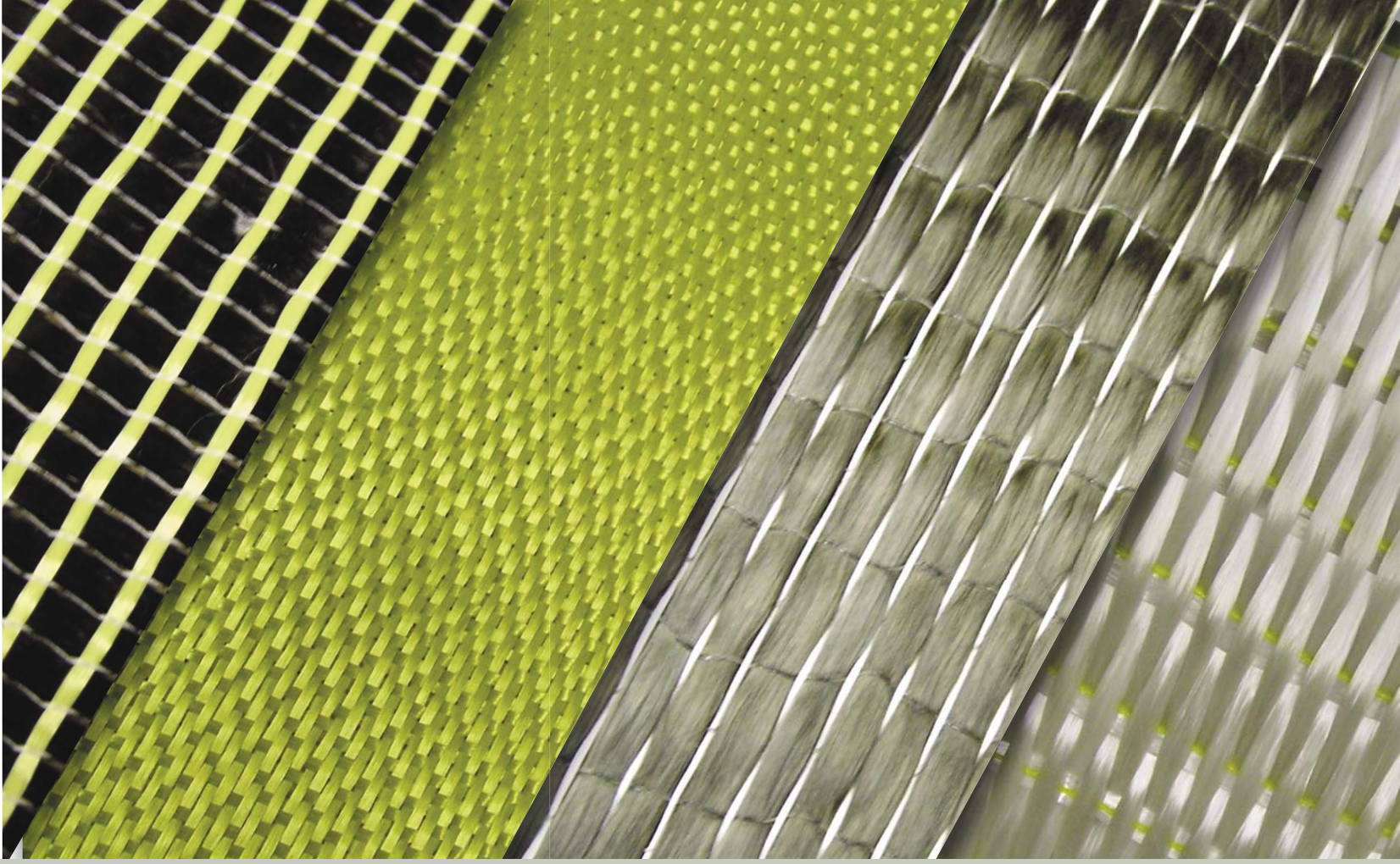
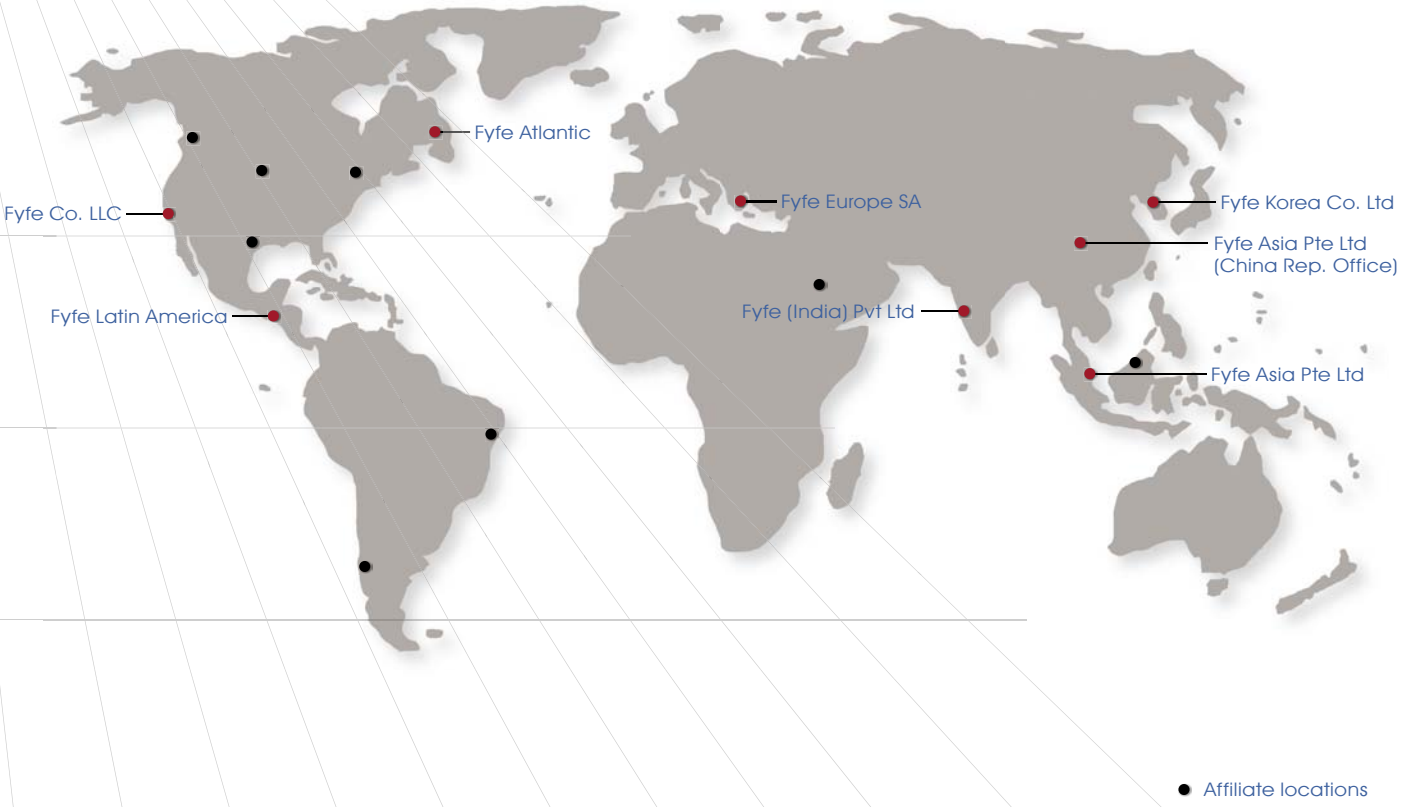


