

PRODUCT DATA

3 03 01 00 Maintenance of Concrete

MBRACE® S&P LAMINATE

High strength carbon fiber laminate for the MBrace® Composite Strengthening System

Description

MBrace® S&P Laminates are high strength carbon fiber reinforced polymer (CFRP) plates used to strengthen existing structural members. Similar to bonding steel plates onto a structure, MBrace® S&P Laminates provide additional reinforcement that strengthens and stiffens existing structures. Unlike steel plates, however, MBrace® S&P Laminates are lightweight, easy to install, and will not corrode. MBrace® S&P Laminates can be used in surface mounted applications, where the laminate is bonded onto the surface of a structural member, or near surface mounted (NSM) applications, where the laminated is installed in shallow grooves cut into the existing structural member. Depending on the application, the laminate is bonded using an epoxy resin specifically suited for the installation. The result is an externally bonded reinforcement system that offers outstanding long-term physical and mechanical properties.

Packaging

492 lineal foot coils

Color

Black

Shelf Life

3 years in unopened containers properly stored

Features

- Cost effective repair
- High strength to weight ratio
- Will not corrode
- Easy installation
- Low aesthetic impact

Benefits

- MBrace systems offer an alternative to traditional supplemental strengthening methods by reducing installed costs to the owner
- Can add significant strength to a structure without adding significant dead load
- Offers an extremely durable repair even in exterior applications
- Can be installed quickly, even in areas of limited access
- Easy to conceal, will not significantly change existing member dimensions, will form around complex surfaces

Storage

Store out of direct sunlight in a dry place between 50 and 90° F. Store laminates on original rolls or packaging until ready to use. Keep laminates dry and free from dust and oil.

Where to Use

APPLICATION

- Increase load bearing capacity of concrete beams and slabs
- Restore structural capacity to damaged or deteriorated concrete structures
- Substitute reinforcing steel mistakenly omitted in the construction of concrete and masonry structures
- Improve the seismic response of shear walls and collector elements
- Improve the blast resistance of concrete and masonry structures
- Strengthening steel and timber structures

LOCATION

- Vertical
- Horizontal
- Exterior
- Interior

SUBSTRATE

- Concrete
- Masonry
- Wood
- Steel

Technical Data

Composition

Pultruded fiber reinforced polymer (FRP) laminate composed of a dense network of high strength carbon fibers bound in an epoxy resin matrix

Test Data

PROPERTY			
S&P Laminate	10/1.4 (NSM)	50/1.4	100/1.4
Fiber Type	Carbon	Carbon	Carbon
Matrix Resin Type	Epoxy	Epoxy	Epoxy
Fiber Volume Fraction	70%	70%	70%
Nominal Width, in (mm)	3/8 (10)	2 (50)	4 (100)
Nominal Thickness, in (mm)	0.055 (1.4)	0.055 (1.4)	0.055 (1.4)
Design Area (sq in)	0.0217	0.109	0.217
Modulus of Elasticity (psi)	23,000,000	23,000,000	23,000,000
Tensile Strength @ Ultimate (psi)	390,000	390,000	390,000
Ultimate Elongation (%)	1.67	1.67	1.67
Epoxy Adhesive Usage (LF/gallon)	60 to 75	75 to 120	30 to 60

How to Apply

Surface Preparation

Preparing the Laminate

1. USE CAUTION WHEN UNPACKING MBRACE® S&P LAMINATES. The laminate coils are under a high degree of tension. Prior to unpacking the material, the coil should be braced against unraveling. It is recommended to place the coil in a Laminate Dispenser Frame for convenient unpacking and dispensing. Contact a DBS Representative for information on obtaining a Laminate Dispenser Frame. Alternately, the laminate can be placed in a frame constructed of lumber.
2. Uncoil the required length of laminate to be installed, and cut the laminate to the proper length. The laminate can be cut using a hack saw or an angle grinder with a metal cutting wheel. Use caution when cutting the laminate, the laminate can splinter when cutting. The use of gloves, protective eyewear and a dust mask is highly recommended.
3. Clean the laminate using a white rag and T-471, acetone or methyl ethyl ketone. Repeat cleaning until the laminate can be wiped without black carbon dust coming off onto the rag.

