ACI 503.2-92(03)
ACI 503.3-10
ACI 503.4-92(03)

Standard Specification for Bonding Plastic Concrete to Hardened Concrete with a Multi-Component Epoxy Adhesive (ACI 503.2-92)

Specification for Producing a Skid-Resistant Surface on Concrete by the Use of Epoxy and Aggregate (ACI 503.3-10)

Standard Specification for Repairing Concrete with Epoxy Mortars (ACI 503.4-92)

An ACI Standard

Reported by ACI Committee 503



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February 2014 printing

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Epoxy Resins

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ISBN: 978-0-87031-875-7

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Full document details: ACI 503.2-92 (2003) + ACI 503.3-10 + ACI 503.4-92 (2003) 2014

ACI 503.2-92
(Reapproved 2003)

Standard Specification for Bonding Plastic Concrete to Hardened Concrete with a Multi-Component Epoxy Adhesive*

Reported by ACI Committee 503

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This specification describes the work of bonding plastic concrete to hardened concrete with a multi-component epoxy adhesive such as defined for this purpose in ASTM C 881. It includes controls for adhesive labeling, storage, handling, mixing and application, surface evaluation and preparation, as well as well as inspection and quality control.

Keywords: adhesives; bond (concrete-to-concrete); bonding; concrete construction; epoxy resins; fresh concretes; hardened concrete; quality control; repairs; specifications; standards.

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Reference to this document shall not be made in contract documents. If items found in this document are desired by the Architect/Engineer to be a part of the contract documents, they shall be restated in mandatory language for incorporation by the Architect/Engineer.

FOREWORD

This foreword is included for explanatory purposes only; it does not form part of Standard Specification ACI 503.2.

This specification is a reference standard which the Architect/Engineer may cite in the project specification(s) for any building project, together with supplementary requirements for the specific project.

This specification is written in the section and three-part format of the Construction Specifications Institute, but with the numbering system modified to ACI requirements. The language is generally imperative and terse.

A specification guide is included as a preface to, but not forming part of, Standard Specification ACI 503.2. The purpose of this guide is to assist the Architect/Engineers' designer(s) and specifier(s) to properly choose and specify the necessary supplemental requirements for the project specifications.

*Adopted as a standard of the American Concrete Institute effective June 1979, in accordance with the Institute's standardization procedure. It was revised according to the expedited procedure effective October 1986 and March 1992.

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SPECIFICATION GUIDE

SG1—Standard Specification ACI 503.2 is intended to be used essentially in its entirety, by citation in the project specification, to cover all usual requirements for bonding plastic concrete to hardened concrete with a multi-component epoxy adhesive. Individual sections, parts, and articles should not be copied into project specifications since taking them out of context may change their meanings.

SG2—However, adjustments to the needs of a particular project shall be made by the Architect/Engineer's designers and specifiers by reviewing each of the items indicated in this specification guide and checklist and then including their decisions on each as mandatory requirements in the project specification.

SG3—These mandatory requirements shall designate specific qualities, procedures, materials, and performance criteria for which alternatives are permitted or for which provision is not made in Standard Specification ACI 503.2. Or exceptions shall be taken to Standard Specification ACI 503.2 if required.

SG4—A statement such as the following will serve to make Standard Specification ACI 503.2 an official part of the contract requirements:

> The use of an epoxy adhesive for bonding plastic concrete to hardened concrete shall conform to all requirements of "Standard Specification For Bonding Plastic Concrete To Hardened Concrete with a Multi-Component Epoxy Adhesive (ACI 503.2)," published by the American Concrete Institute, Detroit, Mich., except as modified by the requirements of this project specification.

SG5—The specification checklist that follows is addressed to each item of ACI 503.2 that requires the designer/specifier to make a choice where alternates are indicated, or to add provisions where they are not indicated in ACI 503.2, or to take exceptions to ACI 503.2. The checklist consists of section, part, and article heads of ACI 503.2, with accompanying notes to the designer/specifier to indicate the action required of them.

SPECIFICATION CHECKLIST

Section/Part/Article of ACI 503.2	Notes to the Designer/Specifier
Section 1—General requirements	
1.1 Scope	Indicate specific scope.
1.4 Reference standards	Review applicability of cited references and take exceptions if required.
Section 2—Materials and application	

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SPECIFICATION CHECKLIST (cont.)