FYFE CO. LLC

Tyfo® Fibrwrap® FRP Systems

Providing creative solutions for today's structural problems since 1970



Representatives available in over 50 countries around the world.

Additional literature for specific application types available upon request —

- Tyfo® Fibrwrap® Systems for Columns
- Tyfo® Systems for Beams
- Tyfo® Systems for Unreinforced Masonry (URM) and Reinforced Concrete/Masonry Wall Strengthening
- Tyfo® Systems for Wood
- Tyfo® AFP Advanced Fire Protection
- Tyfo® Fibrwrap® Systems for Blast Hardening and Mitigation
- Tyfo® Blast-Flex
- Tyfo® Fibrwrap® for Abatement
- Tyfo® SW Fibrwrap® for Underwater Applications
- Tyfo® Fire-Resistant Systems
- Tyfo® Fabricated Composite Systems
- Tyfo® Fibrwrap® Systems for Chimneys, Stacks and Tanks
- Tyfo® Fibrwrap® for Steel and Aluminum
- Tyfo® CIS Corrosion Inhibitors
- Tyfo® Fibrwrap® Systems Pipe Rehabilitation and Repair
- The Fyfe Disc Bearing

FYFE COMPANY PROFILE

The Fyfe Group is comprised of engineers, designers, material specialists, material manufacturers and project support personnel. Working together, this team provides innovative construction products and technical support to meet the needs of engineers, contractors and owners.

