MONTERRA™
REINFORCEMENTS

Empower Your Projects With

NEXT-GEN UNPARALLELED BUILDING MATERIALS

Product Catalogue

About Us

We transform your ideas into reality.

Belonging to the family business of Monterra International LLP, Montera Reinforcements Pvt. Ltd. is a leader in manufacturing composite construction products for over the last three decades.

Three qualities define us. First, our passion for innovation. Second, our commitment to delivering high-performance products on time, within budget, and beyond expectations. And third, our commitment to excellence and meeting high-quality benchmarks.

As a subsidiary of a family-owned and operated business, we take pride in our rich cultural values and heritage. Building long-lasting relationships with our customers remains a cornerstone of our business and such values reflect in our core operations seamlessly.

We collaborate with our clients ingeniously to bring out the benchmark quality that supersedes any other. Our three major product categories include us producing:

1. GFRP Straight Rebars
2. GFRP Ready Mesh of Rebars
3. GFRP Ready Bent Materials

Over these past thirty years in business, our products have come across to be known for their reliability, durability and tailored for high performance. Monterra Reinforcement Pvt. Ltd. is a name that is synonymous to extensive Research & Development, Sustainable Innovation and Next-gen Professional Equipment.

Our expertise of having an extensive network and approach allows us to bridge the gap between manufacturers and our customers, ensuing each party's needs are fulfilled every step of the way.

Our Vision

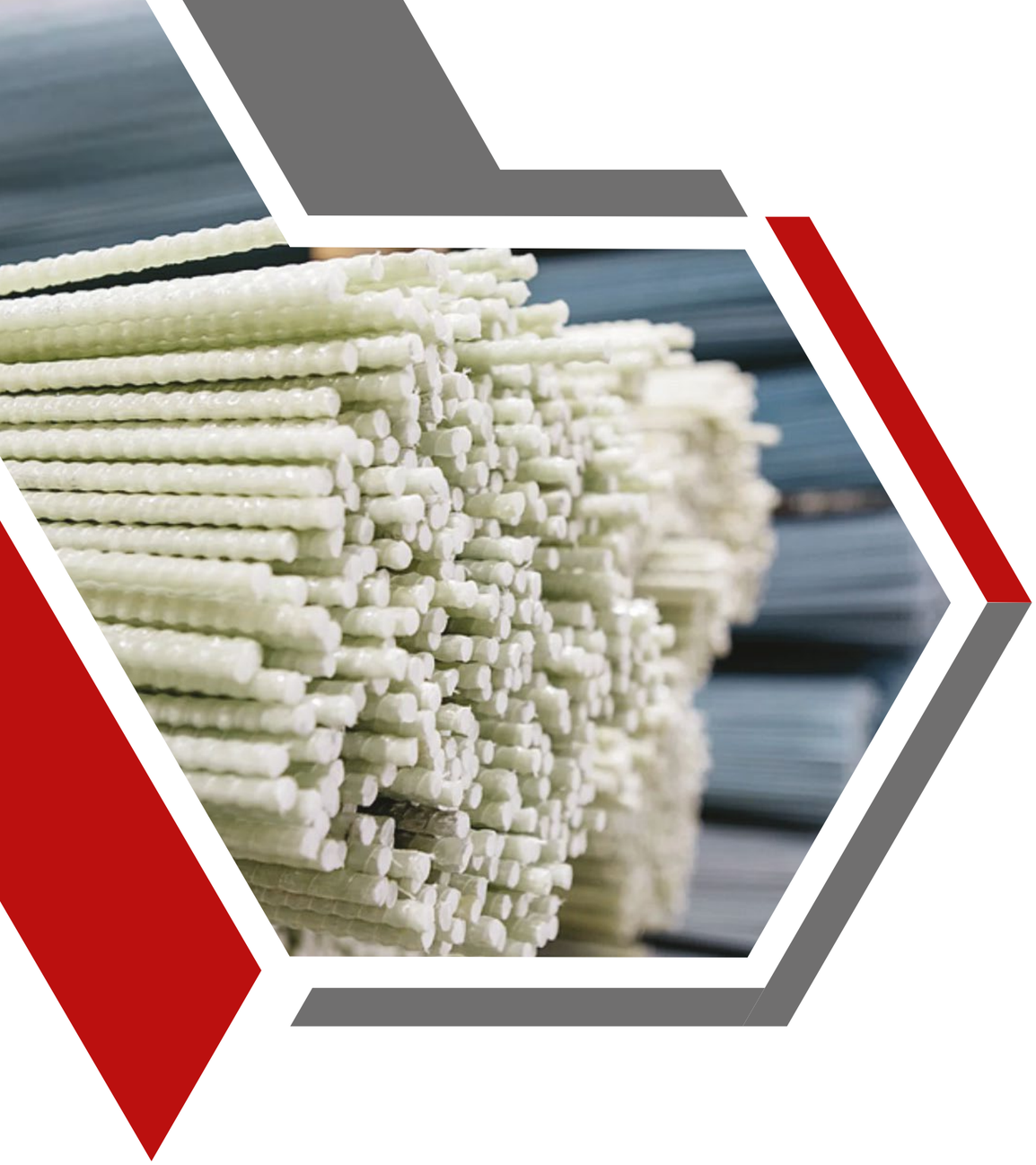
At Monterra Reinforcements Pvt. Ltd., our vision is to redefine the future of construction by becoming a global leader in composite materials. We are committed to pioneering innovative, engineered solutions that not only meet but exceed the evolving demands of modern infrastructure. By consistently setting the industry benchmark for quality, safety, and sustainability, we aim to transform the construction landscape—delivering superior alternatives to traditional materials like steel. Our vision encompasses a world where construction is stronger, more durable, and environment-friendly, contributing to a safer and more resilient future for generations to come.

