (SDS) for material handling safety.
- **Both the adhesive and filler putty have a minimum shelf-life of 2 years if stored between 40°F – 70°F (5°C – 22°C).** AVOID PROLONG STORAGE ABOVE 90°F (32°C).
- Although the adhesive and filler putty will cure in the presence of water, it is recommended that the Pipe Surface should be dry and clean for material application. **For Condensing or "Sweaty" Pipe** – solvent wipe surface, allow to evaporate ("flash"), then apply material prior to condensate reforming.
- The WrapMaster™ systems may be applied in adverse weather conditions, but the installation area is to be protected (tented) from inclement conditions whenever possible. It is also recommended the repair site be **tented and heated when temperatures are below 32 °F (0 °C).**
- **For temperatures above 100 °F (38°C) the installation area should be protected (tented).**
- **For cold weather application** – materials will thicken. Ensure the materials are thoroughly mixed prior to application. **Adhesive Mix time for temperatures < 40 °F (5 °C) should be adjusted to: mix for 5-6 minutes, scrape container sides, then mix for an additional 2-3 minutes.**
- **Ensure all soft materials, coal tar and zinc residue are removed from pipe prior to application.**
- **Keep the Adhesive/Filler Components and the Paint Tray out of direct sunlight to prevent "heat build-up" which may affect available "working time".**
- Water has minimal effect on cured adhesive and filler putty materials.

Clean-up and Disposal of Materials:

- Acetone, MEK and Toluene will "soften" cured materials to assist in clean-up.
- Uncured materials may be disposed of as non-hazardous waste by thoroughly mixing the adhesive and activator and allowing them to fully harden. To prevent excessive heat build-up, do not allow to harden in layers greater than 2" thick.
- Unmixed or uncured materials may be removed by wiping or scraping excess material, then followed by a solvent wipe.
- Unused materials should be sealed in their original packaging containers and stored in covered area until further use or disposal. If the adhesive and activator components are contaminated – mix materials, allow to cure, then discard.
- Unmixed materials must be disposed of as hazardous waste according to local, state, provincial and governmental regulations.