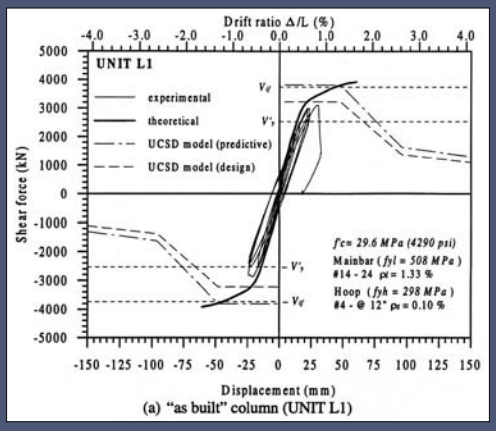
Fyfe Co LLC specializes in the Tyfo® Fibrwrap® Advanced Composite Systems for the strengthening, protection and repair of structures. These systems are comprised of carbon, glass and aramid fiber reinforced polymer (FRP) materials.

Fyfe Company also offers other innovative construction products and structural systems. Among these are disc bearings, expansion joints, concrete repair products, blast mitigation and ballistic products.

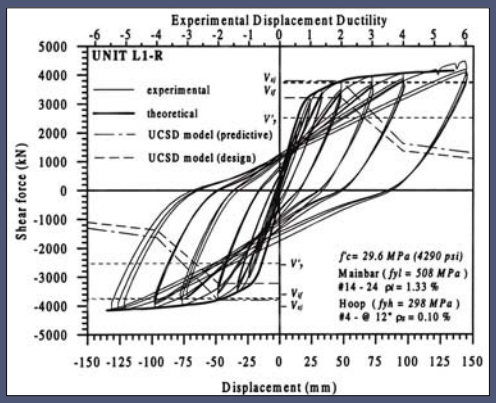
RESEARCH & DEVELOPMENT

Since 1988, The Tyfo® Fibrwrap® Systems have been tested and proven for effectiveness and durability. Over 500 structural and material tests, both destructive and non destructive, have been performed on the Tyfo® Fibrwrap® Systems. These include full-scale structural testing for a variety of design goals, long-term environmental durability testing, and in-situ testing of actual installations. The result is reliable composite strengthening systems that have demonstrated intended design performances.

Copies of test reports from the research pictured here are available upon request as well as the full range of the Fyfe report library.
See our website for abstracts - www.fyfeco.com



UCSD Column test with hysteresis loops



Seismic strengthening of masonry-infilled frames using the Tyfo® SEH System

Testing performed on a large-scale, beam-slab assembly modeling a bridge section. The Tyfo® UC Strips were designed to provide additional two-way bending strength given larger live loads. The Tyfo® SCH System provided shear strength for the beams.

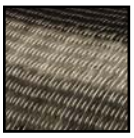
TYFO® FIBRWRAP® SYSTEMS

The Tyfo® Fibrwrap® Systems are comprised of specialized fabrics and resins, which in unique combination, create tested and proven composites. Carbon, glass or aramid reinforcing fibers are combined with high quality resins to produce a multitude of high performance FRP strengthening systems, which gives design engineers a wide range of options to meet the individual needs of a project.

Our Tyfo® FRP Systems have a successful performance record with nearly two decades of use. This includes extensive testing as well as performing as designed during seismic events on three continents.

Data sheets available upon request or at our website - www.fyfeco.com

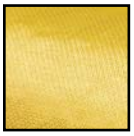
Tyfo® SEH System
Uni-directional glass composite



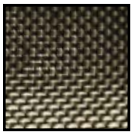
Tyfo® SCH System
Uni-directional carbon composite

Tyfo® SAH System
Uni-directional aramid composite

Tyfo® WEB System
Bi-directional glass composite (0°/90°)

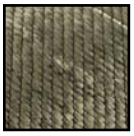


Tyfo® WAB System
Bi-directional aramid composite (0°/90°)

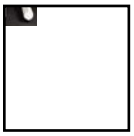


Tyfo® CWEB System
Bi-directional carbon composite (0°/90°)