We strive to be recognized not just as manufacturers, but as thought leaders in the industry, continuously pushing the boundaries of what is possible with advanced materials.

Our Mission

Our mission remains to provide the highest-quality composite construction materials that deliver unmatched performance, durability, and sustainability. We are dedicated to advancing construction technologies by offering a wide range of cutting-edge products, including GFRP rebars, mesh, and bent materials that outperform conventional options in terms of strength, corrosion resistance, and ease of installation.

Our focus is on continuous improvement and innovation, driving us to refine our processes and develop materials that set new standards in the industry. As we grow, our mission remains to expand our reach, delivering our products to clients worldwide with the same unwavering commitment to excellence.



Fiberglass / FRP / GRP

Rebars

100% Corrosion-Free Industrial Infrastructure

What are GFRP Rebars?

Glass Fiber Reinforced Polymer is referred to as GFRP. It belongs to the family of thermosetting plastics and is often regarded as composite material. A contemporary alternative to conventional metal rebars in construction is GFRP rebar. Glass fiber and epoxy resin make up the majority of GFRP rebar. Its exceptional features, which include a spiral wrapped belt that extends above the rod's core, make it ideal for reinforcing concrete structures, that offers significantly greater endurance.

For more than 50 years, GFRP rebars have been used extensively in nations including the USA, Canada, Japan, Europe, and Australia as a corrosion-prevention solution that has been 100% proven internationally. Because of their many distinct and tested qualities, GFRP Rebars are widely used in the global construction sector and are among the most cost-effective and technologically advanced reinforcement materials.

Due to severe climate factors and exposure to chlorides, steel used for reinforcing may experience significant corrosion problems and deteriorate severely. Governments and building owners globally have now incorporated Composite Rebar (GFRP) into their corrosion protection strategies in response to the estimated $85 billion in ongoing repairs and potentially hazardous failures. With immediate and long-term cost savings, GFRP Rebar reinforcement has responded to the demand by offering a cost-effective, secure, and sustainable solution.

GFRP rebar is intended for applications involving high loads. It is extensively utilized for highways and bridges as well as in extremely corrosive environments like industrial sites, coastal environments, and underwater structures.

GFRP Rebar is four times lighter than steel rebar, three times stronger, doesn't carry electricity, heat, or cold, significantly lowers workplace injuries, requires no maintenance or repairs, and lasts longer than the concrete it supports. It also requires half as much manpower to install.

