GUIDE SPECIFICATION

EPOXY SET CARBON FIBER STITCHING SYSTEM

(Specification writer shall choose the most appropriate section that applies to a given scope of work, including but not limited to, the following listed sections)

SECTION 03 25 19

PART 1 – GENERAL

1.1 SUMMARY

A. Provide all labor, materials, equipment and supervision as necessary to install an epoxy set carbon fiber stitching system (referred to in this section as "Stitchdog™") over new and/or existing horizontal or vertical cracked concrete surfaces, as shown on the project drawings and as outlined in this specification.

B. Following all applicable manufacturer's guidelines and application instructions for each product used in the system shall be considered a requirement of this specification.

C. Related Sections: **(Specification writer shall add, delete or amend, as deemed necessary)**
1. Section 03 3000 – Cast-in-Place Concrete
2. Section 03 4000 – Precast Concrete
3. Section 03 4800 – Precast Concrete Specialties
4. Section 03 5000 – Cementious Deck and Underlayment

1.2 REFERENCES (Specification writer shall add, delete or amend, as deemed necessary)

A. ASTM C695-15: Standard Test Method for Compressive Strength of Carbon and Graphite

B. ASTM C882/C882: Method of Test for Bond Strength of Epoxy-Resin Systems used with Concrete by Slant Shear

C. ASTM D3039: Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials

D. ASTM D2393-86: Standard Test Method for Viscosity of Epoxy Resins and Related Components

E. ASTM D790-17: Standard Test Method for Flexural Properties of Unreinforced Plastics and Electrical Insulating Materials

F. ASTM D648-18: Standard Test method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position

G. ASTM D2566: Standard Method of Test for Linear Shrinkage of Cured Thermosetting Casting Resins During Cure

H. ASTM D570-98: Standard Test Method for Water Absorption of Plastics

I. ACI GUIDELINE 440.2R-17: Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Concrete Structures.

1.3 SUBMITTALS (Specification writer shall add, delete or amend, as deemed necessary)

A. General: Submit (4) numbered of copies each of the following items in accordance with the requirements of the Conditions of Contract and in Division 1 Specification Sections.

B. Product Data: Submit manufacturer's technical data sheets, any applicable installation guidelines or recommendations, and material safety data sheets for each product included in this specification.

C. Material certificates signed by the manufacturer certifying that the Stitchdog™ system complies with all requirements of the material specified herein.

D. Warranty: Submit a sample of the manufacturer's standard material warranty.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: The manufacturer of the products specified in this section shall have a minimum 5 years of experience in the production of these types of products.

B. Contractor Qualifications: The contractor installing the products specified in this section shall have a minimum 3 years of experience and have successfully completed no less than 3 projects similar in scope and complexity and is acceptable to and has received formal training by the manufacturer.

C. Substitutions: No substitutions

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels containing brand name, batch or lot numbers, and directions for storage and mixing with other components.

B. Store materials to comply with manufacturer's directions to prevent from damage and/or deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

1.6 PROJECT CONDITIONS

A. Environmental Conditions: Comply with all the manufacturer's directions for maintenance of ambient and substrate temperature, moisture, humidity, ventilation, and other conditions required to execute and protect completed work. In hot and cold weather conditions or when high evaporation rates or adverse conditions may be expected, the contractor will be responsible for the quality of the completed installation. Follow all recommendations and guidelines of the American Concrete Institute.

B. Lighting (Indoor applications): Adequate lighting will be in place and working before installing the Stitchdog™ System.

C. Protection: Protect newly installed Stitchdog™ from rain or other potentially harmful climatic conditions for a minimum of 24 hours, from any potential damages due foot or vehicular traffic, and/or from the work of other trades.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Approved Manufacturer: Stitchdog™™ Division of Professional Construction Products, LLC. 61 East 4800 South, Murray, UT 84107. (801) 707.1189, www.Stitchdogs.com www.professionalconstructionproducts.com

2.2 MATERIALS

A. **Stitchdog™ Carbon Fiber Stitch**: Pre-impregnated, bi-directional, carbon fiber grid strap

B. **4020 Epoxy**: Two component, toughened, high temperature use structural adhesive designed for the bonding of fiberglass or carbon fiber to itself and many dissimilar materials.

