Cem-FIL® GRC

A BUILDING SOLUTION FOR ARCHITECTS AND ENGINEERS

OWENS CORNING®

INNOVATIONS FOR LIVING™

WHAT IS GRC?

GRC or GFRC (Glass Fiber Reinforced Concrete) is a unique construction material.

In its simplest form GRC is comprised of cement, sand, special alkali-resistant (AR) glass fibers and water.

These are combined by a variety of manufacturing processes to provide a construction material of considerable strength and versatility that offers surprising lightness and durability.

ROLE OF AR FIBERS

Resistance and Strength

Cem-FIL® glass fibers have an elastic modulus 10 times greater than polypropylene and a tensile strength 3-4 times greater than steel.

Cem-FIL® fibers are made resistant to the high alkalinity of cement through the use of zirconium-dioxide in the glass formulation. Cem-FIL® GRC combines the compressive strength of concrete with the high flexural and tensile strength of glass fibers. It has been used in more than 100 countries worldwide for more than 40 years, and has enabled the creation of some of the world´s most prestigious buildings.

"GRC IS INSPIRING"

THE VERSATILITY OF GRC IN REPRODUCING SHAPE, COLOR AND TEXTURE FEEDS THE IMAGINATION OF ARCHITECTS AND ENGINEERS.

GRC is one of the most versatile building materials available to architects and engineers.

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"Cem-FIL® FIBERS HAVE BEEN SPECIFICALLY ENGINEERED FOR USE WITH CONCRETE TO GIVE ARCHITECTS AND ENGINEERS A MATERIAL FROM WHICH THE MOST AMBITIOUS DESIGNS CAN BE CREATED."

APPLICATIONS

The greatest expression of versatility. Gives life to your imagination.

Cem-FIL® and architecture:

With GRC and Cem-FIL® fibers, architects can achieve the most ambitious designs. The opportunities are numerous. GRC can be moulded to create modern and futuristic designs or it represents the ideal solution for replication of old features, for refurbishment or renovation projects. It can be colored and produced in a wide range of textures. No other material can achieve its versatility.

Façade cladding
- Architectural panels and elements
- Overcladding systems

Roofing
- Imitation slates, shingles, tiles
- Corrugated sheets
- Promenade tiles

System building
- Insulation blocks
- Permanent formwork

Interior
- Fire protection boards
- Floor systems
- Decorative-cornices, columns, corbels stair treads

Cem-FIL® and landscaping:

GRC and Cem-FIL® fibers can turn fantasy into reality.

GRC can be shaped into any aesthetic form to fulfil dreams, ideas and imagination.

Amusement parks
Simulated rocks
Waterscapes
Buildings and environments for animals

Urban elements
Seating
Planters
Kiosks
Signs and Statues

Cem-FIL® and civil engineering:

GRC is highly resistant to water penetration, chemical attack and erosion, and offers a high quality architectural finish to structural concrete. It is an attractive solution to engineering needs.

Roads, railways and bridges
- Parapets
- Noise barriers
- Permanent bridge deck formwork
- Cable ducts
- Duct covers and lids
- Underground structures

Irrigation and drainage
- Drainage systems
- Canal bank protection
- Sewer liners
- Irrigation systems
- Septic tanks

Others
- Tunnel linings
- Meter housings

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“GRC IS A LIGHTWEIGHT, MOULDABLE, VERSATILE MATERIAL. ALL YOU NEED IS PASSION, IMAGINATION AND… Cem-FIL® FIBERS”

ADVANTAGES

Every day more and more possibilities.

+ STRONG

Excellent impact, tensile and flexural strength. Exceptional resistance to crack development.
Reduced damage during demolding, transportation and erection.

+ MOLDABLE

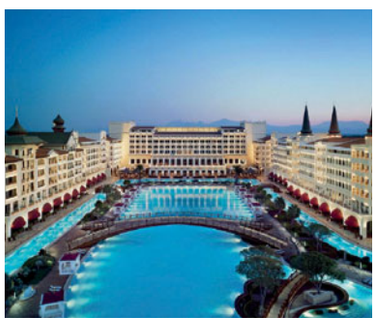
Able to be formed into complex shapes. It is ideal for building construction and renovation (it can replicate exactly or even improve any original feature).

+ DURABLE AND LOW MAINTENANCE

GRC will not rot or corrode. It has low permeability, gives good weather protection and requires very little maintenance.
Good freeze-thaw resistance.

+ LIGHTWEIGHT

Typically 1/4 to 1/6 of the weight of concrete. It reduces transport and installation costs and it may also enable significant savings on structural and foundation costs. Its lightweight also offers significant advantages in seismic areas.



+ THIN

Typically 10-15 mm in thickness, depending on application.

+ FIRE RESISTANT

GRC is fire resistant and in most cases classified as non-combustible.

+ ATTRACTIVE AND VERSATILE

GRC allows reproduction of fine textures and details, and may be colored with pigments paints, or faced with a veneer of natural stone.

+ SAFE

GRC does not use or emit any volatile material and is a low energy product. AR glass is not respirable.

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TECHNICAL APPENDIX

Typical Mechanical Properties of Cem-FIL® GRC (at 28 days).

Property	Unit	Spray	Premix
Addition of Cem-FIL® Fiber	Weight %	5	3
Bending: Ultimate Strength (MOR) Elastic Limit (LOP)	 MPa MPa	 20 - 30 7 - 11	 10 - 14 5 - 8
Tensile: Ultimate Strength (UTS) Elastic Limit (BOP)	 MPa MPa	 8 - 11 5 - 7	 4 - 7 4 - 6
Shear: Interlaminar Strength In Plane Strength	 MPa MPa	 3 - 5 8 - 11	 N/A 4 - 7
Compressive Strength	MPa	50 - 80	40 - 80
Impact Strength	kJ/m^2	10 - 25	10 - 15
Elastic Modulus	GPa	10 - 20	10 - 20
Strain to Failure	%	0.6 -1.2	0.1 - 0.2
Dry Density	t/m^3	1.9 - 2.1	1.8 - 2.0

Note: The above data is relevant to GRC formulations having sand: cement ratios between 0.5 and 1.0.

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