CSS-ES

Epoxy Primer & Saturant

DESCRIPTION

CSS-ES is a two-component, high-strength, high-modulus epoxy resin system used to prime substrates and saturate the Simpson Strong-Tie® Composite Strengthening Systems (CSS) fabrics. When extended with fumed silica, thickened CSS-ES is used as a high-performance substrate repair material and CSS finish coating. 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.

CODES

ICC-ES ESR-3403

MATERIAL PROPERTIES

Part A & B Properties

Viscosity at 72°F (22°C)	**Part A:** 10,400 cps **Part B:** 80 cps **Mixed:** 900 cps
Color	**Part A:** Clear **Part B:** Amber **Mixed:** Clear to Pale Amber
Density	**Part A:** 9.76 lbs/US gal. (1.17 kg/L) **Part B:** 8.09 lbs/US gal. (0.97 kg/L) **Mixed:** 9.20 lbs/US gal. (1.10 kg/L)

Cured Epoxy Properties

Property	ASTM	Cure Schedule	Test Value
Tensile Strength	D638	7 days at 72°F (22°C) +3 days at 140°F (60°C)	5,230 psi (36 MPa) 10,400 psi (72 MPa)
Tensile Modulus	D638	7 days at 72°F (22°C) +3 days at 140°F (60°C)	322,000 psi (2,220 MPa) 306,000 psi (2,110 MPa)
Elongation at Break	D638	7 days at 72°F (22°C) +3 days at 140°F (60°C)	1.73% 5.89%
Flexural Strength	D790	7 days at 72°F (22°C) +3 days at 140°F (60°C)	9,150 psi (63 MPa) 18,300 psi (126 MPa)
Flexural Modulus	D790	7 days at 72°F (22°C) +3 days at 140°F (60°C)	531,000 psi (3,660 MPa) 439,000 psi (3,030 MPa)
Compressive Strength	D695	7 days at 72°F (22°C) +3 days at 140°F (60°C)	15,800 psi (109 MPa) 14,400 psi (99 MPa)
Compressive Modulus	D695	7 days at 72°F (22°C) +3 days at 140°F (60°C)	434,000 psi (2,990 MPa) 390,000 psi (2,690 MPa)
T_g	D3418	7 days at 72°F (22°C) +3 days at 140°F (60°C)	144°F (62°C) 187°F (86°C)
Density	D792	7 days at 72°F (22°C) +3 days at 140°F (60°C)	9.55 lbs/US gal. (1.15 kg/L) 9.55 lbs/US gal. (1.15 kg/L)

MADE IN USA with GLOBAL MATERIALS

Certified to NSF/ANSI 61

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

PERFORMANCE FEATURES

- Long working time
- High elongation
- Ambient cure
- Minimal odor
- Component of Class A flame spread/smoke developed indices test
- High versatility
- VOC 3 g/L (mixed)
- NSF listed (info.nsf.org/certified/pwscomponents)
- 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
- 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

Kit Size	Model No.
3 US gallon (11.4 L)	CSS-ES-3KT
150 US gallon (567.8 L)	CSS-ES-150KT

MIXING RATIO

2A:1B by volume

SHELF LIFE

2 years in unopened container

STORAGE

Store material in a dry area between 45°F (7°C) and 95°F (35°C) with no exposure to moisture.

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 surface 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.

Mixing
Add for standard 3 US gal. kits, the premeasured contents of the Part B container to the premeasured contents of the Part A container. For 150 US gal. kits, combine two parts A to one part B (by volume) in a clean mixing container. Mix with a mixing drill and paddle until uniformly blended (approximately 5 minutes at 500 rpm). When thickened CSS-ES is required, add CAB-O-SIL® TS-720 Fumed Silica by Cabot Corporation before mixing at a maximum ratio of 2 parts fumed silica to 1 part epoxy, by volume.

Application
Apply epoxy to substrate surfaces using a nap roller. Saturate fabrics using manual or mechanical rollers, ensuring full fiber saturation is achieved. Use trowels to apply thickened epoxy. This product may also be used for near surface mounted (NSM) laminate applications.

Pot Life: 1 hour at 70°F (21°C).
Cure Time: 72 hours at 70°F (21°C).

Coverage Rates:

Priming*

Concrete:	200 SF/US gal. (4.9 m^2/L)
CMU:	100 SF/US gal. (2.5 m^2/L)
Brick:	150 SF/US gal. (3.7 m^2/L)

**Highly dependent on the substrate condition/profile. These are typical values.*

Saturating**

6–12 oz/yd.² (204–407 g/ m²) fabrics:
~75 SF/US gal. (~1.8 m^2/L)

18–27 oz./yd.² (611–915 g/ m²) fabrics:
~50 SF/US gal. (~1.2 m^2/L)

CSS-CUCF44 fabric:
~25 SF/US gal. (~0.6 m^2/L)

***Highly dependent on waste. These are typical values.*

Limitations
- Only install when the ambient and substrate temperatures are between 45°F (7°C) and 95°F (35°C)
- Do not thin epoxy
- Where moisture vapor transmission is expected, note that CSS-ES will create a vapor barrier
- Do not apply thickened CSS-ES in lifts greater than 1 in. (25 mm)

CAUTION
Component "A": May cause eye and/or skin irritation. Prolonged or repeated exposure may cause skin sensitization.
Component "B": CORROSIVE! Severe irritation to eyes and skin. Prolonged or repeated exposure may cause skin sensitization. Components of this product may affect the central nervous system.
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** for detailed information.

FIRST AID
Eye Contact: Immediately flush eyes with plenty of cool water for at least 15 minutes while holding the eyes open. If redness, burning, blurred vision, or swelling persists, seek medical advice.
Skin Contact: In case of contact, remove product and immediately wash affected area with plenty of soap and water for at least 5 minutes. Do not apply greases or ointments. Remove contaminated clothing. Clean contaminated clothing with soap and water before re-use. If redness, burning or swelling persists, seek medical advice.
Ingestion: DO NOT INDUCE VOMITING. Never administer anything by mouth to an unconscious person. Rinse out mouth with water, then drink sips of water to remove taste from mouth. Seek medical advice. Do not leave victim unattended. If vomiting occurs spontaneously, lay victim on side and keep head lower than waist to prevent aspiration.
Inhalation: If respiratory irritation or distress occurs, remove victim to fresh air. If breathing is difficult, give oxygen. If breathing stops, apply artificial respiration. Seek medical advice.

CLEAN-UP
Environmental Precautions
Construct a dike to prevent spreading. Keep out of sewers, storm drains, surface waters and soils.
Small Spills: Soak up with an absorbent material, such as clay, sand or other suitable non-reactive material. Place in leak-proof containers. Seal tightly for proper disposal.
Large Spills: Approach suspected leaks with caution. Construct a dike or trench to contain material. Soak up with an absorbent material, such as clay, sand or other suitable non-reactive material. Place in leak-proof containers. Seal tightly for proper disposal.

Disposal
Dispose of container and unused portions in accordance with local, state and federal regulations. Emptied container may contain product residue and should not be reused.

LIMITED WARRANTY
This product is covered by the Simpson Strong-Tie RPS Product One-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.