PileMedic, LLC
2055 E. 17th Street
Tucson, AZ 85719 U.S.A.
Phone: (520) 791-7000
Fax: (520) 791-0600
www.PileMedic.com

Product Data Sheet

PileMedic™ CF60.40

For Structural Strengthening of Columns and Submerged Piles

DESCRIPTION

PileMedic™ CF60.40 is a high-strength high-modulus Carbon Fabric with biaxial fiber architecture, providing strength in both longitudinal and transverse directions. The fabric is specially suited for economical repair of columns and submerged piles. The fabric is impregnated with our proprietary urethane resin system in our plants and is ready to apply directly out of the bag. PileMedic™ CF60.40 is cured in the field by way of a chemical reaction that is initiated by spraying water to the fabric in the field. This offers considerable advantages over conventional wet layup FRP systems in that there is no measuring, mixing, spreading, or dripping of resins and solvents in the field to harm the environment. Cured PileMedic™ 60.40 is a very durable, high long term strength material, impervious to fuels, most chemicals and solvents. It permanently bonds to a wide variety of surfaces such as metals, composites, concrete, plastics and wood.

USES

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

ADVANTAGES

- Fabrics are flexible and can be used to wrap piles of any shape and size.
- Fabrics are impregnated in our plant, eliminating the need for mixing resins and saturating the fabric in the field.
- Plant-impregnated fabrics eliminate errors by field crew.
- The fabric provides significant *lateral confining pressure* (in the hoop direction) that increases the axial compressive capacity of the pile or column.
- The combination of fabric and PileMedic™ T-Lock plastic sheets result in a *seamless shell that prevents migration of moisture and oxygen* into the column, significantly reducing future rate of corrosion and deterioration.
- Annular space can be adjusted in the field *to minimize the volume of grout or resin*.
- Eliminates or reduces the need for costly divers in underwater pile repairs
- *Corrosion-resistant* system can withstand various chemicals.
- System is flexible allowing repair of columns of any shape, size and height without any advanced fabrication.

PACKAGING

Standard rolls are 12 in. wide X 30, 60, or 90 feet long (305 mm X 9.1, 18.2, or 27.4 m).

SHELF LIFE

PileMedic™ CF60.40 has a 12 month shelf life from date of sale, in an unopened package, stored in cool warehouse conditions.

STORAGE CONDITIONS

Store at 60-90° F in a dry place. Do not freeze. Dispose of any leftover material.

APPLICATION

PileMedic™ CF60.40 is shipped in a sealed protective bag to protect it from atmospheric moisture. Because it cures with the application of water (and air in humidity), care must be taken in handling the sealed bags to prevent puncturing or scuffing, which would cause the product to cure in the bag. Once the bag is opened and the PileMedic™ CF60.40 is exposed to the humidity in air, it will begin to cure and will gel within about 60 minutes. Therefore, work must be well planned prior to opening the bag.

PileMedic™ CF60.40 requires no special handling or application procedures. This resin is slightly irritating to certain sensitive people; it will give off a small amount of carbon dioxide vapor while curing. The cured resin is permanent and very difficult to remove, so gloves, safety glasses and other personal protection equipment appropriate for the task must be used.

Steps in repair of a column or submerged pile are listed below:

1) Cut PileMedic™ T-Lock plastic sheets to desired dimension; normally these sheets will be cut to the length that will fully encompass the pile including any annular space for grouting. The height of the sheets will be 4 feet (along the height of the column).
2) Apply a thin film of QuakeBond™ PM primer/adhesive to the back face of PileMedic™ T-Lock plastic sheet
3) Wrap PileMedic™ T-Lock plastic sheets around the column; spacers such as PVC pipes can be temporarily attached to the column to establish the width of the annular space.
4) Open a bag of PileMedic™ CF60.40
5) Wrap the fabric around the plastic sheet in a continuous spiral fashion, making sure the fabric is in full contact with the plastic sheet and that any air bubbles are removed. While the fabric is exposed,

spray the fabric with water; this will activate the resin in the fabric.

6) Continue wrapping the fabric and spraying it with water.
7) To ensure that the resin remains within the fabric while curing, wrap a thin sheet of plastic such as Saran wrap or shrink wrap on the installed fabric and puncture these sheets with a porcupine roller.
8) When necessary, butt-joint an additional 4-ft tall section of PileMedic™ T-Lock plastic sheet with the previous one and continue wrapping the fabric; this will create an 8-ft tall shell. As the shell is created, it can be lowered into water.
9) When the first roll of fabric is finished, open a new roll and provide a 12-inch overlap with the end of the first roll of fabric and continue wrapping the fabric around the plastic sheets in a spiral manner.
10) Continue these steps until a shell of desired height is constructed.
11) Fill the annular space with tremmie grout or resin.
12) Leave the installation undisturbed for 24 hours before removing the shrink wrap.
13) If desired, apply appropriate coating on the exterior of the jacket.

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

LIMITATIONS

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

FORCE EQUIVALENCY

A double layer (two plies) of PileMedic™ CF60.40 provides a lateral force equivalent to No. 4 Gr. 40 stirrup placed at 1.75 inches on center.

Jacket Diameter inches (mm)[1]	Confining pressure psi (MPa)[2]	Gain in strength psi (MPa)[3]
12	780 (5.4)	3150 (22.0)
24	390 (2.7)	1600 (11.0)
36	260 (1.8)	1060 (7.3)
48	195 (1.3)	800 (5.5)
60	155 (1.1)	640 (4.4)

(1) Cylindrical jackets constructed with two plies of PileMedic™ CF60.40 fabric.
(2) Nominal confining pressure for a cylindrical jacket.
(3) Nominal increase in compressive strength of concrete column & grout due to confining pressure of jacket.

PileMedic™ CF60.40 Properties	
Working Time:	30-40 min. at 25ºC (77ºF)
Application Temps:	4-93°C (40-200°F)
Service Temps:	-18 - 121°C (0 - 250°F)
Cure Time (dry to touch):	30-60 minutes at 25°C (77°F)
Full Cure:	7 days at 25°C (77°F)
HDT, ºF	325
CTE, in/in ºF	8.7 e^{-6} (E)
Tg ºF	288
Usual Packaging:	Pre-Packaged Rolls
Shelf Life:	1 year
Hardness (ASTM D 2240)	90 Shore D
Chemical Resistance:	Acetone, MEK, toluene, gasoline, ethyl alcohol and many others

PileMedic™ CF60.40 Cured Properties		
	US Units	SI Units
Ply Thickness	0.038 in.	1 mm
Bond strength to steel with QuakeBond™ PM primer/adhesive	1000 psi	6.9 MPa
Longitudinal (0°) Direction:		
Tensile Strength	61 ksi	420 MPa
Modulus of Elasticity	4,560 ksi	31,400 MPa
Tensile Load per Ply	2340 lb/in	410 N/mm
Transverse (90°) Direction:		
Tensile Strength	41 ksi	282 MPa
Modulus of Elasticity	4,300 ksi	29,600 MPa
Tensile Load per Ply	1800 lb/in	315 N/mm