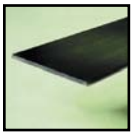
Tyfo® BC System
Bi-directional glass composite (±45°)



Tyfo® BCC System
Bi-directional carbon composite (±45°)



Tyfo® FRB System
FRP reinforcing bars



Tyfo® UC Strip (Pre-formed) System
FRP laminate strips

COMPREHENSIVE FORCE PROTECTION

BLAST MITIGATION

Tyfo® Fibrwrap® Systems offer a variety of products for Blast Mitigation Projects

- Tyfo® Fibrwrap® Composite Systems for Blast Hardening of existing structures
- Tyfo® FE-BR System – DOS Certified 15 Minute Forced Entry and Ballistic Resistance System for Brick Walls
- Tyfo® Cable Protection System – A combination of composite and shielding material to protect cables from various threats
- Tyfo® Ballistic Panels – Prefabricated panels to provide protection against firearms
- Tyfo® Close-In Blast – A special design of composite and steel sheathing to protect structural members from near-proximity blasts with minimal standoff distances
- Tyfo® Steel Reinforced Rubber (SRR) System – special composite wire fabric

U.S. Embassy

This 3-wythe red brick masonry wall was retrofitted with 1/2" of Tyfo Blast-Flex. The average peak pressure was 10.65 psi with a maximum midspan deflection of 2.5".

Below, actual film footage of the blast test conducted on the Tyfo® System at EMRTC, New Mexico. The panels that were strengthened with the Tyfo® System withstood the blast. The unwrapped panels had a V-shaped crack through failure. The test report is available upon request.

SEISMIC RETROFIT

- FRP Diaphragm Shear Strengthening
- Rectangular and Circular Column Strengthening
- Beam and slab strengthening for both shear and flexure
- RC Wall and URM Wall Strengthening
- Beam/Column Joint Strengthening
- FRP Drag Struts
- FRP Connecitons BC/JT/Superanchors

Thessalonikki, Greece

Sham Al Sheik, Egypt

Fyfe Co LLC also offers special seismic expansion joints

BRIDGES

The Tyfo® System has been used to strengthen bridges all over the world. Rigorous structural and durability testing was performed to gain acceptance from the various Ministries and Departments of Transportation.

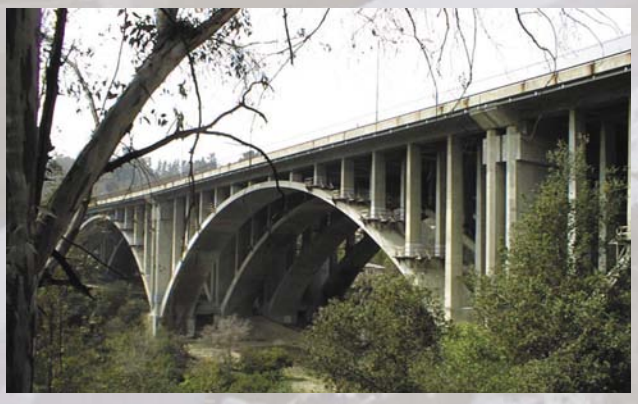
Tyfo® Systems can be used to strengthen bridges for the following reasons —

- Increase Load Rating
- Seismic Retrofit
- Repair Impact Damage
- Extend the Service Life

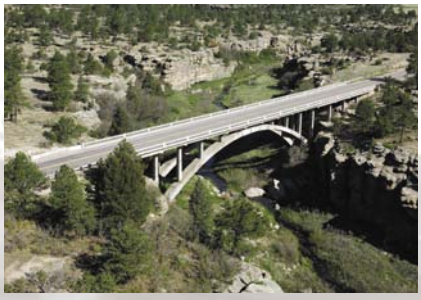
Completed installations include —

- Historic Arch Bridges
- Pedestrian Flyovers
- Construction Error Remediation
- Corrosion Repair & Protection

