

METALCLAD[®]

DuraWrap[®]

Carbon Fiber Pipe Wrap System

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

- 100% Solids
- Requires No Heat
- High Tensile Strength
- Safe & Simple To Use
- No Special Tools Required

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 fluid flow systems - thereby greatly extending their service life and eliminating the need for expensive replacement.



METALCLAD[®] DuraWrap[®] can be applied to the interior and / or exterior of piping and equipment to both seal and strengthen these components. When applied to the interior walls of underground or otherwise inaccessible piping, *METALCLAD[®] DuraWrap[®]* can effectively repair and restore piping integrity without expensive excavation and replacement.

The outstanding performance of the ENECON[®] *METALCLAD[®] DuraWrap[®]* system allows today's maintenance professional to extend the service life of yesterday's equipment and structures.



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Systems Specialists.

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Using DuraWrap®

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

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).

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/cm ²
Tensile Modulus	ASTM D-3039	8,450,000 psi	591,500 kg/cm ²
Elongation	ASTM D-3039	1.38%	1.38%
Flexural Strength	ASTM D-790	97,400 psi	6,820 kg/cm ²
Flexural Modulus	ASTM D-790	7,950,000 psi	556,550 kg/cm ²
Adhesion to steel	ASTM D-1002	> 3,500 psi	>245 kg/cm ²
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

Your Local ENECON® Fluid Flow Systems Specialist

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.

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 & Installation – 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.

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.

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

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.

Please refer to the detailed MATERIAL SAFETY DATA SHEETS (MSDS) supplied with the material (also available on request) for more information.

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.

All information contained herein is based on long term testing in our laboratories as well as practical field experience and is believed to be reliable and accurate. No condition or warranty is given covering the results from use of our products in any particular case, whether the purpose is disclosed or not, and we cannot accept liability if the desired results are not obtained.

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