Specification for Shotcrete

An ACI Standard

Reported by ACI Committee 506
Specification for Shotcrete

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 www.concrete.org/committees/errata.asp. 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, on CD-ROM, through electronic subscription, or reprint and may be obtained by contacting ACI.

Most ACI standards and committee reports are gathered together in the annually revised ACI Manual of Concrete Practice (MCP).

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331
U.S.A.
Phone: 248-848-3700
Fax: 248-848-3701

www.concrete.org

This specification contains the construction requirements for the application of shotcrete. Both wet- and dry-mixture shotcrete are addressed, as well as fiber-reinforced shotcrete. The minimum standard for materials, properties, testing, and application are covered. The materials, processes, quality control measures, and inspections described in this specification should be tested, monitored, or performed as applicable only by individuals holding the appropriate ACI certifications or equivalent.

Keywords: dry-mixture shotcrete; fiber-reinforced shotcrete; nozzleman; qualification; quality control; quality assurance; shooting; wet-mixture shotcrete.
PART 1—GENERAL

1.1—Scope

1.1.1 Work specified—This Reference Specification covers the requirements for shotcrete as specified by the Architect/Engineer. Included are the requirements for materials; proportioning; and application of structural and nonstructural shotcrete, including structural and nonstructural fiber-reinforced shotcrete.

1.1.2 Units—Values in this specification are stated in SI units. A companion specification in inch-pound units is also available.

1.2—Definitions

accepted—determined to be satisfactory by Owner or Architect/Engineer.

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

Contract Documents—set of documents supplied by Owner to Contractor as the basis for construction; these documents contain contract forms, contract conditions, specifications, drawings, addenda, and contract changes.

Contractor—the person, firm, or corporation with whom the Owner enters into an agreement for construction of the Work.

fiber-reinforced shotcrete (FRS)—shotcrete containing discontinuous discrete fibers.

gun finish—undisturbed final layer of shotcrete as applied from a nozzle without further finishing.

overspray—waste shotcrete material deposited away from intended receiving surface.

Owner—the corporation, association, partnership, individual, public body, or authority with whom the Contractor enters into an agreement and for whom the Work is provided.

permitted—accepted by or acceptable to Architect/Engineer; usually pertains to a request by Contractor, or when specified in Contract Documents.

predampening—in the dry-mixture process, adding water to the aggregate before mixing to bring its moisture content to a specified amount, usually 3 to 6 percent.

quality assurance—actions taken by Owner or Owner’s representative to assure Work done and materials provided are in accordance with Contract Documents.

quality control—actions taken by the Contractor to assure that Work meets requirements of Contract Documents.


Reference Standards—standardized mandatory-language documents of a technical society, organization, or association, including building codes of local or state authorities, which are referenced by the Contract Documents.

required—stipulated in this specification or the Contract Documents.

rod finish—a sharp-edged cutting screed to be used to trim shotcrete forms or ground wires.

shotcrete—concrete or mortar conveyed through a hose and pneumatically projected at high velocity onto a surface to achieve compaction.

structural shotcrete—plain or reinforced shotcrete in a member that is part of a structural system required to transfer gravity and/or lateral loads along a path to the ground.

submit—provide to Architect/Engineer for review.

submittal—documents or materials provided to Architect/Engineer for review and/or acceptance.

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

1.3—Referenced standards

Standards of ASTM International cited in this Specification are listed by name and designation, including year.

ASTM International
A185/A185M-07—Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
A615/A615M-12—Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
A706/A706M-09b—Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
C33/C33M-13—Standard Specification for Ready-Mixed Concrete
C127-12—Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
C42/C42M-13—Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
C94/C94M-13a—Standard Specification for Ready-Mixed Concrete
C127-12—Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate