

# *PermaWrap*<sup>TM</sup>

## **Composite FRP Sleeve**

**(Part Numbers: PWS04-6 thru PWS56-18)**

### **Description**

PermaWrap<sup>TM</sup> 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<sup>TM</sup> 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<sup>TM</sup> 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-70. 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  
Magnetically Detectable  
Dual Locking System

Superior chemical resistance  
Low Elongation  
Excellent Durability

### **Typical Properties**

Tensile Strength	90 ksi	ASTM D3039
Tensile Modulus	5.5 msi	
Transverse Tensile Strength	1.6 ksi	ASTM D3039
Transverse Tensile Modulus	1.0 msi	
Tensile Elongation (%)	1%	ASTM D638
Layer Thickness	.060 - .075	
Number of Layers	8	
Configured for Pipe Size(s)	4" thru 56"	
Standard Sleeve Widths	6", 9", 12" and 18"	
Operating Temperature Range	-50 °F to 130 °F	

### **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<sup>TM</sup> Composite FRP Sleeve and apply adhesive while wrapping sleeve around pipe. 5) Tighten Sleeve and allow to cure for 2 hours.

### **Storage**

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

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# *Perma Grip*<sup>TM</sup>

## **AKC Adhesive System**

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

### **Description**

Perma Grip #AKC Adhesive is a highly thixotropic, two component, methacrylate adhesive system. Perma Grip #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. Perma Grip #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**

Perma Grip #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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# *Perma Putty*<sup>TM</sup>

## **FKC Filler Putty System**

(sub-system FKC-500)

### **Description**

PermaPutty #FKC Filler is a highly thixotropic, two component, methacrylate system. PermaPutty #FKC is formulated to provide adjustability of “working time” for both warm and cold temperature applications. This 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. The shelf life is one year from the date of manufacture when stored at 40 °F - 77 °F. Exposure above room temperature will reduce shelf life.

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