

# CSS-CUCF22

Code-Listed Unidirectional Carbon Fabric

**SIMPSON****Strong-Tie**

®

## DESCRIPTION

CSS-CUCF22 is a unidirectional, high-strength, non-corrosive carbon fabric designed to be field laminated with CSS-ES saturant resin to create a carbon-fiber-reinforced polymer (CFRP) composite for structural reinforcement applications. This product has been evaluated per ICC-ES AC125 for concrete and unreinforced masonry strengthening using externally bonded fiber-reinforced polymer (FRP) composite systems. This product is NSF-listed safe for potable water. Please refer to the NSF listing for the NSF 61-listed application. This product is part of the tested assembly in UL Design No. N861, which achieved a four-hour fire rating when subjected to ASTM E119 / UL 263 full-scale fire testing. Please refer to UL Online Certifications Directory for the UL listing. Meets Class A flame spread/smoke developed requirements when coated with FX-207.

## CODES

ICC-ES ESR-3403



## MATERIAL PROPERTIES

### Dry Fiber Properties

Tensile Strength	670,000 psi (4,600 MPa)
Tensile Modulus	37,000 ksi (260 GPa)
Elongation at Break	1.9%
Weight	22.0 oz./yd. <sup>2</sup> (740 g/m <sup>2</sup> )
Color	Black
Density	0.065 lb./in. <sup>3</sup> (0.0018 g/mm <sup>3</sup> )
Dry Fabric Thickness	0.0162 in. (0.42 mm)

### Cured Composite Properties<sup>1</sup>

Property	Design Value <sup>2</sup>
Tensile Strength	128,000 psi (880 MPa)
Tensile Modulus	14,200 ksi (98 GPa)
Elongation at Break	0.9%
Thickness per Layer	0.04 in. (1.0 mm)
Stiffness/width	568 k/in. (98,000 N/mm)

1. When laminated with CSS-ES saturating resin, post cured for 48 hours at 140°F (60°C) and tested per ASTM D3039.

2. Tensile properties based on five percent fractile approach per ACI.



STRUCTURAL CONCRETE FIBER-REINFORCED COMPOSITE SYSTEM FOR USE IN BEAM/SLAB EXTERNAL REINFORCING SYSTEM  
FIRE RESISTANCE CLASSIFICATION  
SEE UL FIRE RESISTANCE DIRECTORY <R37897>

## PERFORMANCE FEATURES

- High strength
- Lightweight
- Ambient cure
- Non-corrosive
- Molds to fit various shapes
- Low aesthetic impact
- Compatible with many finish coatings
- NSF listed ([info.nsf.org/certified/pwscomponents](http://info.nsf.org/certified/pwscomponents))
- UL listed ([www.ul.com/database](http://www.ul.com/database))
- Component of Class A flame spread/smoke developed indices test

## APPLICATIONS

### Seismic Retrofit

- Shear strengthening
- Displacement/ductility
- Life safety

### Load Rating Upgrade

- Increased live loads
- New equipment
- Change of use

### Damage Repair

- Deterioration/corrosion
- Blast/vehicle impact

### Defect Remediation

- Size/layout errors
- Low concrete strengths

### Blast Mitigation

- Hardening
- Progressive collapse

## STRUCTURES

- Buildings
- Bridges
- Parking garages
- Chimneys
- Piers/wharfs
- Tunnels
- Pipes

## ELEMENTS

- Columns
- Beams
- Slabs
- Walls
- Piles
- Pier caps

## SUBSTRATES

- Concrete
- Masonry
- Timber
- Steel

## PACKAGING

### Roll Size (Width x Length)

12 in. x 300 ft. (305 mm x 91.4 m)

24 in. x 150 ft. (610 mm x 45.7 m)

### Model No.

CSS-CUCF2212

CSS-CUCF2224

## SHELF LIFE

10 years in unopened, undamaged carton

## STORAGE

Store material in a dry area with no exposure to moisture.

## Design

The number of layers, dimensions, and detailing of CSS-UCF22 shall be designed in accordance with ACI 440.2R or another recognized design guideline/code in order to meet the design performance specified for the application. Contact Simpson Strong-Tie for design and technical support.

