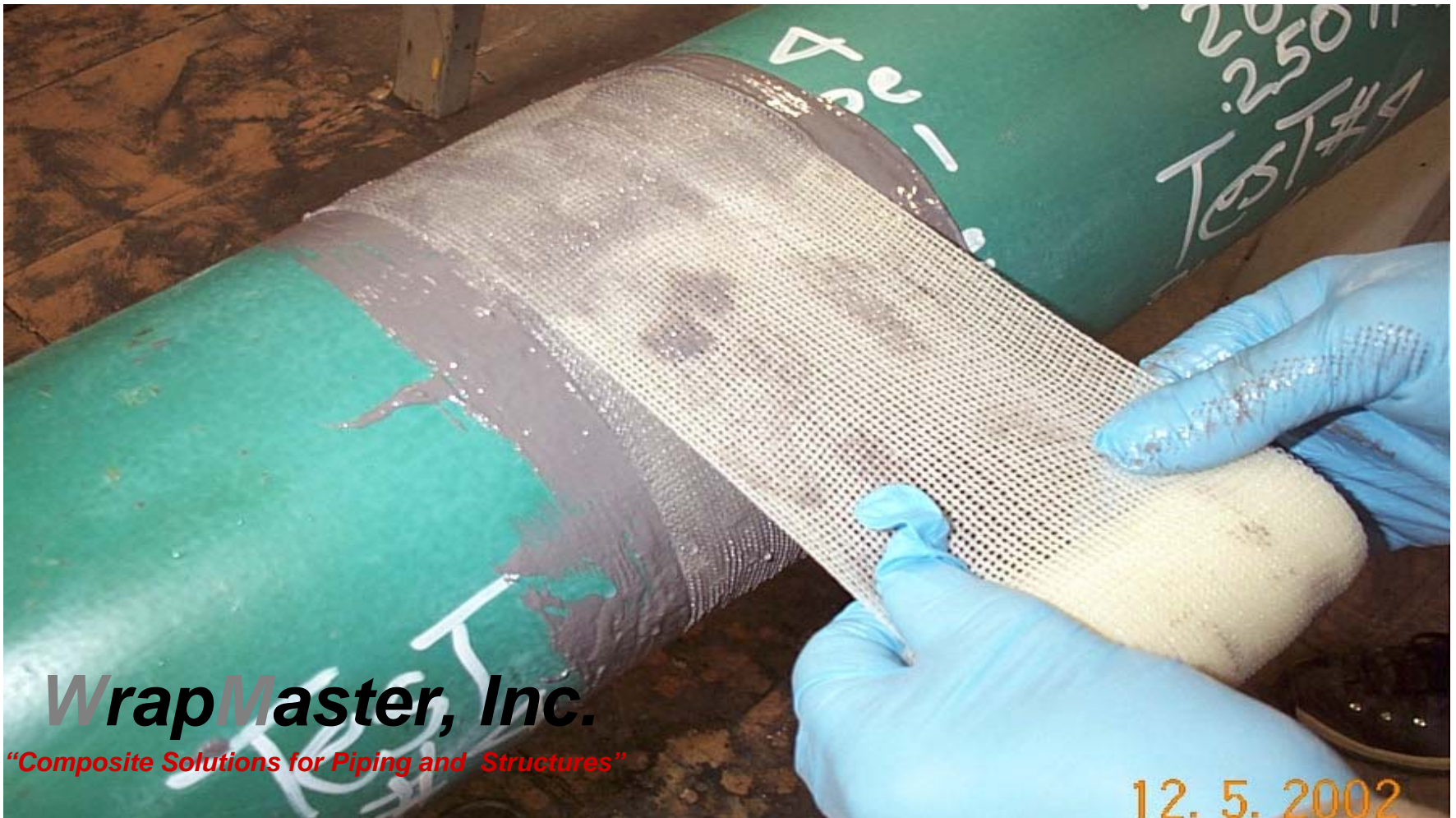


# "Plug-n-Wrap" PLUS™ Installation Instructions



**WrapMaster, Inc.**

*"Composite Solutions for Piping and Structures"*

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# ...Product Specifications ...