ARROYO SECO BRIDGE APPLICATION



CASTLEWOOD CANYON BRIDGE - USA



OAK STREET BRIDGE - CANADA



GEFYRA-RION-ANTIRION BRIDGE - GREECE



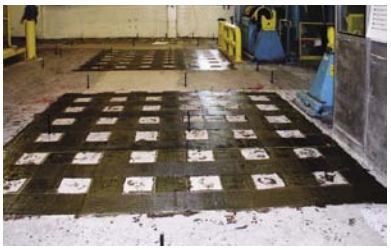
FYFE DISC BEARINGS



STRUCTURAL UPGRADES

CHANGE OF USE

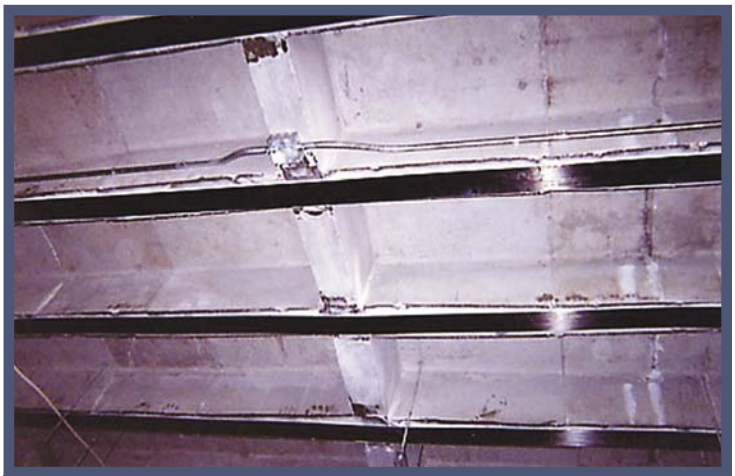
The Tyfo® Fibrwrap® Composite Systems can be used to increase the strength of existing beams, slabs and columns. Strengthening applications include the addition of high-capacity filing systems, computer servers, topping slab material, HVAC equipment, heavy machinery, removal of bays and addition of new openings. In addition, transitioning a building between commercial and residential use typically requires structural reinforcements to meet new load demands.



Specialized Tyfo® FibrAnchors™ and Connectors are designed to meet specific project requirements.

The Tyfo® Fibrwrap® Composite Systems can be also be used to strengthen structures that no longer have their original design strength due to —

- Construction Error
- Corrosion
- Increased Loading



Tyfo® UC Carbon Laminates were used to strengthen these library floor joints

Structural upgrade of Wellington Hospital, New Zealand slab using Tyfo® Carbon Composites

PIPE REHABILITATION

The Tyfo® Fibrwrap® System may be used to strengthen pipes to accommodate increased internal pressure, flexural loads, traffic and soil loads. In particular, the System can be designed to reinforce PCCP segments that have significant loss of post-stressed areas due to corrosion damage. The Tyfo® Fibrwrap® System may be bonded to either the outside or the inside of the pipe. All materials are NSF/ANSI listed.

All required materials and labor are inserted through existing manholes

Surface preparation with hydro blasting to achieve the required 1/16" minimum amplitude

Tyfo® WP (Wet prime) & TC (Tack Coat) epoxy prime coats to enhance bond strength

Specialty scaffolding is designed to span the spool length to allow access to the entire pipe face

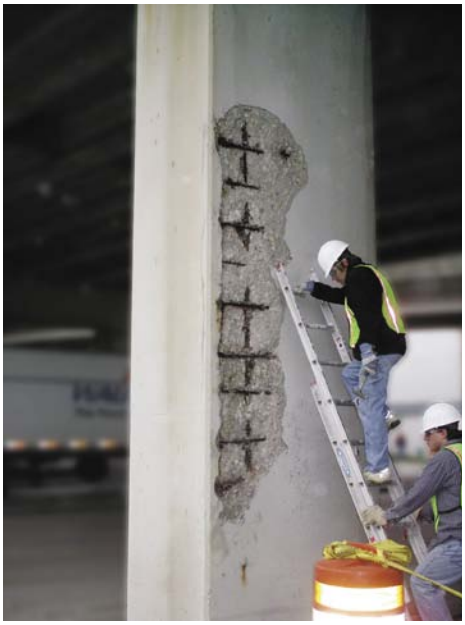
INDUSTRIAL APPLICATIONS

Tyfo® Fibrwrap® Composite Systems are ideal for strengthening industrial structures because of their high strength-to-weight ratio and their ease of installation. They can be installed with minimal impact to the operations of the structure and are easily installed around existing equipment and instrumentation.

CORROSION REPAIR

Fyfe Company offers a wide range of specialty construction products to repair corroded structures. These may be used for concrete repair alone or in conjunction with the Tyfo® Fibrwrap® System for structural upgrades and protection of repairs.