Surface Mounted Installation

Surface Preparation

1. Substrate should be fully cured, clean, sound and dry.
2. For concrete and masonry substrates, mechanically prepare the substrate to remove coatings, laitance and all miscellaneous surface contaminant and to provide a proper surface profile. Surface profile should be a minimum of ICRI CSP-3 (similar to 80-grit sandpaper).
3. For steel substrates, abrasive blast to "white metal" in accordance with Society for Protective Coatings (SSPC) Specification SP-5-89 or NACE No. 1, using clean, dry abrasive to obtain a minimum 3 mil profile.
4. The surface flatness should not vary by more than 1/8 inch in a 3 ft length (3 mm in a 1 m length). Note that length is measured along the direction that the laminate is to run.
5. Surface irregularities can be leveled using Concrete® LPL Paste. For larger irregularities, Concrete® LPL Paste can be extended by mixing in sand at a ratio of 1:1. The leveling material should be allowed to cure no longer than 24 hours before installing the laminate on top of it.

Application

1. MBrace® S&P Laminates may be surface mounted using Concrete® LPL Paste. Consult with the data guide for Concrete® LPL Paste for mixing and handling instructions on this adhesive material.
2. The adhesive should be applied directly to the backside (dull side) of the laminate. When applied properly, the adhesive will be uniform along the length of the laminate and will form a curved profile along the width of the laminate with nearly 1/16" (1.5 mm) thickness at the edge of the laminate and 1/8" (3 mm) thickness at the center of the laminate. This profile can easily be achieved using a Paste Adhesive Dispenser. Alternately the adhesive paste profile can be attained using a flexible piece of plastic as a trowel.
3. With the adhesive side of the laminate against the substrate, apply the laminate to desired location using the light finger pressure. Check the location and alignment of the laminate. Using a smooth rubber roller and moderate pressure, press the laminate against the substrate until adhesive begins to exude from both sides of the laminate.
4. Excess adhesive on the substrate can be removed using a steel trowel. Any adhesive on the exposed side of the laminate can be cleaned using T-471, acetone or methyl ethyl ketone prior to the adhesive curing.

5. The consistency of the adhesive typically allows the laminate to be placed in overhead and vertical applications without the need for supports holding the laminate in place. Under some conditions, the laminate may have a tendency to debond as the adhesive cures. In these situations, temporary supports should be put in place until initial cure of the adhesive is attained.

6. Additional loads should not be put on the structure until the laminate adhesive is fully cured. Cure times will vary depending on ambient temperature and humidity conditions. For detailed information on anticipated cure times, consult the data guide for Concreative® LPL Paste.

Near Surface Mounted Installation

Surface Preparation

1. In the location that the laminate is to be installed, saw cut a 1/8" wide x 1/2" deep groove into the substrate (Note that groove dimensions may vary based on project requirements).

2. Using compressed air or other suitable means, remove any accumulated dust from the saw cut groove.

Application

1. MBrace® S&P Laminates may be near surface mounted using Concreative® LPL Liquid or Concreative® 1420 (preferred). Consult with the data guide for Concreative® material used for mixing and handling instructions on the adhesive material.

2. Fill the saw cut groove roughly half deep with the adhesive material.

3. Place the MBrace® S&P Laminate on edge into the groove. Move the laminate back and forth/up and down in the groove to ensure full coverage of the adhesive around the laminate and into the groove.

4. Fill the remaining space in the groove with adhesive. Any excess adhesive can be removed with a steel trowel. Excess adhesive near the groove can be cleaned using T-471, acetone and methyl ethyl ketone.

5. Additional loads should not be put on the structure until the laminate adhesive is fully cured. Cure times will vary depending on ambient temperature and humidity conditions. For detailed information on anticipated cure times, consult the data guide for Concreative® material utilized.

For Best Performance

- Refer to the data sheet for the epoxy adhesive used for temperature limitations and curing times.
- Make certain the most current versions of product data sheet and MSDS are being used; call Customer Service (1-800-433-9517) to verify the most current versions.
- Proper application is the responsibility of the user. Field visits by personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

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