

Tyfo® SCH-41 Composite using Tyfo® S-T Epoxy

DESCRIPTION

Tyfo® SCH-41 Composite is comprised of Tyfo® S-T Epoxy and Tyfo® SCH-41 reinforcing fabric. Tyfo® SCH-41 is a custom, uni-directional carbon fabric with glass cross fiber for added strength and fabric stability during installation. The carbon fabric is orientated in 0° direction. Tyfo® S-T Epoxy is a two-component high chemical & heat resistance epoxy matrix.

USE

Tyfo® SCH-41 Fabric is combined with Tyfo® Epoxy to strengthen & rehabilitate bridges, buildings, and other structures.

ADVANTAGES

- Excellent high temperature properties
- Proven long-term durability
- Excellent chemical resistance
- Long working time
- High tensile modulus and strength
- Ambient temperature cure
- 100% solvent-free
- Rolls can be cut to desired widths prior to shipping

COVERAGE

Approximately 600 sq. ft. surface area with 3 to 4 units of Tyfo® S-T Epoxy and 1 roll of Tyfo® SCH-41 Fabric when used with the Tyfo® Saturator.

PACKAGING

Order Tyfo® S-T Epoxy packaged in 55-gallon (208L) drums or pre-measured units in 5-gallon (19L) containers. Tyfo® SCH-41 Fabric typically shipped in 2 rolls of 24" x 300 lineal foot (0.6m x 91.4m) rolls. Typically ships in 12" x 13" x 64" (305mm x 330mm x 1626mm) boxes.

EPOXY MIX RATIO

100 parts component A to 38.9 component B by volume, or 100 parts component A to 31.8 parts component 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 fabric 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.

12/10 SCH-41/S-T

TYPICAL FABRIC PROPERTIES

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 (1.74 g/cm ³)
Weight per sq. yd.	19 oz. (644 g/m ²)

COMPOSITE GROSS LAMINATE PROPERTIES

PROPERTY	ASTM METHOD	TYPICAL TEST VALUE	DESIGN VALUE*
Tensile Strength	D-3039	143,000 psi (986 MPa)	121,000 psi (834 MPa)
Elongation at Break	D-3039	1.0%	0.85%
Tensile Modulus	D-3039	13.9 x 10 ⁶ psi (95.8 GPa)	11.9 x 10 ⁶ psi (82 GPa)
Laminate Thickness		0.04 in. (1.0mm)	0.04 in. (1.0mm)

Note: Tension properties are tested in primary fiber direction.

* Gross laminate design properties based on ACI 440 suggested guidelines will vary slightly. Contact Fyfe Co. LLC engineers to confirm project specification values and design methodology.

ELEVATED TEMPERATURE PERFORMANCE CHARACTERISTICS

PROPERTY	ASTM METHOD	TYPICAL TEST VALUE
Glass Transition Temperature (T _g)	E-1356	214° F (101° C)
Critical Temperature (T _c)**		500° F (260° C)

** Critical temperature is defined as the temperature at which the composite loses 50% of its design values.

EPOXY MATERIAL PROPERTIES

PROPERTY	ASTM METHOD	TYPICAL TEST VALUE*
Tensile Strength	D-638 Type 1	10,500 psi (72.4 MPa)
Tensile Modulus	D-638 Type 1	461,000 psi (3.18 GPa)
Elongation at Break	D-638 Type 1	5.0%
Flexural Strength	D-790	17,900 psi (123.4 MPa)
Flexural Modulus	D-790	452,000 psi (3.12 GPa)

Note: Samples cured at 140° F (60° C) for 72 hours and tested at 70° F (21° C)

* Specification values can be provided upon request.

HOW TO USE THE TYFO® S-T 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 Fyfe Co. LLC engineering staff will provide preliminary design at no obligation.

INSTALLATION

Tyfo® System to be installed by Fyfe Co. LLC trained and certified applicators. Installation shall be in strict compliance with the Fyfe Co. 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. Sharp and chamfered corners will be rounded off by grinding or using thickened Tyfo® S epoxy (Tyfo® WS epoxy or approved repair mortar). At the time of application, the substrate shall not have any free moisture on it. If moisture cannot be avoided, the use of Tyfo WP (Wet-Prime epoxy) is recommended. Tyfo® Fibr™ Anchors are incorporated in some designs. The Fyfe Co. LLC engineering staff will provide the proper specifications and details based on the project requirements.

MIXING

For pre-measured units in 5-gallon containers, pour the contents of component B into the pail of component A. For drums, premix each component: 100.0 parts of component A to 38.9 parts of component B by volume (100 parts of component A to 31.8 parts of component B by weight). Mix thoroughly for five minutes with a Tyfo® low speed mixer at 400-600 RPM until uniformly blended.

APPLICATION

Apply one prime coat of Tyfo S Epoxy on the substrate by using a roller. Saturate the fabric by feeding it through the Tyfo® Saturator. Apply using the Tyfo® wrapping equipment or approved hand methods (See the Tyfo® Saturator Manual). Prior to the application of the saturated fabric, fill any uneven surface with thickened Tyfo® S epoxy. Saturate and apply subsequent layers of the fabric according to the Specifications and the Design Requirements. 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 Epoxy and detail all fabric edges, including butt splice, termination points and jacket edges.

LIMITATIONS

Application temperature of the epoxy is a minimum 40° F (4° C) and maximum of 100° F (38° C). **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!

COMPONENT A - Irritant:

Prolonged contact to the skin may cause irritation. Avoid eye contact.

COMPONENT B - Irritant:

Corrosive. Contact with skin may cause severe burns. Avoid eye contact. Product is a strong sensitizer. Use of safety goggles and chemical resistant gloves recommended. Remove contaminated clothing. Avoid breathing vapors. Use adequate ventilation. Use of an organic vapor respirator recommended.

SAFETY PRECAUTIONS

Avoid breathing vapors. Avoid contact with eyes and skin. Use of an approved respirator with an organic absorption cartridge is recommended for possible vapors. Rubber gloves, rubber boots, and protective suits are recommended for handling and application of this material. Safety glasses or a face shield are recommended to prevent eye contact.

FIRST AID

In case of skin contact, wash thoroughly with soap and water. For eye contact, flush immediately with plenty of water; contact physician immediately. For respiratory problems, remove to fresh air. Wash clothing before reuse.

CLEANUP

Collect with absorbent material, flush with water. Dispose of in accordance with local disposal regulations. Uncured material can be removed with approved solvent. Cured materials can only be removed mechanically.

SHIPPING LABELS CONTAIN

- State specification number with modifications, if applicable
- Component designation
- Type, if applicable
- Manufacturer's name
- Date of manufacture
- Batch name
- State lot number, if applicable
- Directions for use
- Warnings or precautions required by law

**KEEP CONTAINER TIGHTLY CLOSED.
NOT FOR INTERNAL CONSUMPTION.
CONSULT MATERIAL SAFETY DATA SHEET
(MSDS) FOR MORE INFORMATION.
KEEP OUT OF REACH OF CHILDREN.
FOR INDUSTRIAL USE ONLY.**

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