IN-LB Inch-Pound Units

An ACI Standard

Strengthening of Concrete Structures with Externally Bonded Fiber-Reinforced Polymer (FRP) Materials Using the Wet Layup Method—Specification

Reported by ACI Committee 440

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American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331
Phone: +1.248.848.3700
Fax: +1.248.848.3701

www.concrete.org

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William J. Gold, Chair

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Mohsen Shahawy
Yasuhisa Sonobe
Minoru Sugita
Luc R. Taerwe
Taketo Uomoto
Paul Zia

*Task Group Chair.

This Specification covers requirements for strengthening concrete structures using externally bonded fiber-reinforced polymer (FRP) materials using the wet layup method. This Specification includes requirements for surface preparation of the substrate, including applying primers and putties, saturating the dry fabric, installing the fabric on the substrate, identifying and repairing defects, and field testing for quality control of the installation and materials.

Keywords: bond-critical application; contact-critical application; fiber-reinforced polymer (FRP) system; laminate; strengthening; wet layup.

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PART 1—GENERAL

1.1—Scope

1.1.1 This Specification covers requirements for strengthening concrete structures using externally bonded fiber-reinforced polymer (FRP) materials using the wet layup method.

1.1.2 This Specification is incorporated by Contract Documents and provides requirements for the Contractor.

1.1.3 This Specification governs for construction within its scope, except project-specific Contract Documents govern if there is a conflict.

1.1.4 This Specification governs if there is a conflict with referenced material or testing standards.

1.1.5 Contractor is permitted to submit written alternatives to any provision in this Specification for consideration.

1.1.6 Ignore provisions of this Specification that are not applicable to the Work.

1.1.7 Values in this Specification are stated in inch-pound units. A companion Specification in SI units is available.

1.1.8 The Notes to Specifier are not part of this Specification.

1.2—Interpretation

1.2.1 Unless otherwise explicitly stated, this Specification shall be interpreted using the following principles:

1.2.1.1 Interpret this Specification consistent with the plain meaning of the words and terms used.

1.2.1.2 Definitions provided in this Specification govern over the definitions of the same or similar words or terms found elsewhere.

1.2.1.3 Whenever possible, interpret this Specification so that its provisions are in harmony and do not conflict.

1.2.1.4 Headings are part of this Specification and are intended to identify the scope of the provisions or sections that follow. If there is a difference in meaning or implication between the text of a provision and a heading, the meaning of the text governs.

1.2.1.5 Footnotes are part of this Specification. The meaning of the provision text governs in the event of a difference in meaning or implication between the provision text and a footnote to that provision.

1.2.1.6 Where a provision of this Specification involves two or more items, conditions, requirements, or events connected by the conjunctions "and" or "or," interpret the conjunctions as follows:

"and" indicates that all the connected items, conditions, requirements or events apply

"or" indicates that the connected items, conditions, requirements, or events apply singularly

1.2.1.7 The use of the verbs "may" or "will" indicates that the Specification provision is for information to the Contractor.

1.2.1.8 The phrase "as indicated in Contract Documents" means the specifier included the provision requirements in Contract Documents.

1.2.1.9 The phrase "unless otherwise specified" means the specifier may have included an alternative to the default requirement in Contract Documents.

1.2.1.10 Unless otherwise stated, the inch-pound system of units is applicable to combined standards referenced in this Specification.

1.3—Definitions

The following definitions shall govern in this Specification.

accepted—determined by Architect/Engineer to be in compliance with Contract Documents.

Architect/Engineer—the architect, engineer, architectural firm, or engineering firm developing Contract Documents, or administering the Work under Contract Documents, or both.

bond-critical application—strengthening or repair application that relies on load transfer from the substrate to the fiber-reinforced polymer (FRP) system through bond of the FRP system to the substrate.

contact-critical application—strengthening or repair application that relies on load transfer from the substrate to the FRP system through contact or bearing at the interface.

Contract Documents—set of documents that form the basis of a contractual relationship between Owner and Contractor or design-builder. These documents are defined by the contractual agreement, and can contain contract forms, contract conditions, specifications, drawings, addenda, and contract changes.

Contractor—the person, firm, or entity under contract for construction of the Work.

drawings—graphic presentations that detail requirements for Work and may include written notes.

fiber orientation—the direction of the principal fibers in a fabric reinforcement.

FRP manufacturer—company that makes components of FRP system.

FRP system—the fibers and resins used to create the composite laminate and resins used to bond it to the concrete substrate.

inspection agency—the person, firm, or entity under contract for providing inspection services.

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