

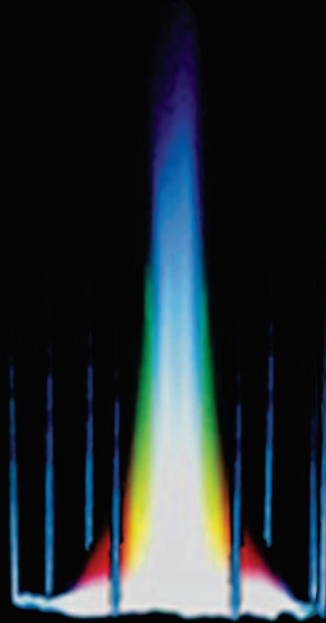


FYFE Co.
LLC

"THE FIBRWRAP® COMPANY"

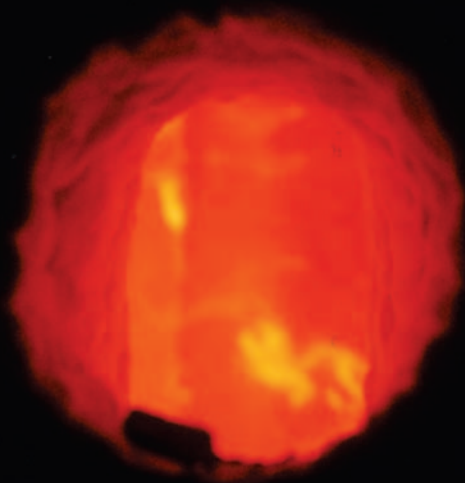
Tyfo®

Fire-Resistant Systems



**Using Glass, Aramid, and Carbon Fiber Reinforced
Tyfo® Materials combined with our Tyfo® Epoxy Matrices**

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Product Description

The Tyfo® FC/F Fire-Resistant system is applied in combination with the Tyfo® Fibrwrap® System or the Tyfo® Epoxy System. Tyfo® FC/F is a two-part system. The first part is the Tyfo® FC Basecoat, applied at 1.1 kg/m², approximately 0.8 mm thick (0.225 lb./sq. ft., approximately 1/32" thick) by trowel, roller, or spray. The second is Tyfo® F Coat, a thin coating applied by brush, roller, or spray in 3 coats to 0.2 kg/m² (0.04 lb./sq. ft.) per coat.

Product Performance Testing

The System provides insulation against fire and increases a 4-hour wall rating as per ASTM E-119 testing at Warnock Hersey in Pittsburgh, California. Underwriter's Laboratories Inc. provides UL certification labels to the products and a follow-up service.

The System results in a Class 1 flame and smoke rating as per ASTM E-84 testing at Underwriter's Laboratories in Santa Clara, California.

- Test report ASTM E-119, dated March 31, 1995 by Warnock Hersey entitled, "Report on the Fire Endurance and Hose Stream Tests of Three 48" high by 56" wide Non-symmetrical Walls."
- Test report summary ASTM E-84, dated February 9, 1996 by Underwriters Laboratories entitled, "Surface Burning Characteristics Investigation of Wallcovering Materials for Fyfe Co. LLC."

Flame Spread	10
Smoke	105-200

Product Uses

In combination with...

- Tyfo® S Fibrwrap® for concrete columns, beams, and joints.
- Tyfo® S Fibrwrap® for concrete masonry walls.
- Tyfo® S Epoxy for concrete members.
- Tyfo® S Fibrwrap® for steel columns, beams, and joints.
- Tyfo® S Fibrwrap® for steel wall.
- Tyfo® S Epoxy for steel members.

Product Description

The Tyfo® **4HFL** Fire-Resistant System is applied in combination with the Tyfo® Fibrwrap® System. Tyfo® **4HFL** is a three-part system. The first coat is Tyfo® **CR** coat applied to a dry thickness of 2 mm (3/32") by brush, roller, or spray. The second is Tyfo® **FC** Basecoat with an application rate of 1.1 kg/m², approximately 0.8 mm thick (0.225 lb./sq. ft., approximately 1/32" thick) by trowel, roller, or spray. The third coat is Tyfo® **IM** (Intumescent Mastic) Coating, 16 mm (0.63") thick, spray-applied or trowelled over a special glass fabric.

Product Performance Testing

The System has a 4-hour rating load test report from UL, ULC, and UL follow-up quality control. UL Assembly No. X646.

ASTM E-84 tested outer layer Class 1 test flame and smoke values 2 and 5 respectively.



Fire Test Chamber



Product Uses

In combination with Tyfo® S Fibrwrap® for concrete columns under ultimate load.

Test Report and UL information available upon request.

Tyfo® 4HFL System

Installation

Apply Tyfo® Fibrwrap® materials as specified.

Apply Tyfo® FC Basecoat to the desired thickness as detailed in the Underwriter’s Laboratories (UL) procedure (details are available upon request).

Apply 1 to 3 coats of the Tyfo® F Coat as per the UL procedure.

Can be coated with a desired finish system.



Roller Application



Trowel Application

The Finish

A variety of finish systems may be installed over the Tyfo® FC System.

The finish on Tyfo® 4HFL, Tyfo® F-EI, and Tyfo® I-F Systems can be tailored to the design requirement.

Contact Fyfe Co. for information on finishes.

Product Testing History

- Tyfo® FC/F ASTM E-84 - UL Flame and Smoke
 ASTM E-119 - Warnock Hersey
- Tyfo® 4HFL ASTM E-119 - UL 4-hours under load
- Report on 8-hour butane fire - Tyfo® FC/F performance
 ASTM E-84 test report
- Monsanto Report - ASTM E-1354-90

Performance of Systems

Fire Types	Approximate Temperature	FC/F	4HFL
Cigarette lighter	Up to 900° F (482° C)	NE	NE
Wood Fire	1200° - 1400° F (649° - 760° C)	NE	NE
Gasoline Fire	1800° F (982° C)	NE	NE
Propane torch	2800° F (1538° C)	NE	NE

NE = No effect on protected element under normal fire conditions.
 High temperature resin information - Tyfo® T, Tyfo® TH, Tyfo® II.
 Report on experience from an 8-hour butane fire or a project for Tyfo® FC/F Systems.

For Beam, Slab and Other Applications

Conventional fireproofing using Vermiculite, Lightweight Concrete, Rock Wool or Drywall can be used to protect the Tyfo® Composite System. Details can be provided by Fyfe Co. LLC.

Fyfe Co. can provide professional engineering services* to validate the application of Tyfo® F and Tyfo® F-EI in as-built conditions in conjunction with other fire protection for structural systems.

Depending on the importance factor and type of construction, a performance-based fire engineering design will determine the extent, intensity and duration of a fire. This will dictate the requirements for passive protection (eg. Tyfo® F, F-EI) or active fire protection (eg. sprinklers). This determination takes into account life safety and property protection imperatives embodied in the local regulations, or as determined by the owner.

For example, the owner may find it to be cost-effective to increase fire protection to offset the consequences of property damage causing business interruption, lost market share, etc.

* Holmes Composites, Inc. & Holmes Fire & Safety Ltd. are engineering experts in this field.

To obtain Tyfo® procedures for the

Tyfo® FC/F Systems & Tyfo® 4HFL System

contact

Fyfe Co. LLC

"The Fibrwrap® Company"

Nancy Ridge Technology Center

6310 Nancy Ridge Drive, Suite 103

San Diego, CA 92121-3209

Tel: 858.642.0694 Fax: 858.642.0947

E-mail: info@fyfeco.com

Web: http://www.fyfeco.com