Facts

In 1975, the former Soviet Union is where GFRP rebars were first used as reinforcement.

The main use of GFRP Rebars started in Europe in the 1980s, and it later received a lot of backing in the 1990s from Japan's Maglev, or magnetically levitated train support structures. Therefore, in 1996, guidelines for design for GFRP in reinforced concrete were first introduced by the Japanese.

Attributes of GFRP Rebars

- Corrosion Resistant
- Stronger
- Lighter
- Cost-effective
- Zero Maintenance
- Longer Lifespan
- Eco-friendly
- Dielectric
- Easy to Transport
- Water Resistant
- Less Thermal Expansion
- Radio Transparent
- Durable
- Lower Installation Cost
- Easy Site Handling & Easy Cutting
- Faster and Safer Installation
- Reduced Concrete Coverage
- Savings in Overlapping Cost

Types of GFRP Rebars

ULTRA BAR

RANGE

Diameter	4mm to 20mm
Length	Straight – upto 12 mtr. Coil – upto 100 mtr. (4mm to 8 mm Dia.)

ULTRA BENT

RANGE

Diameter	4mm to 14mm
Shapes	Customized shapes as per client's design

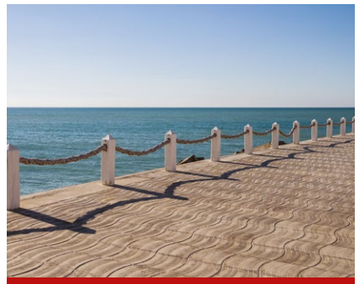
ULTRA MESH

RANGE

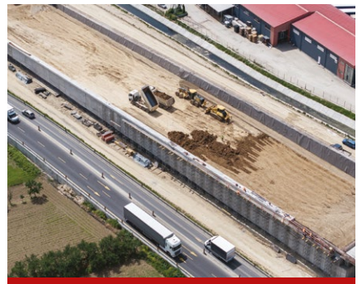
Diameter	2.5mm to 6mm
Mesh	50 x 50 mm Upto – 2 mtr. 100 x 100 mm 150 x 150 mm 200 x 200 mm
Width	Upto – 2 mtr.

