

PRODUCT DESCRIPTION

GCF™ refers to Glass Chopped Fibers. Concrete containing glass chopped fibers — also known as Glass Fiber Reinforced Concrete (GFRC) or Glass Reinforced Concrete (GRC) — is a type of concrete in which short, chopped glass fibers are uniformly distributed within the mix. GFRC is commonly used in the construction of building facades and architectural precast concrete elements. Compared to ordinary concrete, GFRC offers higher durability in alkaline environments and greater tensile strength. This enhanced performance results from the composite interaction between the concrete matrix and the dispersed chopped glass fibers.

PRODUCT FEATURES

- **High Strength:** The use of glass chopped fibers in concrete increases its strength. This enhancement results in a **hard, crack-resistant concrete**.
- **Lightweight:** For the same strength, the **weight of GFRC (Glass Fiber Reinforced Concrete)** is lower than that of ordinary concrete, reducing **transportation and formwork costs**.
- **Excellent Workability:** Since fiber-reinforced concrete is internally reinforced with fine fibers, it can be **cast into any formwork**, making it ideal for **complex architectural shapes**.
- **Smooth Surface Finish:** The inclusion of glass chopped fibers allows the concrete to **take shape more easily**, resulting in a **smoother final surface**.
- **Improved Durability:** GFRC exhibits greater **resistance to environmental effects**, such as **corrosion and chemical attacks**.
- **Reduced Environmental Impact:** One of the major environmental issues of cement production is the **high level of pollution it generates**, accounting for approximately **5–8% of global atmospheric CO₂ emissions**. By adding glass fibers to concrete, the **cement content can be reduced by an average of 1%**, contributing to **lower carbon emissions**. Since concrete is the **most widely used material in the world**, this reduction has a significant positive environmental effect. In the world, after water, concrete is the most widely used material; even a **1% reduction** can have a **significant impact**.
- **Reduced Concrete Thickness:** The use of this type of fiber allows for a reduction in concrete thickness.
- **Heat Resistant:** Provides improved resistance to high temperatures.
- **Impact Resistant:** Enhances the concrete's resistance to mechanical impacts.
- **Increased Tensile Strength:** Improves the tensile performance of concrete.
- **Fire and Heat Resistance:** Increases resistance to fire and thermal effects.
- **Enhanced Durability:** Extends the long-term durability of concrete.
- **Reduced Surface and Hairline Cracks:** Minimizes micro-cracking on the concrete surface.

- **Improved Abrasion Resistance:** Enhances resistance to wear and surface erosion.
- **Lower Water-to-Cement Ratio:** Reduces the water-to-cement ratio, resulting in **less shrinkage and contraction** of the concrete.

PRODUCT USES

Glass Chopped Fibers (GCF™) have a wide range of applications in **reinforcing concrete**. Some of the key uses include:

- **Precast Concrete Panels:** GFRC panels can be produced **without steel reinforcement**, and they are **lighter in weight**. These advantages, along with the superior properties of GFRC, make them ideal for **architectural elements on building exteriors and urban spaces**.
- **Concrete Tables and Benches**
- **Industrial Floors and Slabs**
- **Sidewalks and Road Pavements**
- **Cement Pipes**
- **Tunnel Linings**
- **Precast Composite Roofs**
- **Concrete Silos**
- **Bridge Decks and Concrete Walls**

Glass Fibers in Composite Industries:

- **Electrical Industry**
- **Automotive Industry**
- **Aerospace Industry**
- **Military Industry**
- **Artificial Stones (Decorative Industries)**
- **Construction Materials**, such as **plasters and gypsum products**
- **Insulation Applications**
- **Shipbuilding and Power Plant Industries**

TECHNICAL DATA

Fiber Type	Chopped Glass
Filament Diameter	15 to 17 (µm)
Fiber Lengths	6, 12, mm
Glass Type	E-Glass
Moisture Content	Less than 0.3%
Color	Transparent

HOW TO USE

Design Principles for Concrete Structures with Glass Chopped Fibers (GFRC):

The design of concrete structures reinforced with **glass chopped fibers (GFRC)** is generally similar to that of **conventional concrete**, but several considerations must be taken into account:

1. **Cement Adjustment:** Since fibers are added to the concrete mix, the **cement**

content should be reduced proportionally to maintain the mix design balance.

2. **Behavioral Differences:** The mechanical behavior of **steel reinforcement** differs from that of **glass fibers** and other **polymeric fibers**, leading to differences in the structural performance of GFRC elements.

The first notable difference between steel and glass chopped fibers occurs **before failure**.

- **Glass fibers** exhibit a **linear behavior from loading to ultimate failure** and break in a **brittle manner**.
- **Steel reinforcement**, on the other hand, **yields before failure**, which means GFRC fibers **cannot replace steel in all structural applications**.

However, this brittleness of glass fibers **absorbs more energy** and makes the deformations in concrete **more reversible**.

- **Crack Propagation Mechanism:** The initiation and growth of cracks in steel-reinforced concrete and GFRC are also different.
- **Corrosion Resistance:** GFRC shows **higher resistance to corrosion** compared to conventional steel-reinforced concrete.
- **Other Properties:** GFRC exhibits **higher damping capacity** and a **lower coefficient of thermal expansion**, which are additional benefits of using glass chopped fibers in concrete structures.

PACKAGING

These fibers are available in **25 kg polyethylene bags**.

STORAGE CONDITIONS

In case of skin contact, wash thoroughly with soap and water. For eye contact, flush immediately with plenty of water; contact physician immediately. For respiratory problems, remove to fresh air. Wash clothing before reuse

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