



## Using DuraWrap®

**Repair, reclaim, reinforce & extend the life of all types of metal & concrete pipes & tanks.**

**PLEASE READ THESE INSTRUCTIONS AND SAFETY DATA SHEET (SDS) CAREFULLY PRIOR TO USE**

METALCLAD® DuraWrap® polymer/carbon fiber reinforced composite makes repairing and rebuilding aging, often severely deteriorated piping, tanks and other fluid flow equipment possible.

The ENECON® METALCLAD® DuraWrap® composite, a unique marriage of ENECON®'s high performance polymers and cutting-edge carbon fiber technology, was specifically created to repair, rebuild, reinforce and even restore the integrity of such fluid flow systems - thereby greatly extending their service life and eliminating the need for expensive replacement.

### SURFACE PREPARATION

The DuraWrap® System should only be applied to clean, dry and well roughened surfaces.

Please note: Since the DuraWrap® System is often used to reinforce/strengthen piping and components which may have lost some degree of structural integrity, care should be taken during preparation to minimize excess/unnecessary damage to the equipment.

1. Remove all loose material and surface contamination and clean with a suitable solvent which leaves no residue on the surface after evaporation such as acetone, MEK, isopropyl alcohol, etc.
2. Clean/roughen the surface by abrasive blasting. Use caution when preparing the surface if the structural integrity of the component/area being prepared is in question.
3. If necessary, apply moderate heat and/or allow the component(s) to 'leach' to remove ingrained contaminants.
4. Thoroughly roughen surfaces by abrasive blasting to achieve an SSPC - SP 10 near white metal degree of cleanliness and an anchor pattern of 3 mils/75 microns.

### PRIMING

All surfaces to which the DuraWrap® System is to be applied must first be treated with the DuraWrap® Primer. For your convenience, the DuraWrap® Primer Base and Activator are supplied in precisely measured quantities. Simply pour the contents of the Activator container into the Base container and, using a spatula (provided), putty knife or other appropriate tool, mix thoroughly until a uniform, streak-free color is achieved.

Once mixed, the DuraWrap® Primer should be applied by using a stiff-bristle brush (provided) or a roller. The DuraWrap® Primer has been specifically formulated to fill-in pits and/or damage as deep as approximately ¼ inch (6 mm). Deeper areas may require an additional "pass" to adequately fill the voids.

The installation of the DuraWrap® Polymer/Carbon Fiber composite may begin immediately after priming and must be completed within 6 – 8 hours at a temperature of 77°F/25°C.



### PREPARING THE CARBON FIBER

Two layers of Carbon Fiber must be installed in all areas. On small diameter pipes, it may be possible to spiral wrap the Carbon Fiber onto the pipe; however, on larger pipes/ components, the easiest way to install the Carbon Fiber is to cut the material into pieces approximately 2- 4 inches (5 – 10 cm) longer than the perimeter of the component being "wrapped" and install these pieces in a continuous process while overlapping the preceding piece by 50% of its width.

Please note: Carbon Fiber is electrically conductive. When the DuraWrap® system is used in immersion service on the inside of piping, normal industry standards specify that a layer of non-conductive fiberglass fabric be installed (using the DuraWrap® Polymers and application guidelines) as an insulator prior to the installation of the two-layer DuraWrap® Carbon Fiber System.

### MIXING AND APPLICATION

The DuraWrap® Polymer Base and Activator have been provided in precisely measured quantities. Simply pour the contents of the Activator container into the Base container and, using a spatula (provided), putty knife or other appropriate tool, mix thoroughly.

Lay a piece of the previously cut Carbon Fiber out on a table or other suitable work surface. Apply the mixed DuraWrap® Polymer to the Carbon Fiber using a roller. Once the first side has been thoroughly "wetted out", turn the piece of Carbon Fiber over and roller apply additional DuraWrap® Polymer to the back side.

Please note: It is imperative that each piece of Carbon Fiber is thoroughly impregnated with DuraWrap® Polymer.

Apply/install the wetted out Carbon Fiber to the component being repaired. Using a plastic applicator (provided), a squeegee or other appropriate tool, smooth the Carbon Fiber onto the surface, eliminating any wrinkles and over-lapping the excess length. Any excess DuraWrap® Polymer that is removed in this process can be re-used as long as it is still within its working life.

Once the first piece has been installed, apply the DuraWrap® Polymer to the next piece of Carbon Fiber in exactly the same manner and install this piece so that ½ the width of the previously installed piece is covered by ½ of this second piece – thereby creating the necessary two-layer application of Carbon Fiber. Again, smooth the Carbon Fiber onto the surface to eliminate any wrinkles and overlap the ends.

Continue the process until the entire area is covered with two layers of the DuraWrap® Carbon Fiber Composite System – using half-width pieces of Carbon Fiber fabric to finish the ends/extremities of the repaired area.

## Mixing Ratios

		Base	Activator
DuraWrap® Primer	By volume	2.8	1
	By weight	9	2
DuraWrap® Polymer	By volume	2.2	1
	By weight	5	2

## DuraWrap® System Properties

(Based on a two-ply composite using 12K x 3K Carbon Fiber)

Tensile Strength	ASTM D-3039	123,600 psi	8,650 kg/cm²
Tensile Modulus	ASTM D-3039	8,450,000 psi	591,500 kg/cm²
Elongation	ASTM D-3039	1.38%	1.38%
Flexural Strength	ASTM D-790	97,400 psi	6,820 kg/cm²
Flexural Modulus	ASTM D-790	7,950,000 psi	556,550 kg/cm²
Adhesion to steel	ASTM D-1002	> 3,500 psi	>245 kg/cm²
Adhesion to concrete	ASTM D-4541	Greater than the cohesive strength of the concrete.	

## Cure Times - DuraWrap® Primer

Ambient Temperature		Working Life	Touch Dry	Full Cure
59°F	15°C	2 hrs	12 hrs	5 days
77°F	25°C	60 min	6 hrs	3 days
86°F	30°C	40 min	4 hrs	2 days

## Cure Times - DuraWrap® Polymer

Ambient Temperature		Working Life	Touch Dry	Full Cure
59°F	15°C	90 min	18 hrs	7 days
77°F	25°C	45 min	9 hrs	4 days
86°F	30°C	30 min	6 hrs	3 days

## HEALTH & SAFETY

Every effort is made to insure that ENECON® products are as simple and safe to use as possible. Normal industry standards and practices for housekeeping, cleanliness and personal protection should be observed. For further information and guidance, please refer to the detailed MATERIAL SAFETY DATA SHEETS (MSDS) supplied with the material and also available on request.

## CLEANING EQUIPMENT

Wipe excess material from tools immediately. Use acetone, MEK, isopropyl alcohol or similar solvent as needed.

## TECHNICAL SUPPORT

The ENECON® engineering team is always available to provide technical support and assistance. For guidance on difficult application procedures or for answers to simple questions, call your local ENECON® Fluid Flow Systems Specialist or the ENECON® Engineering Center.

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[www.enecon.com](http://www.enecon.com)

Toll Free: 888-4-ENECON (888-436-3266)

Tel: 516 349 0022 · Fax: 516 349 5522

[info@enecon.com](mailto:info@enecon.com)

6 Platinum Court · Medford, NY 11763-2251