Applications of GFRP Rebars

Dams, Sea Walls & Marine Applications

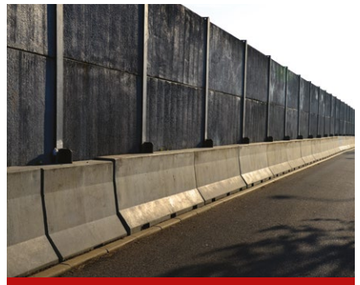


RCC Flooring Built in or close to the Sea



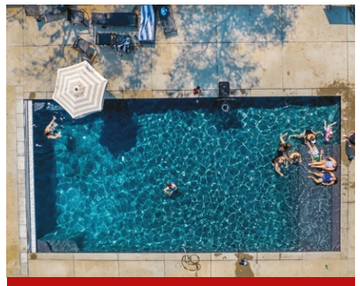
Highway Construction

Bridge Decks

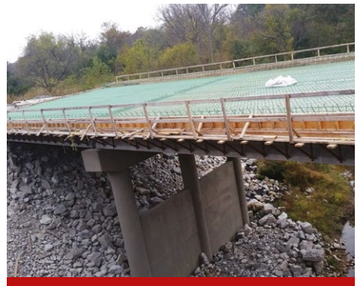


Barrier Walls

Underground Water Tanks



Swimming Pools



Approach Slabs

Hospital MRI Areas

Tunneling & Temporary Reinforcement

Columns

Waste & Water Treatment Plants

Applications of GFRP Rebars

Friction Slabs

Industrial Flooring

Parkings

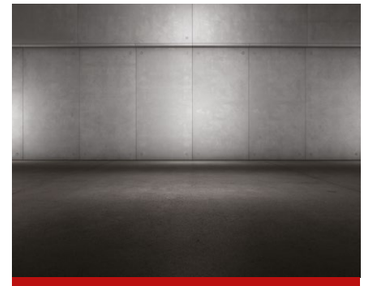
Crash Barriers

Chemical Plants

Concrete Slabs

Precast

Foundations



Walls

RCC Roads

Pavements

Drainage

Applications of GFRP Rebars

Corrosion-free Applications

- Roads & Infrastructure Warehouse / Industrial flooring, RCC Roads, Building Foundations, Basements, Retaining walls, Compound walls
- Marine Precast Walls, Pipe sleepers /Railway Sleepers, Bridge Decks & Approach Slabs, MSE Walls, Coastal Regions, Parking Lots, Swimming Pools
- Underwater structures, Non-conductive / Nonmagnetic applications, Hospitals
- Airport compass calibration pads, Power plants and transformer sites
- Light rails, High chemical resistance & industrial applications
- Industrial applications Sewage treatment plants, Agricultural facilities, Industrial facilities, Chemical plants
- ETP plants, Culverts, Storm water drain channels and other applications, Energy-efficient buildings, Cold storage warehouses

Mechanical Properties | Metal Rebars vs GFRP Rebars

	METAL Rebar	GFRP Rebar
Tensile Strength (MPa)	500 – 600	1000 +
Shear Strength (MPa)	120	>= 150
Bond Strength (MPa)	14	>=11
Compression (MPa)	500	450
Modulus of Elasticity (MPa)	160 – 200	>= 50
Elongation (%)	25	>= 1.5
Durability	As prescribed in Special building Codes	80 + years
Density (gm/cm3)	7.8	1.9
Corrosion resistance to aggressive environment	Appearance of rust	Non-corrosive
Electrical Conductivity	Conductive	Non-conductive

Mesh Size	Rebar Diameter & Mesh Weight in kg/sq.mtr.					Number of Rebars (per sq.mtr.)
	0 2.5	0 3.0	0 4.0	0 5.0	0 6.0	
50 x 50	0.400	0.560	0.920	1.480	2.200	42
100 x 100	0.200	0.280	0.460	0.740	1.100	22
150 x 150	0.140	0.196	0.322	0.518	0.770	14
200 x 200	0.100	0.140	0.230	0.370	0.550	12

GFRP Rebars Weight Comparison

Wt./mtr. & Quantity per ton				
	METAL REBARS		FRP REBARS	
	Kg./mtr.	Mtr./Ton	Kg./mtr.	Mtr./Ton
6mm	0.222	4,504.50	0.058	17,241.38
8mm	0.395	2,531.65	0.103	9,708.74
10mm	0.617	1,620.75	0.161	6,211.18
12mm	0.890	1,123.60	0.232	4,310.34
16mm	1.580	632.91	0.412	2,427.18

GFRP Rebars Packing Details

DIAMETER	TYPE OF PACKING	LENGTH OF BAR	QTY OF REBARS IN A BUNDLE	METERS IN A COIL
3mm	Straight bar / Coil	12 Meters	50	50 / 100 Meters
3.5mm	Straight bar / Coil	12 Meters	50	50 / 100 Meters
4.5mm	Straight bar / Coil	12 Meters	50	50 / 100 Meters
6mm	Straight bar / Coil	12 Meters	50	50 / 100 Meters
7mm	Straight bar / Coil	12 Meters	25	50 / 100 Meters
8mm	Straight bar / Coil	12 Meters	25	50 / 100 Meters
10mm	Straight bar / Coil	12 Meters	15	50 / 75 Meters
12mm	Straight bar / Coil	12 Meters	15	50 / 75 Meters
14mm	Straight bar	12 Meters	5	-
16mm	Straight bar	12 Meters	5	-
18mm	Straight bar	12 Meters	5	-
20mm	Straight bar	12 Meters	5	-

Standards & Design Guidelines of GFRP Rebars in India and across The Globe

INDIA

IS 18255 : 2023

Fibre-Reinforced Polymer (FRP) Rebars for Concrete Reinforcement - Methods of Test.

