CSS-CUCL
Code-Listed Unidirectional Carbon Laminate

DESCRIPTION
CSS-CUCL is an epoxy-based, pultruded, unidirectional, high-strength, non-corrosive carbon fiber reinforced (CFRP) precured laminate 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.

MATERIAL PROPERTIES

Cured Composite Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Design Value per ICC-ES AC125</th>
<th>Design Value per ISO 527</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>181,000 psi (1,250 MPa)</td>
<td>400,000 psi (2,800 MPa)</td>
</tr>
<tr>
<td>Tensile Modulus</td>
<td>23,600 ksi (163 GPa)</td>
<td>24,000 ksi (165 GPa)</td>
</tr>
<tr>
<td>Elongation at Break</td>
<td>0.8%</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

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

PERFORMANCE FEATURES
- High strength
- Lightweight
- Ambient cure
- Non-corrosive
- NSM applications
- Low aesthetic impact
- Compatible with many finish coatings

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

SHELF LIFE
10 years in unopened, undamaged packaging

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

1. Minimum 10 roll order
2. Product is available by the lineal foot; additional charges may apply. Contact Simpson Strong-Tie Customer Service for information.

CSS-CUCL is packaged in 150 m (492 ft.) rolls, except where otherwise indicated, and is available in the following dimensions:

<table>
<thead>
<tr>
<th>Width</th>
<th>Thickness</th>
<th>Area</th>
<th>Model No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 mm (0.39 in.)</td>
<td>1.4 mm (0.055 in.)</td>
<td>14 mm² (0.021 in²)</td>
<td>CSS-CUCL114-RL</td>
</tr>
<tr>
<td>10 mm (0.39 in.)</td>
<td>2.8 mm (0.110 in.)</td>
<td>28 mm² (0.043 in²)</td>
<td>CSS-CUCL128-RL</td>
</tr>
<tr>
<td>20 mm (0.79 in.)</td>
<td>1.4 mm (0.055 in.)</td>
<td>28 mm² (0.043 in²)</td>
<td>CSS-CUCL214-RL</td>
</tr>
<tr>
<td>50 mm (1.97 in.)</td>
<td>1.2 mm (0.047 in.)</td>
<td>60 mm² (0.093 in²)</td>
<td>CSS-CUCL512-RL</td>
</tr>
<tr>
<td>50 mm (1.97 in.)</td>
<td>1.4 mm (0.055 in.)</td>
<td>70 mm² (0.108 in²)</td>
<td>CSS-CUCL514-RL</td>
</tr>
<tr>
<td>60 mm (2.36 in.)</td>
<td>1.4 mm (0.055 in.)</td>
<td>84 mm² (0.130 in²)</td>
<td>CSS-CUCL614-RL</td>
</tr>
<tr>
<td>80 mm (3.15 in.)</td>
<td>1.2 mm (0.047 in.)</td>
<td>96 mm² (0.148 in²)</td>
<td>CSS-CUCL812-RL</td>
</tr>
<tr>
<td>80 mm (3.15 in.)</td>
<td>1.4 mm (0.055 in.)</td>
<td>112 mm² (0.173 in²)</td>
<td>CSS-CUCL814-RL</td>
</tr>
<tr>
<td>90 mm (3.54 in.)</td>
<td>1.4 mm (0.055 in.)</td>
<td>126 mm² (0.195 in²)</td>
<td>CSS-CUCL914-RL</td>
</tr>
<tr>
<td>100 mm (3.94 in.)</td>
<td>1.2 mm (0.047 in.)</td>
<td>120 mm² (0.185 in²)</td>
<td>CSS-CUCL1012-RL</td>
</tr>
<tr>
<td>100 mm (3.94 in.)</td>
<td>1.4 mm (0.055 in.)</td>
<td>140 mm² (0.217 in²)</td>
<td>CSS-CUCL1014-RL</td>
</tr>
<tr>
<td>120 mm (4.72 in.)</td>
<td>1.2 mm (0.047 in.)</td>
<td>144 mm² (0.222 in²)</td>
<td>CSS-CUCL1212-RL</td>
</tr>
<tr>
<td>120 mm (4.72 in.)</td>
<td>1.4 mm (0.055 in.)</td>
<td>168 mm² (0.260 in²)</td>
<td>CSS-CUCL1214-RL</td>
</tr>
<tr>
<td>150 mm (5.90 in.)</td>
<td>1.2 mm (0.047 in.)</td>
<td>180 mm² (0.277 in²)</td>
<td>CSS-CUCL1512-RL</td>
</tr>
</tbody>
</table>

* Minimum 10 roll order
1. Product is available by the lineal foot; additional charges may apply. Contact Simpson Strong-Tie Customer Service for information.
2. Packaged in 100 m (328 ft.) rolls.
**USAGE**

**Design**
The dimensions and detailing of CSS-CUCL 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. Existing concave and convex surfaces must be filled/transitional using CSS-EP epoxy paste or a suitable repair mortar such that the flatness varies less than 5 mm (1/4 in.) over 2 m (6.5 ft.) length.

**Application**
CSS installation shall only be performed by contractors and personnel who have been properly trained by Simpson Strong-Tie. Where minor surface defects are present, apply CSS-EP epoxy paste in lifts no thicker than 25 mm (1 in.).

**Surface Mounted Applications**
Apply the pasted laminate before the filler paste has cured. Cut CSS-CUCL to appropriate lengths using a metal cutting wheel and clean with solvent to remove all contaminants. Apply CSS-EP epoxy paste to the laminate using a paste profiler or trowel to form a curved cross-sectional profile with paste thickness of approximately 3 mm (1/8 in.) at the middle and 1 mm (1/32 in.) at the edges. Install the laminates with the paste side against the substrate and remove entrapped air using hand pressure, rollers or towels until paste emission becomes present. Allow epoxy paste to fully cure and lightly sand epoxy and laminate before applying finish coating. Take care to avoid damaging laminate fiber during sanding.

**Near Surface Mounted (NMS) Applications**
Saw-cut a slot into the substrate per approved shop drawings. When using CSS-EP, fill entire slot with the epoxy paste, ensuring that the slot is full of paste with no air bubbles present. Place the CSS-CUCL oriented vertically into the slot and remove the excess paste. When using the CSS-ES, fill approximately 3/4 of slot with the epoxy saturant. Place the CSS-CUCL oriented vertically into the slot and add additional saturant to fill the slot, if necessary.

- **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 a 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 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 patient 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**

**ENVIRONMENTAL PRECAUTIONS**

**Spill/Release and Clean-up 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 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 job site 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.