

**PRODUCT DESCRIPTION**

The C-Tech-LLC® Carbon Spike Anchors (CSA™) are manufactured a multiple fiber tow compiling machine, at the C-Tech-LLC® facility. The use of CSA™ 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**

- System-compatible anchoring details
- Good high & low temperature properties
- Long working time
- High tensile modulus and strength
- High mechanical and chemical resistance.
- Ambient cure
- High dielectric performance and are resistant to electricity

**SHELF LIFE**

CSA™ carbon spike anchors must be stored in its original packaging. Lid of the container should be kept closed. Moisture can decrease shelf life of epoxy resins. With proper storage, resin and hardeners remain usable for at least 24 months.

**STORAGE CONDITIONS**

Store CSA™ at 4° to 32°C. Avoid freezing the product and keep it away from direct sunlight, flame or other hazards. Store at temperatures below 38° C. Avoid moisture and water contamination.

**TYPICAL DRY FIBER PROPERTIES**

Tensile Strength	4.90 GPa
Tensile Modulus	230 GPa
Ultimate Elongation	1.7%

**COMPOSITE GROSS LAMINATE PROPERTIES**

PROPERTY	ASTMN METHOD	TYPICAL TEST VALUE	DESIGN VALUE
Ultimate tensile strength in primary fiber direction	D7205	986 MPa	834 MPa
Elongation at break	D7205	1.2%	0.85%
Tensile Modulus	D7205	95.8 GPa	82.1GPa

**EPOXY MATERIAL PROPERTIES**

PROPERTY	ASTMN 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
T <sub>g</sub>	D-4065	82° C

Curing Schedule 72 hours post cure at 60° C.

**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.

**HOW TO USE**

**DESIGN**

The C-Tech-LLC® Systems shall be designed to meet specific design criteria. The criteria for each project is dictated by the engineer of record and any relevant building codes and/or guidelines. The design should be based on the allowable strain for each type of application and the design modulus of the material.

**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.

**APPLICATION**

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

## LIMITATIONS

Proper temperature for applying epoxies is between 4° C to 38° C. for applying them must use adequate ventilation. They should not be used in cold and humid weather.

## CAUTION!

All components of FRP composite 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.

Resin products can cause strong eye irritation. Avoiding eye contact and using safety goggles is necessary.

## SAFETY PRECAUTIONS

- Avoid eye contact.
- Do not allow resin contact with skin.
- Use safety gloves and glasses.
- Wear rubber boots and protective suits.
- Do not eat, drink or smoke when using the products.

If any symptoms happened, go to open air and get medical attention.

## FIRST AID

If eye contact happened, Flush eyes with large amounts of water and obtain medical attention. In case of skin contact, wash your skin with soap and water and get medical attention if irritation persists. If there is cough or difficulty in breathing, go to open air and get medical attention if it persists.

## 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.