## **Material Description:**

Plug-n-Wrap is a leak repair system cured in 30 minutes for low-pressure applications up to 450 psi (dependent on number of rolls and size). The Plug-n-Wrap Kit is comprised of a flexible fiberglass mesh material impregnated with water activated polyurethane resin. The tape will react with the humidity in the air but should be activated with a water supply (fresh or saltwater). After application and total cure, a rigid case-like monolithic sheath is produced. The Plug-n-Wrap is non-toxic and acceptable for potable water lines.

## **Temperature Limits:**

-20 °F to 250 °F (temperatures > 150 °F will affect pressure capability)

## **Chemical Compatibility:**

Plug-n-Wrap is chemically resistant to most chemicals and fuels.

## **Set and Cure Time:**

Plug-n-Wrap will “set” tack free in 3-5 minutes and fully cure in 30 minutes for temperatures of 50 °F to 80 °F. Anticipate longer cure times for colder temperatures and short cure times for warmer temperatures.

## **For Longitudinal Reinforcement:**

A 50% overlap has shown to be the most effective in improving longitudinal strength. The half-lap method leaves a “weak-link” at the edge of each wrap. When applying on a slope, it is best to fold the tape (not twisted) to change directions.

## **Shelf Life:**

2 years when stored at 40 °F to 95 °F

# ...Application Notes...

## **Notes:**

1. Prior to beginning application read the instructions carefully and gather any required tools.
2. Plug-n-Wrap and its resin are activated by water, including humidity in the air, and is also heat sensitive. The higher the temperature, the faster the chemical reaction, directly affecting the amount of time available to apply the Plug-n-Wrap.
3. If the resin impregnated cloth begins to stiffen or harden during installation, it has begun to reach an initial cure and has passed its installation life. *Do not continue to apply this roll: cut off the remaining cloth and discard.*
4. Although Plug-n-Wrap is non-toxic and non-combustible, standard precautions should be taken: protective gloves, eye protectors and long sleeve work clothes are recommended. The resin in Plug-n-Wrap may stick to the skin and is a potential skin irritant. Please refer to the MSDS for additional information.
5. Store the Plug-n-Wrap in a cool dry place until its use. The bags should not be directly exposed to sunlight before their application. Plug-n-Wrap has a 2 year shelf life at temperatures of 95° F (MAXIMUM).
6. Always try to use cool or tepid water; do not use warm or hot water as this will accelerate the initial cure time of the resin and substantially reduce the working life of the wrap.

## **Helpful Tools:**

1. Supply of clean water (saltwater is acceptable)
2. Clean bucket or container for water
3. Disposable gloves (included in each kit)
4. Sandpaper (included in each kit)
5. Solvent to remove oil residue – MEK, Acetone or Alcohol (alcohol swabs included in each kit)

## **Labor Recommendations:**

1. For repairs to lines with diameters up to 6", a single technician can make the installation.
2. For diameters up to 12", 2 technicians are recommended.

# ...Application Steps and Procedures...



## Step 1

Inspect the defect area to be repaired.  
Remove any loose dust or debris using sandpaper (provided in kit).  
Wire brush or file the pipe surface providing a good anchor pattern.  
Solvent wipe the area to be repaired with MEK, Acetone or Alcohol (alcohol swabs are included in each kit) to remove any oily residue and dust which may affect the adhesion of the wrap to the pipe.



## Step 2

Open the two adhesive containers and combine Part A with Part B.  
Thoroughly mix the adhesive. In colder climates, mix the adhesive for longer periods.

***Remember that the "working time" continues to advance once the materials are mixed.***

***DO NOT open the Plug-n-Wrap foil pack until surface preparation has been completed.***

## Step 3

Apply the epoxy to all defect areas, corrosion, dents and gouges.  
If repairing a leaking defect apply the epoxy to the plug then drive the plug carefully into the defect.  
Trim the protruding excess from the plug.





#### **Step 4**

Using the paint brush supplied, apply the epoxy to the pipe surface, all voids and longitudinal weld areas.



#### **Step 5**

Allow the epoxy to cure to a tack free state. Approximately 30 minutes depending on temperature.