- Tyfo® CIS System – Multi-part corrosion inhibiting system
- Tyfo® P – Polymer concrete patch material
- Tyfo® PF – Polymer concrete patch material applied by forming
- Tyfo® CB – Epoxy modified concrete bonding agent
- Tyfo® AZ – sacrificial zinc mesh for corrosion repairs



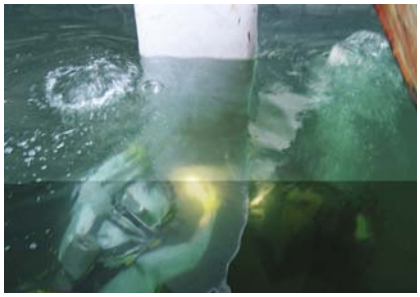
WATERFRONT STRUCTURES

TYFO® PR JACKETS

Tyfo® PR Jackets are manufactured using Tyfo® S Epoxy. Some applications can incorporate additional Tyfo® Fibrwrap® System "wet-lay-up" layers to optimize jacket performance. Stainless steel fasteners are used to help develop the bond strength for continuity of the lap splice segment.

THE PROBLEM

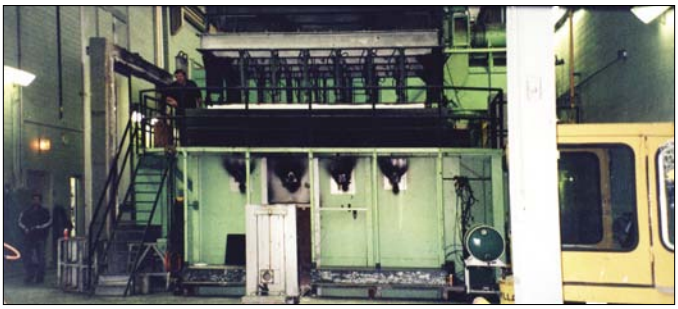
The corrosive nature of marine environments can hinder the servicability of the structure, destroy the aesthetics, or render it unable to effectively support machinery or equipment or other loads it was designed for. The amount of structural distress varies with each project. Fyfe Co LLC is the leader in retrofitting reinforced concrete, wood and marine structures with Tyfo® advanced composites, which rehabilitate and preserve existing structural elements.



FIRE PROTECTION

TYFO® AFP DESCRIPTION

Tyfo® Advanced Fire Protection (AFP) is used to provide an hourly structural rating for the Tyfo® Fibrwrap® System during a fire. A layer of VG Primer and Dash Cote is applied to the installed Tyfo® Fibrwrap® System. The required thickness of Tyfo® VG is then applied to meet the UL/ULC design requirements. Tyfo® EI-R is a unique coating which is sprayed over the VG as a finish coat. The UL/ULC Design Numbers for columns are X842/X824. The UL/ULC Design Numbers for beams and slabs are N790/N811.



TYFO® FC/F FIRE-RESISTANT SYSTEM

The Tyfo® FC/F Fire-Resistant system is applied in combination with the Tyfo® Fibrwrap® System. Tyfo® FC/F is a two-part system comprised of the Tyfo® FC base coat and Tyfo® F top coating. (UL Listing #R15357)

TYFO® RR SYSTEM

Tyfo® RR System can be used in combination with the Tyfo® Fibrwrap® Systems as an assembly to provide a Class 1 Flame and Smoke Spread Rating as per ASTM E84. (UL Listing #R15357)

COATINGS

The Tyfo® Fibrwrap® Systems can be used in conjunction with a variety of coatings to meet the requirements of each individual project. The following are just a few of the many coatings that are available for final aesthetics or protection.

TYFO® RR

A UL approved, Class 1 ASTM E84 Flame and Smoke Spread coating available in limestone, sandstone and a variety of artistic finishes. (UL listing #R15357)

TYFO® HS

Final coating tailored to match the existing concrete, as with a historic structure.

TYFO® PWC

NSF listed coating for use in potable water applications. (ANSI/NSF 61)

TYFO® A

Acrylic coating.

TYFO® U

A urethane coating with low V.O.C. content to give excellent UV protection and durability.

Mission Statement

The mission of Fyfe Company is to provide state-of-the-art solutions for today's structural problems. Fyfe Company provides innovative construction products and personalized technical support to meet the needs of engineers, contractors and owners in the most efficient, cost-effective manner.

Fyfe Company is committed to developing long-term relationships with our customers by providing the best possible technical assistance and delivering the most professional, up-to-date solutions through continuous research and innovation.

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