Section/Part/Article of ACI 503.2	Notes to the Designer/Specifier
Part 2.1—General	
2.1.2 Submittals	To whom sent?
2.1.3.2 Application control	Mixing and application procedures submitted must be in accordance with product manufacturer's instructions.
2.1.5 Project conditions	Specify any which would specifically affect this work.
2.1.5.1 Environmental requirements	Performance of epoxy systems may be affected by temperature, humidity, and surface water. Strict adherence to the manufacturer's recommendations should be maintained. Where other unusual conditions are encountered, the material manufacturer should be consulted before application.
Part 2.2—Products	
2.2.1 Epoxy adhesive	Specify Class and Grade as indicated. Also specify additional performance requirements and/or approved suppliers, as advisable.
2.2.2 Plastic concrete	Specify concrete requirements.
Part 2.3—Execution	
2.3.1 Preparation of surfaces	Specify limitations, if any, on use of mechanical abrasion and on disposal of waste products.
2.3.2 Inspection of concrete surfaces	Specify if architect/engineer will also inspect, and if hold points are required.
2.3.2.2 Minimum pullout strength	The test method specifies the bonding of a steel pipe cap to the concrete surface with an epoxy adhesive. If the test results not in failure of the concrete but in cohesion of the epoxy resin adhesive or any failure in adhesion, the test shall be repeated. Repeated failures in adhesion, or cohesion in the adhesive, indicate improper cleaning of the concrete, incorrect adhesive, or faulty adhesive application techniques.
2.3.2.4 Surface moisture content	Some epoxy adhesives may be capable of wetting the concrete surface at temperatures below 40 F. The specification should allow such use only if test data is available which conclusively demonstrates adequate bond at the actual concrete temperature expected.
2.3.4.1 Ambient temperature control	Review applicability of referenced standards and take exceptions if required. Also specify any unusual ambient conditions.
2.3.4.2 Coverage rate	The rate at which the epoxy should be applied is generally a function of the surface texture and viscosity of the epoxy system. Therefore, the rate at which the epoxy should be applied should be in accordance with the manufacturer's recommendations.

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SPECIFICATION CHECKLIST (cont.)

Section/Part/Article of ACI 503.2	Notes to the Designer/Specifier
2.3.4.3 Consolidation of concrete	Review applicability of referenced standard and take exceptions if required.
2.3.4.4 Curing	Specify procedure to be used. Also specify additional performance requirements and/or approved suppliers, as advisable.
2.3.7 Field quality performance requirements	Are specified test methods (sounding and coring) suitable? Are additional requirements necessary? Specify test methods that will be used, and size of cores.

SECTION 1—GENERAL REQUIREMENTS

1.1—Scope

1.1.1 This standard specification covers the bonding of plastic concrete to hardened concrete with a multi-component epoxy adhesive.

1.1.2 The provisions of this standard specification shall govern unless otherwise specified in the contract documents. In case of conflicting requirements, the contract documents shall govern.

1.2—Notation

1.2.1 ACI: American Concrete Institute
P.O. Box 9094
Farmington Hills, Mich. 48333-9094

1.2.2 ASTM: ASTM
100 Barr Harbor Dr.
West Conshohocken, Pa. 19428-2959

1.3—Specification wording

1.3.1 The language of this standard specification is generally imperative and terse, and may include incomplete sentences. Omissions of phrases and words such as "the contractor shall," "in accordance with," "shall be," "as indicated," "a," "an," "the," "all," etc., are intentional. Omitted phrases and words shall be supplied by inference.

1.4—Reference standards

1.4.1 The standards referred to in this Standard Specification ACI 503.2 are listed in Articles 1.4.2 and 1.4.3 of this section, with their complete designation and title including the year of adoption or revision and are declared to be a part of this Standard Specification ACI 503.2 the same as if fully set forth herein, unless otherwise indicated in the contract documents.

1.4.2 *ASTM standard*

C 881-87 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete

1.4.3 *ACI standard*

301-89 Specifications for Structural Concrete for Buildings

SECTION 2—MATERIALS AND APPLICATION

Part 2.1—General

2.1.1 *Description*—This section covers the requirements for surface preparation of the hardened concrete and for materials and for application of the multi-component epoxy adhesive and the plastic concrete.

2.1.2 *Submittals*

2.1.2.1 Contractor shall submit manufacturer's certification verifying conformance to material specifications specified in Part 2.2.

2.1.3 *Quality assurance*

2.1.3.1 *Labeling*—Clearly mark all containers with the following information:

a) Name of manufacturer
b) Manufacturer's product identification
c) Manufacturer's instructions for mixing
d) Warning for handling and toxicity

2.1.3.2 *Application control*—Submit mixing and application procedures for approval prior to use.

2.1.4 *Product delivery, storage, and handling*

2.1.4.1 *Delivery of materials*—Deliver all materials in sealed containers with labels legible and intact.

2.1.4.2 *Storage of materials*—Store all materials at temperatures between 40-100 F (5-38 C) unless otherwise recommended by manufacturer.

2.1.4.3 *Handling of materials*—Handle all materials in a safe manner and in a way to avoid breaking container seals.

2.1.5 *Project conditions*

2.1.5.1 *Environmental requirements*—Contractor shall comply with manufacturer's recommendations as to environmental conditions under which the epoxy compound may be applied.

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