#### **Step 6**

Remove the repair tape from the sealed foil packet and soak in water for 5 seconds, no more than 20 seconds. Squeeze roll 2 or 3 times while immersed. \*In extreme high temperature and/or humidity conditions, such as those in tropical climates, a portable garden type sprayer can be used. Fill sprayer with clean cool water and apply a fine mist of water in between each layer of Plug-n-Wrap as it is being applied. (\* This procedure is also recommended for installation on large diameter pipe.)



### **Step 7**

Apply the Plug-n-Wrap spirally around the pipe circumference in one direction with a \*\*50% overlap until the entire length of cloth has been used or until the entire width of the repair area has been covered in one direction. At the end of the repair length, reverse the direction of the wrap and continue to install. NEVER change the direction of the installation in the middle of a layer.

(\*\* By using a 50% overlap, each completed length of the wrap will actually be 2 layers; a repair that call for 20 layers of Plug-n-Wrap will be completed with 10 wraps)



### **Step 8**

For the best adhesion, it is recommended that the new roll be applied over the previously applied rolls while they are still wet, thus achieving a monolithic cure along the entire width and thickness of the Plug-n-Wrap sleeve. Each layer of Plug-n-Wrap will be fully integrated into the next layer above it.



### **Step 9**

After 8 layers have been applied (4 wraps with a 50% overlap), begin to work the resin into the cloth by massaging and squeezing the tape in the direction of the wrap. It is very important to work the resin into all layers of the tape. Continue to apply the Plug-n-Wrap massaging the resin into the tape, until all layers have been applied.



### Step 10

When all layers have been applied, massage the resin in the direction of the wraps. The chemical reaction between the water and the resin will create a slight but noticeable increase in temperature in the composite sleeve. Excess water, including moisture on the steel surface, will rise to the outer layer of the sleeve. The resin will also have a tendency to rise to the surface. Continuously massage the resin using wetted gloves for five minutes or until the resin has set or hardened.



### Step 11

The application is now complete. Allow the Plug-n-Wrap to cure approximately 2-4 hours depending on ambient and pipe temperatures. Higher temperatures will advance the cure time and lower temperatures will retard the time.



### Step 12

**Alternate method.** The exterior surface of the Plug-n-Wrap sleeve may be epoxy coated using the brush supplied in the kit. Coating of the sleeve will protect the sleeve from ultraviolet damage if exposed to sunlight.

Prior to applying the epoxy, allow the Plug-n-Wrap sleeve to cure approximately 2-4 hours depending on ambient and pipe temperatures. If bubbles develop in the epoxy coating, the sleeve is still releasing gasses and has not completed curing. Allow additional time.

# ...Calculating Quantity of Kits ...

## FORMULA FOR CALCULATING QUANTITY OF KITS REQUIRED FOR A REPAIR

This formula calculates the length and number of rolls are required to cover the length of the pipe at a specified number of layers, overlapping a recommended 50% width of the cloth.

### Considerations:

1. In general, for anticorrosive and reinforcement applications, a minimum of 6 layers of Plug-n-Wrap is sufficient.
2. For repairs of leaks in lines operating under 300 psi, a minimum of 15 layers of Plug-n-Wrap is required.
3. For repairs of leaks in lines operating up to 450 psi, a minimum of 24 layers of Plug-n-Wrap is recommended.

## FORMULA FOR CALCULATING THE LENGTH OF PLUG-N-WRAP REQUIRED

**(12/WIDTH OF CLOTH, INCHES) x (CIRCUM-PIPE DIA. x 3.14) x (LAYERS OF WRAP) x (LENGTH IN FT. TO BE REPAIRED)**

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12 INCHES

Example:

Width of cloth	= 4"
Pipe diameter	= 4"
Pressure < 300 psi	= 15 layers
Length of Pipe in ft.	= 1 ft.

$$\frac{(12/4) \times (4 \times 3.14) \times 15 \times 1}{12} = 47 \text{ ft.}$$

For 47 ft. - 3.9 rolls of Plug-n-Wrap 4 x 12 (Round up to 4 rolls of Plug-n-Wrap needed)



# ...Chemical Compatibility List...

**Plug-n-Wrap™ is chemically resistant to most chemicals and fuels.**

No visible changes after 35 day immersion in the following chemicals:

Acetone  
Ammonia  
Sulfuric Acid (30%)  
Ethyl Alcohol  
Hydrochloric Acid (10%)  
Mineral Spirits  
Methyl-ethyl-ketone (MEK)  
Toluene  
Diesel Fuel  
Varsol  
Ethylene Glycol  
Crude Oil  
Hydraulic Oil  
Xylenes, Mixed, o-, m- and p-

**Plug-n-Wrap™ may be used with products that are compatible with polyurethane plastic.**

The user must always determine the suitability of the product for its intended use and recognize that strong acids or bases may affect the durability of the repair.