2.3 PROPERTIES

A. Physical Properties: Stitchdog™ Carbon Fiber Grid Stitch

Base Material:	Carbon filament tows woven into a grid
Shelf life:	Unlimited
Carbon Filament Tensile Strength, ksi (MPa)	700 (4,826)
Carbon Filament Tensile Modulus, ksi (MPa)	36,000 (248,000)
Stitchdog™™ Nominal Size, in (mm)	12 x 1.0 x 0.090 (305 x 25 x 2.3)

B. Physical Properties: Stitchdog™ 4020 Hi-Temp Toughened Structural Adhesive

Stitchdog™ Material	4020 Resin	w/4020 Hardener
Density at 25°	1.1 – 1.2 g/cm3 (9.7 – 9.8 lbs)	1.1 – 1.2 g/cm3 (8.65 – 8.75 lbs)
Viscosity	Thixotropic Gel	Thixotropic Gel
Color	Yellow	Blue
Color Mixed	-	Green
Mix Ratio by Weight	100	35
Working Life, 1000 grams at 77°	-	55- 60 minutes
Initial Cure Time	-	6 – 8 hours
Shore D Hardness	-	87
Heat Deflection Temperature	-	105° C (220° F)
Tensile Lap-Shear (DIN EN 1465)	-	10.5 MPa
Peeling Resistance (DIN 53282)	-	2.3 N/mm (minimum)

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine all concrete or other substrates and conditions where the Stitchdog™ is to be installed. Notify the Specifying Authority of any unsatisfactory conditions that may be detrimental to the proper and timely completion of the work.

B. Do not proceed with the work until all such deficiencies have been corrected by the Contractor in an acceptable manner, and as approved by the Specifying Authority.

3.2 PREPARATION

A. Protect all surrounding areas and surfaces from the execution of each item of work including, but not limited to, surface preparation and all application steps of the Stitchdog™ System.

B. Perform crack repairs as necessary to apply Stitchdog™ system as per manufacturers recommendations.

C. Crack Treatment: Route all cracks to be treated with v-blade concrete “crack chaser”. Saw cut across crack at 10” – 12” intervals in a toe-heal pattern at 1-1/8” depth.

D. Dust removal: vacuum all chased cracks and saw cuts to remove all concrete dust and debris utilizing an OSHA & EPA compliant HEPA vac.

3.3 APPLICATION

A. General: Follow all manufacturers’ directions, as published in their product technical data sheets, available installation guidelines and detail drawings regarding the application of the Stitchdog™ System, as specified herein.

B. Epoxy primer: Prime substrate by applying a generous bead of resin to the chased crack and all cuts to receive Stitchdog™ Carbon Fiber.

C. Stitchdog™ Carbon Fiber Stitch Placement: Insert Stitchdog™ Carbon Fiber Stitch into each crack assuring that the Stitchdog™ is below the top of slab elevation. For vertical applications, apply resin to both sides of Stitchdog™ Carbon Fiber Stitch before inserting into the saw cut.

D. Finish resin neat coat: Apply additional resin as needed to crack and saw cuts to assure that all voids have been filled. For any areas of the repair where the resin is sinking, topically apply portland cement or fine silica sand to prevent sinking.

E. Final grind: After the resin has reached full cure as per manufactures recommendations, diamond grind all excess resin to create a CSP (Concrete Surface Profile) that is applicable to the specified finished product.

3.4 CLEANING

A. Clean work area and remove/discard all debris resulting from the application of the Stitchdog™ system to the acceptance of the specifying authority and/or the owner.

3.5 PROTECTION

A. Protect all completed work of the application during the specified cure time of the material from vehicular or pedestrian traffic, or any exposure to solid or liquid spillage or any other form of contamination.

END OF SECTION