IS 18256 : 2023

Solid round glass fibre reinforced polymer (GFRP) Rebars for Concrete Reinforcement - Specification.

IRC : 137 - 2022

Guidelines on use of fibre-reinforced polymer bars in road projects.

USA

ACI 440. 1R-06 (2006)

"Guide for the design and construction of structural concrete reinforced with FRP Rebars", American Concrete Institute

ACI 440. 3R-04 (2004)

"Guide for test methods for Fiber Reinforced Polymers (FRP) for Reinforcing or Strengthening Concrete Structures.

ACI 440R-07 (2007)

"Report on Fiber-Reinforced Polymer (FRP) Reinforcement for Concrete Structures," ACI Committee 440.

ACI 440.1-15 (2015)

"Guide for the Design and Construction of Structural Concrete Reinforced with Fiber - Reinforced Polymer Bars," ACI Committee 440.

ACI 440.3R-12 (2012)

"Guide Test Methods for Fiber-Reinforced Polymers (FRPs) for Reinforcing or Strengthening Concrete Structures," ACI Committee 440.

ACI 440.6M-08 (2017)

"Specification for Carbon and Glass Fiber-Reinforced Polymer Bar Materials for Concrete Reinforcement", ACI Committee 440

ACI 440.5-18 (2018)

"Specification for Construction with Fiber-Reinforced Polymer Reinforcing Bars," ACI Committee 440.

AASHTO GFRP-1 (2009)

AASHTO LFRD Bridge Design Guide Specifications for GFRP - Reinforced concrete Bridge Decks and Traffic Railings", American Association of State Highway and Transportation Officials.

FHWA-HRT-05-081 (2005)

"Design of Continuously Reinforced Concrete Pavements using Glass Fiber Reinforced Polymer Rebars." Federal Highway Administration, US Department of Transportation.

FDOT (2021)

"Florida Department of Transportation Standard Specifications for Road and Bridge Construction." Florida Department of Transportation.

AASHTO (2018)

"LRFD Bridge Design Guide Specifications for GFRP Reinforced Concrete," American Association of State Highway and Transportation Officials.

CANADA

CAN/CSA-S807-10

"Specifications for Fiber Reinforced Polymers"

CAN/CSA-S806-12

"Design and Construction of Building Components with Fiber-Reinforced Polymers"

CAN/CSA-S6-06 (2006)

Fiber-Reinforced Structures, "Canadian Highway Bridge Design Code", pp.693-728.

CSA CAN/CSA-S6-06 (2006)

"Canadian Highway Bridge Design Code." Standards Council of Canada.

JAPAN

JSCE Series 23

"Recommendation for Design and construction of Concrete structures using continuous Fiber Reinforced Material".

JBDPA Design Manual (2009)

"Japanese Design and Construction Guidelines for Seismic Retrofit of Building Structure with FRP composites."

GERMANY

DIN1045-1

"EN-Concrete Reinforced and Pre-stressed Concrete Structures - part 1: Design and Construction."

SWITZERLAND

Fib Bulletin No.40 (2007)

"FRP Reinforcement in RC Structures"

AUSTRALIA

Transport for NSW (2020)

"Technical Guide Design of Continuously Reinforced Concrete Pavement using Glass Fibre Reinforced Polymer (GFRP) Bars at Traffic Loop Locations," Document Number P-G-008, New South Wales Government, Australia.

EUROPE

EN-13706 (EUROPE)

RUSSIA

GOST 31938-2012

Fibre-reinforced polymer bar for concrete reinforcement.

Code specification 15.13330.2012

Masonry and reinforced masonry structures.

Code specification 63.13330.2012

Concrete and reinforced concrete structures. General provisions.

Revised edition of SNiP (construction norms & regulations) 52-01-2003.

Code specification 28.13330.2012

Protection against corrosion of construction. Revised edition of SNiP 2.03.11-85.

Code specification 27.13330.2011

Concrete and reinforced concrete structures intended for the use in elevated and high temperatures.

OTHERS

ASTM D570-98 (2018)

"Standard Test Method for Water Absorption of Plastics," ASTM International.

