

CSS V-Wrap™ CFRR

Carbon Fiber Rod — Rough



DESCRIPTION

CSS V-Wrap CFRR is an epoxy-based, high-strength, noncorrosive carbon fiber reinforced polymer (CFRP) prefabricated surface-roughened bar used for near-surface-mounted (NSM) structural reinforcement applications.

MATERIAL PROPERTIES

Typical Data

Primary Fiber Direction	0° (unidirectional)
Fiber Type	Carbon
Matrix Type	Epoxy Vinylester Resin
Fiber Volume Fraction	70%
Tensile Strength	330,000 psi (2,275 MPa)
Modulus of Elasticity	19,000 ksi (131,000 MPa)
Elongation at Break	1.7%

PERFORMANCE FEATURES

- Noncorrosive reinforcement system
- High strength
- Lightweight
- Easy to handle
- Shear, flexural, and tensile strengthening
- Low aesthetic impact
- Compatible with many finish coatings
- Short downtime for building

APPLICATIONS

NSM Structural Strengthening

- For strengthening of beams, columns and slabs
- Gravity, wind, and seismic strengthening applications
- When member surface is exposed to vehicular, snowplow or pedestrian traffic
- When use of externally bonded fabric and laminates is not feasible due to poor concrete surfaces that require extensive preparation
- When member surface is exposed to mechanical impact
- Where final aesthetics of FRP sheets is not acceptable
- For anchoring the end of FRP sheets

Masonry Strengthening

- For increasing in-plane or out-of-plane flexural capacity
- For increasing wall in-plane shear capacity

PACKAGING

Rod Size:	#3	#4
Rod Diameter:	0.375 in. (9.5 mm)	0.5 in. (12.7 mm)
Design Area:	0.11 in. ² (71 mm ²)	0.19 in. ² (127 mm ²)
Rod Length:	20 ft. (6.1 m) 40 ft. (12.2 m)	20 ft. (6.1 m) 40 ft. (12.2 m)
Model No.	CV-CFRR#3/20FT CV-CFRR#3/40FT	CV-CFRR#4/20FT CV-CFRR#4/40FT

HOW TO USE

Design

Design should comply with ACI 440.2R and is typically based on CFRP contribution determined by detailed analysis. The design should be based on force equilibrium and strain compatibility principles. Design parameters will vary based on project requirements and applicable environmental, groove surface condition and strength reduction factors.

Application

The integrity of the surface concrete should be checked prior to installing the rod. Corrosion of internal steel reinforcement should be adequately addressed prior to installing the strengthening system. Make grooves onto the surface of the slab. Minimum groove width and depth is 1.5 times the rod diameter. The inside faces of the groove should be cleaned using mechanical brushing (wire wheel) or high-pressure water washing (3,000 psi). All grooves shall be cleaned of dust or loose particles using clean, pressurized air. The rod must be dry and free of moisture. All dust, laitance, grease, curing compounds, waxes, deteriorated materials and other bond-inhibiting materials must be removed from the surface prior to application. After cleaning, prime groove sides using CSS V-Wrap 770 epoxy. Fill the slot with either CSS V-Wrap 770-thickened epoxy or CSS V-Wrap PF epoxy, then make V-shaped groove in putty using the corner of trowel or putty knife. Insert the CSS V-Wrap CFRR into the slot. Clean off any excess adhesive that flows out of the slot. Ensure rod is completely covered with putty once finished. Allow adhesive to cure. See CSS V-Wrap 770 epoxy and CSS V-Wrap PF epoxy technical data sheets for curing times.

Cutting

Rods can be cut to appropriate length using a reciprocal saw with a fine-tooth blade, grinder or wall chaser tool. Proper personal protective equipment should be used when performing any cutting.

Adhesives and Coatings

Construction materials will vary based on project requirements and applicable environmental and surface condition. Contact Simpson Strong-Tie at (800) 999-5099 to determine applicable adhesive resin and coatings for a specific use.

Limitations

- Design calculations must be made and certified by a licensed professional engineer.
- Concrete deterioration and steel corrosion must be resolved prior to application.
- Only apply CSS V-Wrap CFRR when the ambient temperature is within the specified temperature range of the chosen epoxy. See CSS V-Wrap 770 epoxy and CSS V-Wrap PF epoxy technical data sheets for additional information.

Storage

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

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 of all product being applied.

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.

CLEANUP

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 fiber 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 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.