



TYFO[®] SCH COMPOSITE ANCHORS

Carbon Tyfo[®] Fiber Anchor Systems

DESCRIPTION

The Tyfo[®] SCH Composite Anchors are custom, uni-directional reinforcing carbon fiber bundles that are combined with the Tyfo[®] S Epoxy for anchoring applications.

USE

Tyfo[®] SCH Composite Anchors are manually saturated with Tyfo[®] S Epoxy and installed to improve end details, anchoring or development of tension or shear forces in various Tyfo[®] designs.

ADVANTAGES

- IAPMO UES ER-595 listed product
- System-compatible anchoring designs
- Excellent wet-out and handling properties
- 100% solids, solvent-free epoxy matrix
- Low viscosity, long working time
- Ambient cure application

PACKAGING

Packaging and weight will vary based on anchor design requirements.

CONSUMPTION RATE

Fiber-to-epoxy ratio by weight:
For Tyfo[®] SCH Fiber Anchors: 1 : 1.35

SHELF LIFE

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

STORAGE CONDITIONS

Store epoxy at 60°F to 100°F (15°C to 38°C). Resin is susceptible to crystallization at temperatures below 50°F. If crystallized, epoxy must be reheated until clear. Store fabric rolls flat, not on ends, and at temperatures below 100°F (38°C). Avoid moisture and water contamination.

Typical Dry Fiber Properties

Property	Typical Test Value
Tensile Strength	620,000 psi (4.3 GPa)
Tensile Modulus	36 x 10 ⁶ psi (250 GPa)
Ultimate Elongation	1.7%
Density	0.064 lbs/in ³ (1.77 g/cm ³)

Composite Gross Laminate Properties

Property ¹	ASTM Method	Typical Test Value	ACI 355.4 Design Value ²
Ultimate Tensile Strength	E488	140,000 psi	110,000 psi
Ultimate Shear Strength		59,000 psi	40,000 psi
Bond Shear Strength in uncracked concrete		4,100 psi	3,000 psi
Bond shear Strength in cracked concrete, crack width = 0.012"		2,700 psi	2,300 psi
Bond shear Strength in cracked concrete, crack width = 0.020"		2,600 psi	1,600 psi

¹ Properties based on testing 5/8" and 7/8" anchors in low strength concrete.

² Design properties calculated per ACI 355.4.

Anchor Construction Detailing

Use carbide-tipped masonry and concrete hammer bit meeting requirements of ANSI B212.15.

Composite Anchor Diameter, in.	Weight per unit length, oz./in.	Concrete Bit Size, in.
1/4	0.02	3/8
3/8	0.04	1/2
1/2	0.08	3/4
5/8	0.12	7/8
3/4	0.17	1
7/8	0.23	1-1/8

INSTALLATION OF THE TYFO[®] SCH ANCHORS

DESIGN

The Tyfo[®] SCH Anchors are designed to meet specific project criteria dictated by the engineer of record and any relevant building codes and/ or guidelines. Tyfo[®] SCH Anchors are incorporated for additional development, anchorage, or end detailing of strengthening systems. The size and area of the Tyfo[®] SCH anchors are directly correlated to the equivalent fiber area of the Tyfo[®] SCH-41 and Tyfo[®] SCH-41-2X laminates. The design shall be based on the amount of tension force transferred as described in the Fyfe Company Design Manual v10. FyfeFRP LLC engineering staff may provide preliminary design, specification wording and application details based on the project requirements.

INSTALLATION

The Tyfo® system is to be installed by FyfeFRP LLC trained and certified applicators in accordance with the FyfeFRP LLC quality control manual, project specifications, and design requirements.

Drilling

1. Drill anchor holes with rotary hammer drill and carbide bit to the required depth.
2. Grind edges around anchor holes for smooth transitions as required by the drawings.
3. HEPA-Vacuum the concrete dust generated during drilling, whenever possible.

Cleaning

1. Vacuum the concrete dust from the anchor hole. Alternatively, blow out anchor hole with compressed air in combination with vacuum collection to clean the anchor hole.
2. Use a steel bristle brush to clean out the hole walls. Perform 5 insertions. (diameter of brush to be equal to or greater than concrete bit diameter)
3. Vacuum anchor hole.
4. Use the pipe brush to clean out the hole walls. Perform 5 insertions.
5. Vacuum anchor hole.

Anchor Embedment

1. Prime the anchor hole with Thickened Tyfo® S, using a syringe with flexible tip capable of filling from max depth of hole. Fill hole up to 75%.
2. Embed saturated anchor into hole to the specified depth with anchor insertion tool.
3. Keep tool inserted and anchor tensioned while free end is splayed as required.
4. Remove insertion tool and backfill cavity with thickened Tyfo® S.
5. Apply skim coat of thickened Tyfo® S over anchor hole and splay area.
6. Continue with installation as detailed in drawings

MIXING TYFO® S EPOXY

For pre-measured units in 5-gallon containers, pour the contents of component B into the component A container. Mix thoroughly with a low speed mixer at 400 to 600 RPM until uniformly blended. Ensure epoxy is transferred between the A and B buckets. For 55-gallon drums, mix component A and component B per the appropriate weight or volumetric mix ratio. Resin may be heated to achieve desired viscosity (i.e. radiant heating, drum heaters, water bath). Mixed Tyfo® S Epoxy may be thickened by adding up to 7 percent by weight of fumed silica (such as Cab-o-sil TS-720).

APPLICATION NOTES

Manually saturate the Tyfo® SCH Composite Anchors with Tyfo® S Epoxy. The fully saturated anchor is then applied as detailed on the project drawings. Maintain an appropriate slope when transitioning fibers over uneven surfaces. If anchor penetrations are elevated from the bonding surface, use an appropriate transition to slope the anchors from the anchor penetrations onto the bonding surface. A typical slope requirement is a 4:1 transition. Refer to project drawings for the slope detail or contact FyfeFRP LLC. Slope to be filled with a thickened epoxy or epoxy mortar. For slopes greater than 1" height, use an approved epoxy mortar.

PROTECTIVE COATINGS

Apply a final coat of thickened Tyfo® S Epoxy to all fabric edges, including butt splice, termination points and jacket edges. Paint between 24 and 72 hours after final application of epoxy. If more than 72 hours after application, prepare the surface by light sandblast or hand sanding to lightly etch the surface.

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°F (3°C) 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.

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. Carbon fiber is electro-conductive.

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

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