

# *PermaWrap™*



## ***“The Next Generation Repair System”***

**Tested and Proven at the EXTREMES**

- ***“Smart Pig” Detectable • Diamond Lock Technology***
- ***No Shutdown • No Hot Work • No Heavy Equipment***
- ***D.O.T. Compliant • 45 Minute Installation***
- ***2-Man Operation***



**WrapMaster, Inc.**

**“Composite Solutions for Piping and Structures”**

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# AN ADVANCEMENT IN PIPE REPAIR

05-21-03

12.75" O.D. x .375" Wall; API-5LX-52

Defect - 6.5" x 6.5" x .300" Deep

Completed Installation in 35 minutes

Pipe Body Failure @ 4,260 psi



## PermaWrap™ Kit:

- ◆ *PermaWrap Composite Sleeve -Patent Pending- uses a superior laminate construction with proven materials to form a high tensile strength rigid "magnetically detectable" fiberglass wrap for the PERMANENT structural reinforcement of "blunt" type external defects to piping with up to 80% wall loss.*
- ◆ *Two-part proprietary Adhesive System used to bond the PermaWrap Sleeve to the pipe surface and to composite layers to form a monolithic structure.*
- ◆ *Two-part proprietary high compressive strength Putty used to fill all cavities and tented areas to ensure a "load-transfer" path from the pipe surface to the PermaWrap Sleeve.*
- ◆ *Installation Accessory Kit provides all items to properly apply the PermaWrap System with minimal additional tooling.*
- ◆ *The PermaWrap™ System Repairs 4" thru 56" Diameter Piping.*
- ◆ *The PermaWrap™ Kit comes in five (5) standard widths - 6", 9", 12", 15" & 18".*

## Repair:

- ◆ *Corrosion Defects*
- ◆ *Blunt Dents and Gouges*
- ◆ *Girth Weld Zone Repairs*
- ◆ *Field Bends & Elbows (greater than 5 D)*
- ◆ *Vertical & Horizontal Piping*

## Testing:

- ◆ *Cyclic Fatigue >100 psi to 2200 psi (72% SMYS)*
- ◆ *Hydrostatic Burst > Bare Pipe & Reinforced*
- ◆ *Adhesive Bond Testing*
- ◆ *Tensile Strength Evaluations*
- ◆ *Compressive Strength Evaluations*

## Material Properties:

<i>Cure Time</i>	<i>2 Hours</i>
<i>Max Operating Temperature</i>	<i>130 °F</i>
<i>Chemical Resistance (pH range)</i>	<i>4-11</i>
<i>Tensile Strength (psi)</i>	<i>90 ksi</i>
<i>Tensile Modulus (psi)</i>	<i>5.5 msi</i>
<i>Flexural Strength (psi)</i>	<i>26 ksi</i>
<i>Flexural Modulus (psi)</i>	<i>2msi</i>
<i>% Elongation @ 77 °F - Composite</i>	<i>1%</i>
<i>% Elongation @ 77 °F - Adhesive</i>	<i>40%</i>
<i>% Elongation @ 77 °F - Putty</i>	<i>&lt;1%</i>
<i>Lap Shear Strength @ 140 °F - Adhesive (psi)</i>	<i>1.6 ksi</i>
<i>Compressive Strength @ 140 °F - Putty (psi)</i>	<i>10 ksi</i>
<i>Hardness - Shore D</i>	<i>78</i>
<i>Coefficient of Thermal Expansion (in/in/°F)</i>	<i>6.70E+06</i>