

GSA™

Unidirectional Glass Fiber to Anchor FRP Composite Systems



Building
&
Transportation



Oil, Gas
&
Industrial



Offshore
&
Onshore



Water
&
Wastewater

PRODUCT DESCRIPTION

The CTech-LLC® Glass Spike Anchors (**GSA™**) are manufactured a multiple fiber tow compiling machine, at the CTech-LLC® facility. The use of GSA™ in FRP (Fiber Reinforced Polymer) retrofitting increases the axial strain and the strength of the interface between the surface and the composite fiber (FRP), which increases the efficiency of the composite fiber (FRP). The spikes can be embedded and/or developed with thickened epoxy.

ADVANTAGES

- Factory-fabricated for full quality assurance.
- Non-corrosive and can be applied to a wide variety of structural elements.
- FRP anchors can prevent or delay the delamination of EB FRP sheets.
- Long working time.
- High tensile modulus and strength.
- High mechanical and chemical resistance.
- Ambient cure.
- High dielectric performance and are resistant to electricity.

TYPICAL DRY FIBER PROPERTIES

Tensile Strength	3.24 GPa
Tensile Modulus	72.4 GPa
Ultimate Elongation	4.5%

COMPOSITE GROSS LAMINATE PROPERTIES

PROPERTY	ASTM METHOD	TYPICAL TEST VALUE	DESIGN VALUE
Ultimate tensile strength in primary fiber direction	D-3039	575 MPa	460 MPa
Elongation at break	D-3039	2.2%	1.76%
Tensile modulus	D-3039	26.1 GPa	20.9 GPa

TYPICAL USES

- CTech-LLC® Glass Spike Anchors can delay or even eliminate premature de-bonding failure of the FRP prior to its ultimate strength being reached.



- GSA™ improves the efficiency, reliability and safety of EBR-FRP strengthening systems.
- Enhancing of pre-stressed FRP strengthening system.
- Improving force transferring of carbon and glass fabric.

DESIGN

Design calculations shall be made and sealed by a licensed, independent engineer knowledgeable with the design of FRP strengthening systems.

INSTALLATION PROCEDURE

SURFACE PREPARATION

- For retrofitting applications, substrate preparation can highly effect on the quality of the performance of systems.
- All the surfaces must be cleaned from dirt, grime, dust, curing compounds, oils, grease, waxes and all the other contaminated materials.
- An industrial vacuum cleaner must be used to remove dust and dirt.
- All the surfaces need grinding, sandblasting, shot blasting, pressure wash or other common mechanical methods to reach an even concrete substrate.
- The sharp edges must be smooth and rounded to a minimum radius of 30 mm.
- Note that concrete surfaces must be fully dried or cured so adhesive can properly dry.

MIXING

For pre-measured units in 20L containers, pour the contents of component B into

the pail of component A. For drums, premix each component: 100.0 parts of component A to 42.0 parts of component B by volume (100 parts of component A to 34.5 parts of component B by weight). Mix thoroughly for five minutes with a low speed mixer at 400-600 RPM until uniformly blended.

EPOXY MATERIAL PROPERTIES

Property	ASTM Method	Typical Test Value
Tensile strength	D-638 Type 1	62.4 MPa
Tensile Modulus	D-638 Type 1	3.08 GPa
Elongation Percent	D-638 Type 1	4.0%
Flexural Strength	D-790	114.4 MPa
Flexural Modulus	D-790	3.02 GPa
Tg	D-4065	82° C

Curing Schedule 72 hours post cure at 60° C.

APPLICATION

Surface of all the contaminated elements must be cleaned thoroughly. Apply the C-Tech-LLC® epoxy to the CTech-LLC® spike anchors by hand. The fully saturated spike is then applied as detailed on the project.

STORAGE & SHELF LIFE

Store GSA™ at 4° to 32°C. Avoid freezing the product and keep it away from direct sunlight, flame or other hazards. Avoid moisture and water contamination.

CAUTION

All components of FRP systems may cause skin irritation and sensitization. Use of chemical resistant gloves is recommended. Avoid breathing vapors and dust. Get medical attention if you are breathing with difficulty. Resins products can cause strong eye irritation. Avoiding eye contact and Using safety goggles is necessary.

CTech-LLC®

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IMPORTANT NOTE:

Before using any CTech-LLC® product, the user must review the most recent version of the product's technical data sheet, material safety data sheet and other applicable documents, available at www.ctech-llc.com.

WARANTY:

CTech-LLC® warrants its products to be free from manufacturing defects. Buyer determines suitability of product for use and assumes all risks. Buyer's sole remedy shall be limited to replacement of product. Any claim for breach of this warranty must be brought within one month of the 'date of purchase. CTech-LLC® shall not be liable for any consequential or special damages of any kind, resulting from any claim or breach of warranty, breach of contract, negligence or any legal theory. The Buyer, by accepting the products described herein, agrees to be responsible for thoroughly testing any application to determine its suitability before utilizing.
