

Blome CS-U18C Carbon Fiber Fabric for Composite Strengthening

DESCRIPTION AND USES

Blome CS-U18C is an 18 oz., heavy duty, unidirectional carbon fiber fabric. This material is field laminated using either the wet or dry lay-up method. Field laminating uses either Blome CS-600 or CS-650 Epoxy to form a carbon fiber reinforced polymer (CFRP) used to strengthen various structural elements.

Damage/Deterioration of industrial structures

Restoring integrity to chemically deteriorated or damaged structures
Concrete/Brick Chimney wrapping
Concrete storage silos
Tile tanks and chests
Steel storage tanks and process vessels

Load increases

Installation of heavy machinery in industrial buildings
Vibrating floor slabs, columns
Building utilization changes
Increased live loads
Increased traffic volumes

Seismic strengthening

Concrete/Brick Chimneys
Tile tanks, chests and silos
Column wrapping
Masonry walls

Structural system changes or defects

Removal of walls or columns
Removal of slab sections for openings
Insufficient reinforcements
Insufficient structural depth

ADVANTAGES/BENEFITS

Easy to use fabric - ideal for confined spaces
Used for shear, confinement or flexural strengthening
Flexible - can be wrapped around complex shapes
High strength
Non-corrosive
Corrosion resistant
Low aesthetic impact - can be painted to match existing structures

PACKAGING/COVERAGE

Blome CS-U18C Fabric is supplied in rolls: 12 in. x 300 ft. or 24 in. x 300 ft.

For practical coverage, make necessary allowances for condition of the substrate, temperatures, jobsite conditions, waste, overspray, etc.

TYPICAL PROPERTIES

| | |
|--------------------------------|----------------------------------|
| Storage Conditions | Store dry at 40°-95°F (4°-35°C) |
| Color | Black |
| Primary Fiber Direction | 0° (unidirectional) |
| Weight per Square Yard | 18.0 oz. (618 g/m ²) |

Cured Laminate Properties Design Values

| | |
|--------------------------------|----------------------------|
| Tensile Strength | 104,000 psi (717 MPa) |
| Tensile Modulus | 9,446,600 psi (65,087 MPa) |
| Thickness | 0.04 in. (0.51 mm) |
| Tensile Elongation | 0.98% |
| Strength per Inch Width | 4,160 lbs./layer (18.5 kN) |

Fiber Properties

| | |
|-------------------------|--|
| Tensile Strength | 550,000 psi (3,793 MPa) |
| Tensile Modulus | 34 x 10 ⁶ psi (234,000 MPa) |
| Elongation | 1.5% |
| Density | 0.065 lbs/in ³ (1.8 g/cc) |

STORAGE AND SHELF LIFE

Keep CS-U18C Fabric and other system components tightly sealed in a dry place and in their original containers until ready for use. Store at 50°F to 75°F, protected from water, weather and out of direct sunlight. Blome CS-U18C has a shelf life of one year, when properly stored. Refer to batch number on label for date of manufacture.

APPLICATION GUIDELINES TEMPERATURE CONSIDERATIONS

The temperature of the surface to be coated, and the ambient air temperature, should be at least 55°F while applying this system and while it cures. If you wish to attempt to apply in cooler temperatures, tarp and heat the area to be coated to create and maintain the minimum 55°F conditions. Stop application if the temperature falls within 5°F of the dew point. Twenty-four hours before application, all materials should be stored at 75°F-85°F, to facilitate mixing and handling.

SURFACE PREPARATION -GENERAL

Surface must be clean and sound. It may be dry or slightly damp, but free of standing water and frost. Remove dust, laitance, grease, curing compounds, impregnations, waxes, foreign particles, disintegrated materials and other bond inhibiting materials from the surface. Consult Blome CS-600/CS-650 technical data sheets for information on surface preparation. Uneven surfaces must be filled with an appropriate repair mortar, such as Blome CP-83MP. The adhesive strength of the concrete must be verified after surface preparation by random pull-off testing (ACI 503R) at the discretion of the engineer. Minimum tensile strength, 200 psi (1.4 MPa) with concrete substrate failure.

Preparation Work: Concrete - Blast clean, shotblast or use other approved mechanical means to provide an open roughened texture. Blome CP-83MP Epoxy can be used to fill exposed bug holes and smooth out any irregularities in the concrete prior to applying CFRP System. In certain applications and at the engineer's discretion, the intimate contact between the substrate and the fabric may be determined to be non-critical. In these cases, a thorough cleaning of the substrate using low pressure sand or water blasting is sufficient.

Preparation Work: Steel (Tank Interiors) - Abrasive blast steel surfaces to white metal finish with a 2 to 3 mil anchor profile. (Ref. SSPC-SP-5) All welds should be continuous and should be ground to remove sharp edges, laps, under cuts and other surface irregularities. Relatively smooth, ripple finished welds are acceptable. Blome CP-83MP Epoxy can be used to smooth out any irregular welds just prior to applying CFRP System.

Preparation Work: Steel (Exterior Wrapping) - Abrasive blast steel surfaces to a near white metal finish with 1 to 2 mil anchor profile. (Ref. SSPC-SP-10) All welds should be continuous and should be ground to remove sharp edges, laps, under cuts and other surface irregularities. Relatively smooth, ripple finished welds are acceptable. Blome CP-83MP Epoxy can be used to smooth out any irregular welds just prior to applying CFRP System.

MASKING

Masking surfaces that are not to be wrapped is recommended. The Blome CFRP System is difficult to remove, once cured.

APPLICATION

Blome CS-U18C can be applied using wet or dry lay-up methods.

Dry Lay-Up: Apply the mixed Blome CS-650 epoxy directly onto the substrate at a rate of 40-50 ft.²/gallon (32-40 mils) depending on the surface profile. Carefully place the CS-U18C fabric into the resin with gloved hands and smooth out any irregularities or air pockets using a plastic laminating roller. Allow the resin to squeeze out between the rovings of the fabric. Apply Blome CS-600 at a rate of 40-50 ft.²/gallon to fully saturate fabric. If a smoother surface is desired, an optional, final coat of Blome CS-600 or CS-650 may be applied to the exposed surface at a rate of 160 ft.²/gallon (10 mils). If more than one layer of fabric is required, wet lay-up method should be used.

Wet Lay-Up: Seal the entire prepared concrete surface with Blome CS-600 or CS-650 epoxy resin. This sealer/primer coat is applied at a rate of 40-50 ft.²/gallon (32-40 mils). Material may be applied by spray, brush or roller. Blome CS-U18C is then impregnated using Blome CS-600 epoxy at a rate of 40-50 ft.²/gallon. For best results, the impregnation process should be accomplished using an automated saturation device. Once saturated, apply fabric to the sealed concrete surface and smooth out any irregularities or air pockets using a plastic laminating roller. If required, apply additional layers of fabric while epoxy on previous layer is still tacky. For overhead or vertical applications, prime concrete with Blome CS-650 to improve tack. Saturate fabric with Blome CS-600. If a smoother surface is desired, an optional, final coat of Blome CS-600 or CS-650 may be applied to the exposed surface at a rate of 160 ft.²/gallon (10 mils). Installation of Blome CFRP Systems should be performed only by specially trained and approved contractors.

CUTTING FABRIC

Fabric can be cut to appropriate length by using a commercial quality heavy duty scissor. Since dull or worn cutting implements can damage, weaken or fray the fiber, their use should be avoided. Consult MSDS for proper handling procedures.

CLEANUP

Before material gels, tools and equipment should be cleaned using hot, soapy water or a citrus based, biodegradable cleaner. After system components begin to cure, xylene or MEK will be required.

LIMITATIONS

Design calculations must be made and certified by an independent licensed professional engineer. System is a vapor barrier. Saturated concrete should not be encapsulated in areas of freeze/thaw.

CAUTION

Blome CS-U18C fabric is non-reactive. However, caution must be used when handling since a fine "carbon dust" may be present on the surface. Gloves must therefore be worn to protect against skin irritation.

Caution must also be used when cutting Blome CS-U18C fabric to protect against airborne carbon dust generated by the cutting procedure. Use of an appropriate, properly fitted NIOSH approved respirator is recommended. Avoid contact with skin & eyes; do not ingest material or inhale vapors. When mixing or applying Blome CFRP Systems, always wear chemical goggles, appropriate rubber gloves, and other appropriate safety clothing. When applying in confined areas, it may be necessary to wear a fresh air hood and/or make provisions for forced air ventilation. Prolonged or repeated exposure to Blome CFRP System components may cause skin irritation and/or allergic reactions. Refer to Blome material safety data sheets on individual components.

WARRANTY

We warrant that our goods will conform to the description contained in the order and that we have good title to all goods sold. Our material data sheets and other literature are to be considered accurate and reliable, but are used as guides only. WE GIVE NO WARRANTY OR GUARANTEE, WHETHER OF MERCHANTABILITY OR FITNESS OF PURPOSE OR OTHERWISE, AND WE ASSUME NO LIABILITY IN CONNECTION THEREWITH. We are happy to give suggestions for applications; however, the user assumes all risks and liabilities in connection therewith regardless of any suggestion, we may give. We assume no liability for consequential or incidental damages. Our liability, in law and equity, shall be expressly limited to the replacement of non-conforming goods at our factory, or at our sole option, to repayment of the purchase price of the non-conforming goods.

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Supersedes all previous literature