PileMedic® PLC100.60

Description

PileMedic® PLC100.60 is a high-strength high-modulus Fiber Reinforced Polymer (FRP) laminate constructed with bidirectional carbon fabrics providing strength in both longitudinal and transverse directions. The laminate is wrapped around the host structure and the overlapping portions are bonded together using QuakeBond™ 220 to create a strong shell around the existing structure. PileMedic® is unique in that it allows construction of a seamless structural shell around an existing column, utility pole or submerged pile. The annular space between the PileMedic® Jacket and the host structure can be filled with an array of Quakewrap® fill materials, including resins, epoxy grouts, and non-shrinking grouts.

Uses

- Repair of underwater piles
- Repair of bridge piers
- Repair and strengthening of corroded steel columns
- Repair and strengthening of timber utility poles & bridge piling
- Applicable to all materials: concrete, steel and timber

Advantages

- One flat sheet can be used to construct a custom circular shell in the field, eliminating the expense and delays of special order jackets.
- The jacket provides significant lateral confining pressure in the hoop direction under code compliant conditions.
- Increases the axial compressive capacity of the structure under code compliant conditions
- Provides flexural (bending) enhancement under code compliant conditions
- The seamless shell prevents migration of moisture and oxygen into the structure, significantly reducing future rate of corrosion and deterioration.
- Annular space is easily maintained in the field, minimizing the waste of fill material.
- Eliminates or Reduces the diving time in underwater repairs
- Corrosion-resistant system can withstand various chemicals.
- Non-toxic, odorless resins are approved for potable water.
- Strength of the laminates can be verified prior to installation in
- the field (in contrast with wet layup FRP systems).
- A polyester scrim is provided on both faces, eliminating the
- possibility of galvanic corrosion when the laminate is installed
- in contact with steel columns.
- Laminates can be installed as single shells with overlapping
- joints along the column height or as a continuous spiral shell.
- The laminates are manufactured in our plant with the highest
- quality control.

Packaging

Standard rolls are 50 in. x up to 240 feet (1.27 m X 91.4 m). PileMedic® laminates can be custom manufactured in widths up to 50 inches (1.27 m).

Shelf Life & Storage

PileMedic® laminates have unlimited shelf life when stored properly. Store in dry place at 30°-120° F (0°-50° C).

Fiber & Laminate Properties

		US Units	SI Units
Longitudinal (0°) Direction:			
Tensile Strength	**(ASTM D3039)**	101 ksi	698 Mpa
Modulus of Elasticity	**(ASTM D3039)**	7,150 ksi	49,280 Mpa
Ultimate Elongation	**(ASTM D3039)**	0.85%	0.85%
Transverse (90°) Direction:			
Tensile Strength	**(ASTM D3039)**	64.2 ksi	443 Mpa
Modulus of Elasticity	**(ASTM D3039)**	2,940 ksi	20,260 Mpa
Ultimate Elongation	**(ASTM D3039)**	1.42%	1.42%
Laminate Properties:			
Ply Thickness		0.026 in	0.66 mm
Barcol Hardness	**(ASTM D2583)**	45 min	45 min
Water Absorption	**(ASTM D570)**	0.7% max	0.7% max

Force Equivalency

A double layer of PileMedic® PLC100.60 provides the following equivalent forces:
No. 4 Gr. 40 stirrup placed at 1.75 inches on center
No. 4 Gr. 40 bars placed vertically at 2.5 inches on center

Jacket Diameter inches (mm) [1]	Confining Pressure psi (MPa) [2]	Gain in Strength psi (MPa) [3]
12 (305)	875 (6.0)	3500 (24.1)
24 (610)	440 (3.0)	1760 (12.1)
36 (915)	290 (2.0)	1160 (8.0)
48 (1220)	220 (1.5)	880 (6.1)
60 (1525)	175 (1.2)	700 (4.8)

(1) Cylindrical jackets constructed with two plies of PileMedic® PLC100.60 laminate plus an 8-inch (200-mm) overlap beyond the starting point.
(2) Nominal confining pressure for a cylindrical jacket.
(3) Nominal increase in compressive strength of concrete column & grout due to confining pressure of jacket.

The Infrastructure Innovators

QuakeWrap.com

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QuakeWrap, Inc. warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current technical data sheet if used as directed within shelf life. User determines suitability of product for intended use and assumes all risks. Buyer's sole remedy shall be limited to the purchase price or replacement of product exclusive of labor or cost of labor. NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. QUAKEWRAP, INC. SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES.

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Application

The following steps outline a typical application of the PileMedic® system. Project-specific requirements may vary.

1) Cut the required length of PileMedic® laminate considering the number of layers necessary and the overlap length.
2) Prepare the laminate bond surface by roughening with 60-grit sandpaper.
3) Wipe laminate with appropriate cleaner (e.g. acetone, MEK, or approved alternate) using a clean cloth.
4) Apply QuakeBond™ 220 on the over-lapping regions of the laminate sheet.
5) Wrap the laminate around the host structure to create a multi-layer jacket. PileMedic® spacers shall be used to control the size of the annular space between the host structure and the laminate.
6) Use straps to temporarily hold the jacket in the desired shape.
7) Seal the bottom of the annular space, as required.
8) Fill the annular space with approved fill material; the hydrostatic pressure from the weight of the fill material will press the laminate plies against each other for improved bonding. For underwater applications, the fill material must be compatible for such applications.
9) For longer piles, repeat the above steps for additional 4-ft wide bands of jacket along the height of the pile; overlap the new jacket as required with the adjacent jacket.
10) Leave the installation undisturbed for 24 hours before removing the straps.
11) Apply appropriate coating on the exterior of the jacket, as required.

Installation of PileMedic® products must be performed only by specially-trained and approved contractors.

Laminates can be cut to appropriate length using commercial quality heavy duty shears. Care must be taken to support both sides of the laminate during cutting to avoid splintering. Since dull or worn cutting tools can damage, weaken or fray the fiber, their use should be avoided.

Limitations

Design calculations must be made and certified by a licensed professional engineer.

Minimum repair diameter is 12”. Maintain a minimum repair diameter of no less than 12” over the face of the repair. Sharp corners and flat faces of the laminate should be avoided.

Caution

PileMedic® PLC100.60 laminates are non-reactive. They do not require a Safety Data Sheet (SDS). However, caution must be used when handling since a fine dust may be present on the surface. Gloves and safety glasses are recommended to protect against skin and eye irritation. Care must also be taken when cutting the laminates to protect against airborne dust generated by the cutting procedure. Use of an appropriate, properly fitted NIOSH approved respirator is recommended.

First Aid

Appropriate Personal Protective Equipment (PPE) should be worn at all times when handling product.

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QuakeWrap, Inc. warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current technical data sheet if used as directed within shelf life. User determines suitability of product for intended use and assumes all risks. Buyer’s sole remedy shall be limited to the purchase price or replacement of product exclusive of labor or cost of labor. NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. QUAKEWRAP, INC. SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES.