

An ACI Standard

# Type ES (Epoxy Slurry) Polymer Overlay for Bridge and Parking Garage Decks—Specification

Reported by ACI Committee 548

ACI SPEC-548.9-21



American Concrete Institute  
*Always advancing*



## **Type ES (Epoxy Slurry) Polymer Overlay for Bridge and Parking Garage Decks—Specification**

Copyright by the American Concrete Institute, Farmington Hills, MI. All rights reserved. This material may not be reproduced or copied, in whole or part, in any printed, mechanical, electronic, film, or other distribution and storage media, without the written consent of ACI.

The technical committees responsible for ACI committee reports and standards strive to avoid ambiguities, omissions, and errors in these documents. In spite of these efforts, the users of ACI documents occasionally find information or requirements that may be subject to more than one interpretation or may be incomplete or incorrect. Users who have suggestions for the improvement of ACI documents are requested to contact ACI via the errata website at <http://concrete.org/Publications/DocumentErrata.aspx>. Proper use of this document includes periodically checking for errata for the most up-to-date revisions.

ACI committee documents are intended for the use of individuals who are competent to evaluate the significance and limitations of its content and recommendations and who will accept responsibility for the application of the material it contains. Individuals who use this publication in any way assume all risk and accept total responsibility for the application and use of this information.

All information in this publication is provided “as is” without warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose or non-infringement.

ACI and its members disclaim liability for damages of any kind, including any special, indirect, incidental, or consequential damages, including without limitation, lost revenues or lost profits, which may result from the use of this publication.

It is the responsibility of the user of this document to establish health and safety practices appropriate to the specific circumstances involved with its use. ACI does not make any representations with regard to health and safety issues and the use of this document. The user must determine the applicability of all regulatory limitations before applying the document and must comply with all applicable laws and regulations, including but not limited to, United States Occupational Safety and Health Administration (OSHA) health and safety standards.

Participation by governmental representatives in the work of the American Concrete Institute and in the development of Institute standards does not constitute governmental endorsement of ACI or the standards that it develops.

Order information: ACI documents are available in print, by download, through electronic subscription, or reprint, and may be obtained by contacting ACI.

ACI codes, specifications, and practices are made available in the ACI Collection of Concrete Codes, Specifications, and Practices. The online subscription to the ACI Collection is always updated, and includes current and historical versions of ACI's codes and specifications (in both inch-pound and SI units) plus new titles as they are published. The ACI Collection is also available as an eight-volume set of books and a USB drive.

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

## Type ES (Epoxy Slurry) Polymer Overlay for Bridge and Parking Garage Decks—Specification

An ACI Standard

Reported by ACI Committee 548

Mahmoud M. Reda Taha, Chair

Ashraf I. Ahmed  
Mohammad A. Alhassan  
Jacques A. Bertrand  
Constantin Bodea  
Chris Davis  
James T. Dikeou\*

Don Edwards  
David W. Fowler  
Quentin L. Hibben  
Albert O. Kaeding  
Jay Lee  
John R. Milliron

Myles A. Murray\*  
Bradley Nemunaitis  
Joseph A. Nuciforo Jr.  
John R. Robinson  
Michael L. Schmidt  
Joseph R. Solomon

Michael M. Sprinkel  
Michael S. Stenko  
Donald P. Tragianese  
Wafeek S. Wahby  
David White

\*Deceased.

### Consulting Members

Milton D. Anderson  
Lu Anqi  
Craig A. Ballinger  
John J. Bartholomew  
Shashi P. Bhatnagar  
Jerry D. Byrne  
Zhi-Yuan Chen

Lech Czarnecki  
Harold (Dan) R. Edwards  
Larry J. Farrell  
George Horeczko  
David P. Hu  
Bert Paul Krickemans  
Dion Kruger

William Lee  
Troy D. Madeley  
Henry N. Marsh Jr.  
Peter Mendis  
Peter J. Moss  
Yoshihiko Ohama  
Kelly M. Page

Hamid Saadatmanesh  
Donald A. Schmidt  
Meyer Steinberg  
Harold H. Weber Jr.

*This Specification covers epoxy slurry (ES) polymer overlay for bridge and parking garage decks. Type ES polymer overlay incorporates a low-modulus epoxy binder, fillers, and selected aggregate to produce a flexible, skid-resistant, and low-permeability overlay. The overlay may be used for both new construction and rehabilitation of existing structures. The overlay is placed by applying the mixed epoxy binder and filler to the surface and broadcasting aggregate. This Specification includes requirements for epoxy resin, fillers, aggregates, storage and handling, surface preparation, surface profile, mixing, placement, quality control, and quality assurance.*

**Keywords:** bridge decks; epoxy; low permeability; parking garage decks; polymer overlay; slurry; surface preparation.

### CONTENTS

#### PART 1—GENERAL, p. 2

- 1.1—Scope, p. 2
- 1.2—Interpretation, p. 2
- 1.3—Definitions, p. 2
- 1.4—Reference standards, p. 3
- 1.5—Submittals, p. 3
- 1.6—Project conditions, p. 3
- 1.7—Delivery, storage, and handling of materials, p. 3
- 1.8—Safety, p. 3
- 1.9—Quality assurance, p. 3

#### PART 2—PRODUCTS, p. 3

- 2.1—Epoxy binder, p. 3
- 2.2—Fillers, p. 4
- 2.3—Aggregate, p. 4

ACI SPEC-548.9-21 supersedes ACI 548.9-08 and was adopted and published in February 2022.

Copyright © 2022, American Concrete Institute.

All rights reserved including rights of reproduction and use in any form or by any means, including the making of copies by any photo process, or by electronic or mechanical device, printed, written, or oral, or recording for sound or visual reproduction or for use in any knowledge or retrieval system or device, unless permission in writing is obtained from the copyright proprietors.

## 2.4—Polymer overlay, p. 4

**PART 3—EXECUTION, p. 4**

- 3.1—Procedure qualification, p. 4
- 3.2—Surface preparation, p. 5
- 3.3—Mixing epoxy primer and slurry, p. 5
- 3.4—Overlay application, p. 5
- 3.5—Curing, p. 5
- 3.6—Excess aggregate removal, p. 5
- 3.7—Joints, p. 5
- 3.8—Open to traffic, p. 5

**NOTES TO SPECIFIER, p. 5**

- General notes, p. 5
- Foreword to checklists, p. 6

**PART 1—GENERAL****1.1—Scope**

**1.1.1** This Specification covers materials and procedures for constructing a low-permeability epoxy polymer slurry (Type ES) overlay at locations designated in Contract Documents pertaining to new construction and rehabilitation of bridge and parking garage decks. Type ES polymer overlay incorporates a low-modulus epoxy binder, fillers, and selected aggregate to produce a flexible, skid-resistant, and low-permeability overlay. This Specification includes requirements for epoxy resin components, fillers, aggregates, storage and handling, surface preparation, surface profile, mixing, placement, and quality control.

**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 and testing standards.

**1.1.5** The Contractor is permitted to submit written alternatives to any provisions in this Specification for consideration.

**1.1.6** Ignore provisions of the 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 also 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 provision 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 conjunction 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 the Contract Documents.

**1.2.1.9** The phrase “unless otherwise specified” means the specifier included an alternative to the default requirements in Contract Documents.

**1.2.1.10** The phrase “if specified” means the specifier may have included a requirement in Contract Documents for which there is no default requirements in this Specification.

**1.3—Definitions**

The following definitions shall govern in this Specification.

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

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

**broadcast**—to scatter over a wide area by hand or mechanical method.

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

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

**gel time**—time interval after mixing that a liquid material exhibits an increase in viscosity as determined by a specific test method.

**mechanical mixing**—mixing of epoxy resin components and fillers with drills and mixing paddles or mortar mixing equipment.

**submit**—provide to Architect/Engineer for review.

**submittal**—document and material provided to Architect/Engineer for review or acceptance.

**testing agency**—organization responsible for performing material testing; not responsible for acceptance of test values.

**Work**—the entire construction or separately identifiable parts required to be furnished under Contract Documents.