# ***WM700 Wet-Dry Epoxy***

## **Solvent-Free Epoxy Coating**

### **Description**

WM700 Wet-Dry epoxy is a 100% solids, non-regulated, non-hazmat, Kevlar™ reinforced epoxy coating system designed for coating surfaces that may be subjected to constant immersion in water. WM700 Wet-Dry will bond to water saturated concrete, and is resistant to sewer gasses, sulfur based chemicals, diluted acids and most caustics.

**Recommended Uses:** Steel and concrete piping, Marine environments, Docks, Fiberglass and wood boats, Sewers, Tunnels, Dams, Spillways, Underground structures.

### **Features**

Excellent chemical resistance. Convenient 1:1 ratio by volume or 1:0.83 by weight (base/cure). Superior adhesion to cold, damp surfaces. Non-hazmat to ship.

### **Typical Properties**

Compressive Strength	10,500 psi	ASTM D695
Tensile Strength	5,200 psi	ASTM D638
Abrasion Resistance (CS-17 Wheel, 1 kg Load)	0.20 gm loss	ASTM D4060
Water Absorption (2 hour boil)	0.19 %	ASTM D570
Flexural Strength	4,900 psi	ASTM D790
Shore D Hardness	88	ASTM D2240
Heat Distortion Temperature	122°F	
Bond Strength to Concrete	100 %	Concrete failure

### **Cure Schedule**

Pot Life @ 75°F	70-80 minutes
Tack Free	2 hours
Recoat	6-48 hours

### **Surface Preparation**

Surface to top-coated must be clean and free of oils, grease and loose contamination.

### **Application**

Mix WM700 epoxy base with the WM700 curing agent. Use a mechanical mixer if possible to ensure thorough mixing. The mixing ratio is 1/1 (base/curing agent) by volume or 1/0.83 by weight. WM700 does not require a 'sweat-in' or induction time and the mixed components should be used immediately.

Pot life is approximately 70-80 minutes at 75°F, so mix only the amount of epoxy that can be easily applied within that time limit. Apply using a squeegee.

WM700 is suitable for horizontal surfaces and vertical surfaces.

### **Notes**

Unless top-coated with a UV absorber, this epoxy will yellow in sunlight.

### **Transport**

Non-regulated by USDOT, IATA & IMO.

## ...Limitation of Warranty...

1. All products are sold subject to Terms and Conditions of Sale by WrapMaster, Inc. A copy of these terms and conditions is available from the company at its office in Longview, Texas. All products are sold F.O.B. WrapMaster plant.
2. WrapMaster warrants that upon shipment, the goods will be (i) free from defects and workmanship and (ii) substantially in accordance with WrapMaster's standard specifications for the specific goods. If, within sixty (60) days after shipment, WrapMaster receives written notice of any defect in the material or workmanship of the specified goods, or the failure of the goods to meet WrapMaster's standard specifications therefore, WrapMaster will correct each such defect of failure, at WrapMaster's option, by either making available repaired goods or replacement goods.
3. All goods must be handled, stored, transported, installed, operated and maintained in accordance with WrapMaster's standard written instructions set forth herein or provided or approved in writing by WrapMaster. WrapMaster makes no warranties which extend to damage to the goods due to deterioration or wear occasioned by sunlight, chemicals, abrasion, corrosion, installation, operation or maintenance, abnormal conditions or temperature or other use of the goods above standard recommended uses or in an improper manner. WrapMaster's sole responsibility for defects in material and workmanship or goods and Customer's sole remedy hereunder will be as stated in Terms and Conditions of Sale of WrapMaster, Inc. Composite Systems are UV sensitive.
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