## Surface Preparation

Repair existing substrate per ICRI Guideline No. 310.1R. Concrete shall be abrasively prepared to achieve an open pore structure and CSP-3 in accordance with ICRI Guideline No. 310.2R by means of grinding, sand blasting, shot blasting, or pressure washing. Application surfaces shall be clean, sound, and free of standing water at time of application. All dust, laitance, grease, curing compounds, and other foreign materials that may hinder the bond must be removed before installation. In some applications, such as column confinement, the engineer may determine that the installation is not bond-critical, in which case abrasive surface preparation is not required. Existing concave and convex surfaces must be filled/transitioned using CSS-EP, thickened CSS-ES epoxy, or a suitable repair mortar. All corners to be wrapped around shall be rounded to a  $\frac{3}{4}$  in. (19 mm) minimum radius using a grinder, CSS-EP, or thickened CSS-ES epoxy.

## Application

CSS installation shall only be performed by contractors and personnel who have been properly trained by Simpson Strong-Tie. Apply one coat of CSS-ES primer using a nap roller. Where minor surface defects are present, apply CSS-EP or CSS-ES epoxy saturant thickened with fumed silica (maximum ratio of 2 parts fumed silica to 1 part epoxy, by volume) in lifts no thicker than 1 in. (25 mm). Apply the saturated fabric before the primer and paste/thickened epoxy have cured. Sheets can be cut to required length using heavy duty scissors. Saturate fabric mechanically or manually, ensuring that full fiber saturation is achieved. Apply the saturated sheet to the primed surface and remove entrapped air using hand pressure, rollers, or trowels. Apply additional layers as necessary to meet the project requirements, ensuring each layer is in firm contact with the previous layer. Feather all seams and edges with CSS-EP or thickened CSS-ES epoxy. Allow epoxy to fully cure (approximately 72 hours at 70°F) and lightly sand epoxy before applying finish coating.

**Pot Life:** 1 hour at 70°F (21°C).

**Cure Time:** 72 hours at 70°F (21°C).

## Limitations

CSS installation shall only take place when the ambient and substrate temperatures are between 45°F (7°C) and 95°F (35°C).

## CAUTION

**Protective Measures:** The use of safety glasses and chemically resistant gloves is recommended. Use appropriate clothing to minimize skin contact. The use of NIOSH-approved respirator is required to protect respiratory tract when ventilation is not adequate to limit exposure below the PEL. Refer to Safety Data Sheets (SDS) available at [strongtie.com/sds](http://strongtie.com/sds) for detailed information.

## FIRST AID

**Skin:** Wash fibers off skin with water and soap. If fibers are embedded in the skin, remove with tweezers. Discard clothing that may contain embedded fibers. Seek medical advice if exposure results in adverse effects.

**Eyes:** Immediately flush with a continuous water stream for at least 20 minutes. Washing immediately after exposure is expected to be effective in preventing damage to the eyes. Seek medical advice.

**Inhalation:** If there is inhalation exposure to the fibers of this product, remove source of exposure and move affected person to fresh air. If not breathing, give artificial respiration. If there is breathing difficulty, give oxygen. Seek medical advice for any respiratory problems.

**Ingestion:** Not expected to occur since ingestion is not a likely route of exposure for this product. If ingestion does occur, DO NOT INDUCE VOMITING. Nothing by mouth if unconscious. Seek medical advice.

## CLEAN-UP

### Environmental Precautions

**Spill/Release and Cleanup Procedures:** In case of spill, collect (e.g., sweep up, vacuum, etc.) spilled material and either reuse or dispose of properly. Chopped or milled carbon fibers may be slippery if spilled posing an accident risk. Wear personal protective equipment as described in the SDS during cleanup activities.

## LIMITED WARRANTY

This product is covered by the Simpson Strong-Tie RPS Product Five-Year Limited Warranty, which is available at [strongtie.com/limited-warranties](http://strongtie.com/limited-warranties) or by calling Simpson Strong-Tie at (800) 999-5099.

## IMPORTANT INFORMATION

It is the responsibility of each purchaser and user of each Product to determine the suitability of the Product for its intended use. Prior to using any Product, consult a qualified design professional for advice regarding the suitability and use of the Product, including whether the capacity of any structural building element may be impacted by a repair. As jobsite conditions vary greatly, a small-scale test patch is required to verify product suitability prior to full-scale application. The installer must read, understand, and follow all written instructions and warnings contained on the product label(s), Product Data Sheet(s), Safety Data Sheet(s) and the [strongtie.com](http://strongtie.com) website prior to use. For industrial use only by qualified applicators. KEEP OUT OF REACH OF CHILDREN!

 **WARNING!** Cancer and reproductive harm — [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).