

## TECHNICAL AND APPLICATION DATA

### DESCRIPTION

The **EMSOL® SCW-5000** is a non-metallic, structural wrap system designed to restore & rehabilitate damaged pipelines affected by erosion, corrosion, etc. The EMSOL SCW-5000 is a three-component system comprised of a paste grade epoxy metal repair compound, a liquid epoxy resin, and a unidirectional carbon fiber. When used as a system, the components are capable of repairing and restoring structural integrity on pipelines/process equipment, and prevents further damage caused by continuous use of the equipment.

The **EMSOL® SCW-5000** conforms with ASME PCC-2, ASME B31, ISO TS24817 regulations as Non-Metallic, Composite Carbon Fiber Structural Wrap.

### MECHANICAL PROPERTIES

<b>Compressive Strength ASTM-D 695</b>	78.38 MPa (11.37 Kpsi)
<b>Compressive Modulus ASTM D-695</b>	2,290 MPa (3.32 x 10 <sup>5</sup> psi)
<b>Poisson Ratio ASTM D-3039</b>	Axial = 0.0350 Hoop = 0.0387
<b>Young's Modulus ASTM D-3039</b>	Axial = 17.26 GPa (2.503 Mpsi) Hoop = 17.73 GPa (2.570 Mpsi)
<b>Tensile Strength ASTM D-3039</b>	Axial = 192.40 MPa (27.90 Kpsi) Hoop = 203.01 MPa (29.44 Kpsi)
<b>Thermal Expansion Coefficient ASTM D-696</b>	80°C-130°C (176°F-266°F) 0.710 x 10 <sup>-6</sup> in./in./°F (0.181 µm/°C)
<b>Flexural Strength ASTM D-790</b>	127 MPa ( 18.14 Kpsi)
<b>Elasticity Modulus ASTM D-790</b>	11.1 GPa (1,596 Kpsi)
<b>Tensile Shear Adhesion ASTM D-638</b>	0.618%
<b>Lap Shear Adhesion ASTM D-3165</b>	8.42 MPa ( 1.21 Kpsi)
<b>Lap Shear Resistance 1000 hours T=40°C</b>	8.42 MPa ( 1.21 Kpsi)
<b>In-plane Shear Modulus ASTM D-5379</b>	683.1 MPa (99.07 Kpsi)
<b>Heat Distortion Temperature ASTM D-6604</b>	80°C ( 176°F)
<b>Glass Transition Temperature</b>	85.5°C
<b>Cathodic Disbondment ASTM G 8 -96</b>	24°C y 49°C ( 75°F y 120°F) No blistering
<b>Hardness Shore D ASTM D-2240</b>	85

## CARBON FIBER STRUCTURAL WRAP

### BENEFITS

- High Tensile Strength
- Excellent Chemical Resistance
- Easy to use. Does not require preheating
- Excellent application properties
- 100% solids system
- Not flammable, 0% contents VOC's

### TYPICAL APPLICATIONS

- Exhaust pipelines
- Gas & Crude Oil pipelines
- Pipelines operating in Chemical Plants
- Tee's, elbows, accessories
- Steel tanks/Pressured vessels
- NOT FOR LIVE LEAKS, Please contact EMSOL Technical Department

### PHYSICAL PROPERTIES

- Full Cure: 24 hr @ 25°C
- Touch Dry: 4-6 hr @ 25°C
- Maximum Operational Temperature: 80°C
- Application Temperature: Max 65°C

### COMPONENTS

COMPONENT A: Metal Repair Compound (paste grade); 20 Kg Unit

COMPONENT B: Liquid epoxy resin; 3 gal Unit

COMPONENT C: Unidirectional/Bidirectional 50k carbon fiber; 30 cm x 100 m roller

### COVERAGE RATE

- When applied as a four-layer system, an entire KIT will yield 5 square meters.
- The EMSOL SCW-5000 is a standardized 4 layers system. The minimum number of applied layers must be four.

### SHELF LIFE & TEMPERATURE

- Storage temperature 5 - 35°C
- Shelf life: 1 year after purchase when stored at temperatures between 18°C and 30°C (65°F-86°F)

## SURFACE PREPARATION

The surface to be repaired must be free from oil, grease, dust, rust, existing coatings or any contaminant that prevents a direct contact between the EMSOL® SCW-5000 and the metallic substrate.

Any area contaminated by chemical agents must be cleaned, and neutralized before continue with the surface preparation process.

