

CSS-UCG

Unidirectional Carbon Grid



DESCRIPTION

CSS-UCG is a unidirectional, high-strength, non-corrosive carbon grid designed to be field installed with CSS-CM cementitious matrix to create a fabric-reinforced cementitious matrix (FRCM) composite for structural reinforcement applications. This product has been evaluated per ICC-ES AC434 for concrete and unreinforced masonry strengthening and is part of the tested assembly in UL Design No. N859, 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.

CODES

ICC-ES ESR-3506



MATERIAL PROPERTIES

Grid Properties

Weight	13 oz./yd. ² (440 g/m ²)
Weight of fibers	8.3 oz./yd. ² (280 g/m ²)
Equivalent Dry Fabric Thickness (in strong direction)	0.0062 in. (0.157 mm)
Ultimate Tensile Strength	31 kip/ft. (450 kN/m)
Ultimate Tensile Strain	1.5%
Axial Stiffness by width unit	2,067 kip/ft. (30,000 kN/m)
Area by width unit	0.0062 in. ² /in. (157 mm ² /m)
Color	Gray

Cured Composite Properties¹

Property	Design Value ²
Cracked Tensile Modulus	7.1 x 10 ⁶ psi (49,000 MPa)
Ultimate Tensile Strain	1.1%
Ultimate Tensile Strength	128,300 psi (885 MPa)
Lap Tensile Strength	121,000 psi, 12" lap (834 MPa, 30 cm)
Thickness per Layer	0.5 in. (13 mm)

1. When installed with CSS-CM cementitious matrix.

2. Average tensile strength and strain minus one standard deviation per ACI 549. Modulus values are average.

PERFORMANCE FEATURES

- High strength
- Ambient Cure
- Non-corrosive
- Molds to fit various shapes
- Low aesthetic impact
- Compatible with many finish coatings
- UL listed (www.ul.com/database)

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

- Progressive collapse

STRUCTURES

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

ELEMENTS

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

SUBSTRATES

- Concrete
- Masonry

PACKAGING

Roll Size (Width x Length)

77 in. (1.95 m) x 164 ft. (50 m)

Model No.

CSS-UCG19550



FIRE RESISTANCE
CLASSIFICATION FOR USE IN
BEAM/SLAB REINFORCING SYSTEM
<R37897>

Design

The number of layers, dimensions, and detailing of CSS-UCG shall be designed in accordance with ACI 549 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

Prepare surface and any exposed reinforcement per ICRI Guideline No. 310.1R. Concrete shall be prepared to achieve a minimum ¼" (6 mm) amplitude (CSP-6-9 in accordance with ICRI Guideline No. 310.2R) by means of sand blasting, shot blasting, or water blasting. 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. All corners to be covered with grid and matrix shall be rounded to a ¾" (19 mm) minimum radius using a grinder. Wet the substrate for at least 24 hours to a saturated surface dry condition prior to FRCM application.

Application

CSS installation shall only be performed by contractors and personnel that have been properly trained by Simpson Strong-Tie. CSS-CM cementitious matrix is pumped and projected with traditional shotcrete equipment. If required, CSS-CM may be used to patch voids and defects no deeper than 2" (51 mm). Place ¼"-½" (6-13 mm) layer of CSS-CM cementitious matrix, then immediately set CSS-UCG grid into wet CSS-CM layer. Follow with additional layers of CSS-UCG, if required, set into ¼"-½" (6-13 mm) layers of CSS-CM. Finish with a final layer of CSS-CM at ¼"-½" (6-13 mm) thick and screed/trowel to desired finish. If a layer of matrix is allowed to cure with more layers to follow, the first layer must be cleaned with water pressure before the next matrix layer can be applied. See CSS-CM product data sheet for more detailed application and curing recommendations.

Matrix Working and Set Time

See CSS-CM product data sheet for the working time and set times of CSS-CM cementitious matrix.

Limitations

CSS installation shall only take place when the ambient and substrate temperatures are between 41°F (5°C) and 86°F (30°C). Installation shall be kept humid and protected against heat and wind for three to five days after application.

SAFETY PRECAUTIONS

Proper personal protection equipment (PPE) shall be worn at all times. Avoid contact with skin and eyes. Particulate masks, rubber gloves, safety glasses, and coverall suits are recommended. Refer to Safety Data Sheets (SDS) available at 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 affected person is 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. Give nothing by mouth if affected person is unconscious. Seek medical advice.

CLEAN-UP

Dispose of material in accordance with local regulations.

SHELF LIFE

10 years from date of manufacture

STORAGE

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

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 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 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.