ASTM D578/D578M-18 (2018)

"Standard Specification for Glass Fiber Strands," ASTM International.

ASTM D792-20 (2020)

"Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement," ASTM International.

ASTM D2584-18 (2018)

"Standard Test Method for Ignition Loss of Cured Reinforced Resins," ASTM International.

ASTM D3171-15 (2015)

"Standard Test Methods for Constituent Content of Composite Materials," ASTM International.

ASTM D7205/D7205M-21 (2021)

"Standard Test Methods for Tensile Properties of Fiber-Reinforced Polymer Matrix Composite Bars," ASTM International.

ASTM D7617/D7617M-11 (2017)

"Standard Test Method for Transverse Shear Strength of Fiber-reinforced Polymer Matrix Composite Bars," ASTM International.

ASTM D7705/D7705M-12 (2019)

"Standard Test Method for Alkali Resistance of Fiber Reinforced Polymer (FRP) Matrix Composite Bars used in Concrete Construction," ASTM International.

ASTM D7913/D7913M-14 (2020)

"Standard Test Method for Bond Strength of Fiber-Reinforced Polymer Matrix Composite Bars to Concrete by Pullout Testing" ASTM International.

ASTM D7957/D7957M-17 (2017)

"Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement" ASTM International.

ASTM E1356-08 (2014)

"Standard Test Method for Assignment of the Glass Transition Temperatures by Differential Scanning Calorimetry." ASTM International.

ASTM E2160-04 (2018)

"Standard Test Method for Heat of Reaction of Thermally Reactive Materials by Differential Scanning Calorimetry." ASTM International.

FAQs
Frequently Asked Questions

1. Which reinforcement has a better bond with concrete/cement?
Composite reinforcement or metal reinforcement?

Both composite reinforcement and metal reinforcement have approximately the same adhesion to concrete/cement.

2. What kind of binding material is needed while using GFRP Rebars?
Any binding can be used while using GFRP Rebars. Traditional binding wires can be surely used as well as plastic clips or knitting wire with the help of plastic fix clips.

3. How are GFRP Rebars better than metal rebars? What are the advantages of composite reinforcement in comparison with metal reinforcement?

Strength : Composite reinforcement has strength characteristics which are 2-3 times superior to steel reinforcement.

Durability : The coefficient of temperature expansion of composite reinforcement is close to the coefficient of thermal expansion of concrete, so that in concrete structures there are no associated micro defamations, microcracks and the overall durability of the structure is substantially increased.

Resistance to corrosion : As we know that steel rebars are prone to corrosion and have a life of 20-25 years whereas GFRP Rebars are 100% anti corrosive in nature and have a life of over 80 years making it much more durable. Chemical resistance - composite reinforcement has great chemical resistance in various aggressive environments, it is not susceptible to corrosion which also positively affects the durability.

Lightweight : Composite reinforcement with comparable strength characteristics is lighter than steel reinforcement by almost 4 times.

Low thermal conductivity : Due to low thermal conductivity, "temperature bridges" are not formed on the structures, which reduces the thennal loss to 34% and accordingly increases the conditioning cost of the building.

Easy installation : Composite rebars can be cut from the bay of any given length which increases speed of work at site, later fastened with plastic clips, special fasteners/clamps or just with traditional binding wires.

Easy transportation and storage : You can fold the composite rebars into coils at the time of production, which allows us to use even cars, autos, scooters for transportation and save on transport cost significantly.

As we know that GFRP rebars have a density of only 1.9 Tons /m^3 making it almost 4 times lighter than metal rebars. This helps in loading 4 times more material into trucks than steel and can save a significant amount on logistics costs.

Custom length : Unlike metal reinforcement, composite rebars can be provided in custom lengths which can help in reducing costs as no overlapping is required and time, labor cost is saved.

4. What are the disadvantages of composite reinforcement in comparison with traditional metal reinforcement?

Modulus of elasticity

The modulus of elasticity of composite reinforcement is almost 4 times lower than that of metal reinforcement, even with an equal diameter. In other words, it easily bends. For this reason, it can be mostly used in ground applications where usage in floors requires additional calculations.

