

# *PermaWrap™*

## Composite FRP Sleeve

(Part Numbers: P04-6 thru P60-18)

### Description

The PermaWrap™ Composite FRP Sleeve is a rigid coil-shaped device used in conjunction with the WrapMaster's – AKC Adhesive & FKC Putty systems to restore hoop-strength to degraded carbon steel piping. The PermaWrap™ Sleeve is constructed from high tensile strength fiberglass strands incorporating a “magnetically detectable” material for Smart Pig Detection. The composite laminate is impregnated with a chemically resistant polyester resin and has a functional “male and female” surface of embossment. The “Diamond Lock” feature adds to the robustness of the PermaWrap™ Sleeve by providing a Dual Locking System - mechanical locking in addition to securing the system with the WrapMaster's PermaGrip AKC Adhesive.

**Recommended Repair Types:** “Blunted” defects associated with corrosion, dents or gouges with up to 80% wall loss on carbon steel piping. For use on ductile steel pipe for pipe grades up to API-5LX-80. Permanently repair of external defects. For use on field bends with a 5R minimum bend radius and the repair of corrosion defects associated with a Girth Weld. Temporarily repair internal defects – longevity may be determined by the internal metal loss rate.

### Features

High Tensile Strength	Superior chemical resistance
Magnetically Detectable	Low Elongation
Dual Locking System	Excellent Durability

### Typical Properties

Tensile Strength	90 ksi	ASTM D3039
Tensile Modulus	5.0 msi	
Transverse Tensile Strength	12.0 ksi	ASTM D3039
Tensile Elongation (%)	1%	ASTM D638
Layer Thickness	.060 - .075	
Number of Layers	8	
Configured for Pipe Size(s)	4” thru 60”	
Standard Sleeve Widths	6”, 9”, 12”, 15” and 18”	
Max Operating Temperature	161°F / 72°C per ASME PCC-2	



### Applying

WrapMaster's Installer Certification required for product use. Basic outline of application steps are 1) Pipe surface area should be clean, dry and free of contamination with an anchor pattern (NACE #3 or SA-2 ½). 2) Use PermaPutty to fill cavity and tented areas. 3) Apply PermaGrip Adhesive to pipe surface. 4) Attach PermaWrap™ Composite FRP Sleeve and apply adhesive while wrapping sleeve around pipe. 5) Tighten Sleeve and allow to cure for 2 hours.

### Storage

PermaWrap™ Composite FRP Sleeve should be stored in a dry shaded place at room temperature (77 °F).

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# *PermaGrip™*

## AKC Adhesive System

(sub-systems AKC-400 thru AKC-3900)

### **Description**

PermaGrip #AKC Adhesive is a highly thixotropic, two component, methacrylate adhesive system. PermaGrip #AKC is formulated to provide adjustability of “working time” for both warm and cold temperature applications. This adhesive forms a resilient bond and maintains its strength over a wide range of temperatures. PermaGrip #AKC is suitable for bonding a variety of substrates with minimal surface preparation.

**Recommended Substrates:** PVC, polycarbonate, acrylic, aluminum, epoxy coated metal, ABS, carbon and stainless steel, and FRP.

### **Features**

Non-sagging gaps filled to 1inch  
Little or no surface preparation  
Rapid room temperature cure 100% reactive

Superior impact and peel strength  
Offers excellent tolerance to off-ratio mixing  
Excellent environmental resistance

### **Typical Properties**

Tensile Lap Shear @ 77 °F	2,500-2,700	ASTM D1002
Tensile Lap Shear @ 180 °F	1,800-2,000	ASTM D1002
Tensile Elongation (%)	25-35	ASTM D638
Peel Strength (pli)	60	ASTM D3167
Shore D Hardness	75-80	
Bondline Thickness	.005-1.00	
Open Time @ 110 °F	40-45 minutes	16 : 1 Mix Ratio
Open Time @ 32 °F	160-180 minutes	4 : 1 Mix Ratio

### **Applying**

Bonding surface should be clean, dry, and free of contamination. Extensive surface preparation is not required for the PermaGrip #AKC system, a light scuffing with 100 grit sand paper or scotch bright pad and a solvent wipe. To assure maximum bond strength, surfaces must be mated within the adhesive’s open time. Use enough material to completely fill the joint when parts are clamped.

### **Storage**

PermaGrip #AKC should be stored in a cool, dry place when not used for a long period of time. The shelf life is one year from the date of manufacture when stored at 40 °F and six months when stored at room temperature (77 °F). Exposure above room temperature will reduce shelf life.

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# *PermaPutty™*

## FKC Filler Putty System

(sub-system FKC-500)

### **Description**

PermaPutty #FKC Filler is a highly thixotropic, two component, epoxy system. The Filler Putty forms a high compressive strength, low shrinkage “load transfer” structure maintaining its strength over a wide range of temperatures. PermaPutty #FKC is suitable for bonding a variety of substrates with minimal surface preparation.

**Recommended Substrates:** aluminum, epoxy coated metal, carbon and stainless steel, and FRP.

### **Features**

Non-sagging gaps filled to 1inch  
Little or no surface preparation  
Excellent environmental resistance

Superior compressive strength  
Rapid room temperature cure 100% reactive

### **Typical Properties**

Compressive Strength @ 77 °F	14,000	ASTM D1002
Compressive Strength @ 140 °F	10,000	ASTM D1002
Elongation (%)	< 1	ASTM D638
Shore D Hardness	> 80	
Bondline Thickness	.005-1.00	
Open Time @ 110 °F	40-50 minutes	2 : 1 Mix Ratio
Open Time @ 32 °F	220-240 minutes	2 : 1 Mix Ratio

### **Applying**

Bonding surface should be clean, dry, and free of contamination. Extensive surface preparation is not required for the Perma Putty #FKC system, a light scuffing with 100 grit sand paper or scotch bright pad and a solvent wipe. To assure maximum bond strength, surfaces must be mated within the filler putty's open time. Use enough material to completely fill the joint when parts are clamped.

### **Storage**

PermaPutty #FKC should be stored in a cool, dry place when not used for a long period of time. Exposure above room temperature will reduce shelf life.

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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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