Where possible, clean the surface using blasting until a NACE -2 or SSPC-SP10 standard is achieved with a rough profile of 75 microns (3 mils). Before starting the EMSOL® SCW-5000 application, clean the surface in accordance with SSPC-SP1 with a suitable cleaner/degreaser such as xylene, MEK, acetone, etc.

EMSOL® SCW-5000 is designed to achieve optimum performance when applied over manually prepared surfaces. In most cases, when applied over badly damaged or corroded surfaces the surface must be cleaned until a SSPC-SP2 (Hand tool cleaning) is achieved. Please contact the EMSOL's Technical Department to ensure the best surface preparation method.

**Warning:** Under any circumstance clean the surface using abrasive/mechanical methods over surfaces with structural integrity damaged/compromised. Cleaning methods using heating, mechanical equipment, or causing further loss of thickness must be avoided.

## APPLICATION INSTRUCTIONS

**NOTE:** The EMSOL SCW-5000 application is a continuous process that cannot be interrupted once it is started. The application includes a Metal Repair Epoxy Compound followed by the application of four layers of carbon fiber embedded in liquid applied epoxy resin. The EMSOL® SCW-5000 components are designed to be applied continuously, but if the application has to be stopped for any circumstance, please contact the EMSOL Technical Department to determinate the adequate procedure to continue with the application, and to ensure optimum performance of the applied system.

### Metal Repair Epoxy Compound Application (COMPONENT A):

1. NOTE: Before COMPONENT A application, wash the surface thoroughly in accordance with SSPC-SP1 with a cleaner/degreaser such as xylene, MEK, acetone, etc.
2. By volume, measure 1 part of the COMPONENT A-Base, and 1 part of the COMPONENT A-Hardener, and place it onto a suitable mixing board. Mix completely until a homogenous, streak free mix is attained, and use the mixed material to fill pitting, surface defects and loss of thickness over the pipe to be repaired.
3. Once the surface defects are filled, immediately apply a uniform contact layer over the entire area to be repaired. The contact layer must have 1-3 mm thickness and must be applied by spatula, pressing firmly to avoid entrapped air and application voids.

### Epoxy Resin application (COMPONENT B) and Carbon Fiber application (COMPONENT C):

1. Immediately after the COMPONENT A application, and while the material is still tacky, mix an adequate amount of COMPONENT B into a plastic bucket, ensuring a homogenous mix is obtained. The mix ratio for the COMPONENT B is 2:1 by volume.
2. When a 4 layer system is applied, the first layer must be applied in axial direction. Measure, and cut a piece of COMPONENT C with the length specified in the design repair. Place the carbon fiber over the COMPONENT A and press firmly the carbon fiber segment, avoiding the formation of folds and wrinkles. Cut and place as many COMPONENT C segments as required to cover the complete pipeline circumference. The COMPONENT C segments must be overlapped 2".
3. Apply the previously mixed COMPONENT B by brush or roller over the carbon fiber previously applied. Ensure the COMPONENT C is completely wetted out with the epoxy resin, taking care to avoid leaving ponded excess resin during application.
4. The second layer of the SCW-5000 must be applied in circumferential direction. Cut as many pieces as necessary to completely cover the axial length of the repair. The applied wraps must be overlapped 1-2". Once the segments are placed in position, apply the required COMPONENT B, ensuring the layers are embedded into the resin.
5. The third layer must be applied in axial direction, and the fourth layer in circumferential direction. When applied as a four layers system, the EMSOL® SCW-5000 must achieve an approximate thickness of 4 mm.

EMSOL® warrants its products to be free from defects in material and workmanship. EMSOL's sole obligation and Buyer's exclusive remedy in connection with the products shall be limited, at EMSOL's option, to either replacement of products not conforming to this warranty or credit to Buyer's account in the invoiced amount of the nonconforming products. Any claim under this Warranty must be made by Buyer to EMSOL® in writing within five days of Buyer's discovery of the claimed defect, but in no event later than the expiration of the applicable shelf life, or one year from the delivery date, whichever is earlier. Buyer's failure to notify EMSOL® of such nonconformance as required herein shall bar Buyer from recovery under this warranty.

**EMSOL® makes no other warranties concerning this product. No other warranties, either expressed or implied, or statutory, such as warranties of merchantability or fitness for a particular purpose, shall apply. In no event shall EMSOL® be liable for consequential or incidental damages.**

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EMSOL® reserves the right to change formulations, and updates to this document at any time without previous notice. Please contact to EMSOL for the latest information available.

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