Dielectric

Composite reinforcement unlike metal reinforcement cannot be welded by electric welding.

Temperature

When heated to a temperature of 600 degrees Celsius, the compound that binds the composite reinforcement fibers softens so much that the reinforcement loses its elasticity.

To increase the stability of the structure in the event of fire, additional measures should be taken to heat protect the structures that use composite reinforcement.

Bending

Composite reinforcement unlike metal reinforcement does not have mechanical properties which are elastic, thus it doesn't allow you bend material on site.

5. How do GFRP Rebars work during earthquakes?

Due to higher fatigue properties, GFRP Rebars have a higher resistance to cyclical loads of high intensity, which makes them workable during earthquakes, subject to a detailed design report on the same.

6. What is the behavior of GFRP Rebars in case of a fire?

Composite reinforcement is fire resistant up to 600 degrees Celsius. Once the temperature exceeds 600 degrees Celsius, the compound that binds the composite reinforcement fibers softens. Composite reinforcement does not burn directly, and studies show that structures are sustainable during a fire.

7. Can you bend/curve GFRP Rebars on site?

No, as the mechanical properties of GFRP Rebars are elastic, thus it does not allow you to bend the material on site. However, you can get your desired bend/curved elements prefabricated as per your requirement.

8. How does composite reinforcement strength depend on the ambient temperature?

The change in ambient temperatures on the strength of composite reinforcement is practically unaffected. GFRP Rebars can be used at temperatures from (-70 degrees Celsius) to (+120 degrees Celsius) without being affected.

9. What class and type of concrete/cement should be used while using composite reinforcement?

When reinforcing concrete/cement structures with GFRP Rebars, special requirements to the components of the concrete mixture (cement, aggregates additives) are not presented. It is also possible to use composite reinforcement with Portland cement and its varieties (sulfate resistant, hydrophobic etc.) The quality of concrete mixtures and the technology of their preparation should ensure the production of concrete structures that meet the requirements for standardized quality indicators.

10. Is it possible to use composite reinforcement in slabs and walls?

Yes, at the same time it is required to provide the necessary reinforcement area and the compliance with the requirements for fire resistance of a concrete structure. Depending on the loads and design features, additional calculations of the designers are needed. According to the general recommendations, GFRP Rebars can be used in load bearing structures of buildings up to 3 floors with detachable formwork and up to 5 floors with fixed formwork.

11. Is it possible to use composite reinforcement for pile reinforcement?

Yes, the corrosion resistance of composite piles is substantially higher than that of steel reinforced concrete piles.

12. Do GFRP Rebars have any Indian standards?

Indian standards of GFRP Rebars in India are IS 18255 : 2023, IS 18256 : 2023 and IRC : 137- 2022

13. What lengths do GFRP Rebars come in?

GFRP Rebars come in standard length of 12 meters. But since we can coil them, we can make custom lengths of up to 5kms* which helps save in your overlapping cost.

14. Is it possible to use GFRP Rebars together with metal rebars?

Yes, you can use GFRP Rebars together with metal rebars in some cases where it is necessary.

15. Are GFRP Rebars brittle?

Yes, GFRP Rebars are brittle in nature but only break or snap at a tensile strength of 1000+ megapascal.

16. What precautions should I take while using GFRP Rebars?

While handling the material and using GFRP Rebars, it is advised to wear safety hand gloves since GFRP Rebars are made from Fiberglass, they have small threads which may cause irritation if used with bare hands.

17. Are GFRP Rebars used in India? Are they a success for reinforcement?

The rebar revolution of GFRP Rebars began in 2019 in India. Now the growth and usage of the material will grow exponentially in India in the coming future since the Bureau of Indian Standard has published its own standards.

18. What method is used for testing of GFRP Rebars? How are GFRP Rebars tested?

GFRP Rebars are tested in a different way than metal rebars. In the case of GFRP Rebars, couplers/grippers are to be installed on both end of the Rebars to perform major tests like tensile. Further details on testing are mentioned in test methods in IS 18255:2023.

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