



TYFO[®] SCH-11UP COMPOSITE

using Tyfo[®] S-330 Epoxy

DESCRIPTION

The Tyfo SCH-11 UP Composite is comprised of Tyfo S-330 Epoxy and Tyfo SCH-11UP reinforcing fabric. Tyfo SCH-11UP is a custom, unidirectional carbon fabric. Tyfo S-330 Epoxy is a high-temperature two-competent epoxy matrix

USE

Tyfo SCH-11UP Fabric is combined with Tyfo S-330 epoxy to add strength to bridges, buildings, and other structures.

ADVANTAGES

- Good high & low temperature properties
- High tensile modulus and strength
- Ambient cure
- 100% solvent-free
- Rolls can be cut to desired widths prior to shipping

COVERAGE

Approximately 1,200 sq. ft. surface area with 30 gallons of mixed bulk Tyfo S-330 Epoxy and 1 roll of Tyfo SCH-11UP Fabric.

PACKAGING

Order Tyfo S-330 Epoxy in 5 gallon pails (23 kgs of Part A and 17.9 kgs of Part B) Tyfo SCH-11UP Fabric typically shipped in 24" x 600 lineal foot (0.6m x 182.9m) rolls. Typically ships in 14" x 14" x 27" (356mm x 356mm x 686mm) boxes.

EPOXY MIX RATIO

Mix ratio of Tyfo S-330 is 5 parts A to 1 part B by weight.

SHELF LIFE

Epoxy – two years in original, unopened and properly stored containers.
Fabric – ten years in proper storage conditions.

STORAGE CONDITIONS

Store epoxy at 40° to 90° F (4° to 32° C). Avoid freezing. Store rolls flat, not on ends, at temperatures below 100° F (38° C). Avoid moisture and water contamination.

CERTIFICATE OF COMPLIANCE

- will be supplied upon request. Complete with state and federal packaging laws with copy of labels used.
- Material safety data sheets will be supplied upon request.
 - Possesses 0% V.O.C. level.

Typical Dry Fiber Properties

Property	Typical Test Value
Tensile Strength	550,000 psi (3.79 GPa)
Tensile Modulus	33.4 x 10 ⁶ psi (230 GPa)
Ultimate Elongation	1.7%
Density	0.063 lbs./in. ³ (1.8 g/cm ³)
Minimum weight per sq. yd.	11.6 oz. (393 g/m ²)

Composite Gross Laminate Properties

Property ¹	ASTM Method	Typical Test Value	Design Value*
Ultimate Tensile Strength in Primary Fiber Direction	D3039	140,000 psi (965 MPa) (2.8 kip/in. width)	121,000 psi (834.3 MPa) (2.4 kip/in. width)
Elongation at Break		1.0%	0.85%
Tensile Modulus		13.5 x 10 ⁶ psi (93 GPa)	11.4 x 10 ⁶ psi (81.6 GPa)
Nominal Laminate Thickness		0.02 in. (0.51mm)	0.02 in. (0.51mm)

* Design and specification values will vary based on individual project requirements and applicable safety factors. Contact FyfeFRP LLC engineers to determine appropriate specification values.

Epoxy Material Properties

Cure for 24 hours at room temperature and elevated cure at 300° F (150° C) for 12 hours to achieve maximum thermal properties.

Property	ASTM Method	Typical Test Value
Glass Transition Temperature, T _g	D4065	367°F (186°C)

INSTALLATION OF THE TYFO COMPOSITE SYSTEM

DESIGN

The Tyfo System shall be designed to meet specific design criteria. The criteria for each project is dictated by the engineer of record and any relevant building codes and/or guidelines. The design should be based on the allowable strain for each type of application and the design modulus of the material. The FyfeFRP LLC engineering staff will provide preliminary design at no obligation.

INSTALLATION

Tyfo System to be installed by FyfeFRP LLC trained and certified applicators. Installation shall be in strict compliance with the FyfeFRP LLC Quality Control Manual.

SURFACE PREPARATION

The required surface preparation is largely dependent on the type of element being strengthened. In general, the surface must be clean, dry and free of protrusions or cavities, which may cause voids behind the Tyfo composite. Column surfaces that will receive continuous wraps typically require only a broom cleaning. Discontinuous wrapping surfaces (walls, beams, slabs, etc.) typically require a light sandblast, grinding or other approved methods to prepare for bonding. Tyfo® Composite Anchors are incorporated in some designs. The FyfeFRP LLC engineering staff will provide the proper specifications and details based on the project requirements.

MIXING

For drums, premix each component: 100.0 parts of component A to 20 parts of component B by weight. Mix thoroughly for three minutes with a Tyfo low speed mixer at 400-600 RPM until uniformly blended.

APPLICATION

Apply one prime coat of Tyfo S-330 epoxy on the substrate by using a roller. Saturate the fabric by feeding it through the Tyfo Saturator or by approved hand methods (See the Tyfo Saturator Manual). Prior to the application of the saturated fabric, fill any uneven surface. Saturate and apply subsequent layers of the fabric according to the Specifications and the Design Requirements. With the use of a roller or hand pressure, ensure proper orientation of fibers. Release or roll out entrapped air and ensure that each individual layer is firmly bedded and adhered to the preceding layer or substrate. Apply a final coat of thickened Tyfo S-330 Epoxy and detail all fabric edges, including butt splice, termination points and jacket edges.

LIMITATIONS

Recommended substrate temperature range is 50°F to 100°F (10°C to 38°C). All coating applications to be performed at a minimum of 5.4°F above the dew point. Maintain conditions for the first 48 hours of cure. Temperatures below 50°F will significantly increase the viscosity of the mixed product. Higher viscosity will reduce fabric penetration, introduce additional air into the system, and extend the cure times beyond 48 hours. DO NOT THIN. Solvents will prevent proper cure.

FIELD QUALITY CONTROL

Record batch numbers for fabric and epoxy used each day and note locations of installations. Measure square feet of fabric and volume of epoxy used each day.

CAUTION!

CLEANUP

Collect with absorbent material. Dispose in accordance with local disposal regulations. Uncured material can be removed with approved solvent. Cured materials must be mechanically removed.

HAZARDS

Consult the Safety Data Sheets (SDS) for associated hazards. SDS will be supplied upon request.

Consult safety data sheet
(SDS) for more information.
For industrial use only.

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