An ACI Standard

Specification for Unbonded Single-Strand Tendon Materials

Reported by Joint ACI-ASCE Committee 423

ACI 423.7-14

American Concrete Institute
Always advancing

American Concrete Institute
Always advancing

First Printing
November 2014
ISBN: 978-0-87031-961-7

Specification for Unbonded Single-Strand Tendon Materials

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, 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
Phone: +1.248.848.3700
Fax: +1.248.848.3701

www.concrete.org

ACI 423.7-14

Specification for Unbonded Single-Strand Tendon Materials

An ACI Standard

Reported by Joint ACI-ASCE Committee 423

Carin L. Roberts-Wollmann, Chair

Amy M. Reineke Tryges[illegible], Secretary

Theresa M. Ahlborn
Robert W. Barnes
Florian G. Barth
Asit N. Baxi
Roger J. Becker
Kenneth B. Bondy
Charles W. Dolan
James P. Donnelly
Pierre Esselinck
Martin J. Fradua
William L. Gamble
Harry A. Gleich
Shawn P. Gross
Pawan R. Gupta
William M. Hale
H. R. Trey Hamilton III
Carol Hayek
Mohammad Iqbal
Donald P. Kline
Larry B. Krauser
Jason J. Krohn
Mark E. Moore*
Theodore L. Neff†
Sami H. Rizkalla
James Rogers
Bruce W. Russell
David H. Sanders
Thomas C. Schaeffer
Morris Schupack*
Richard W. Stone
Miroslav F. Vejvoda
Jeffrey S. [illegible]
H. Carl Walk[illegible]
Zuming Xia
[illegible]aul Zia

Consulting Members
R[illegible]. Bruce Jr.
Ned H. Burns

Chunsheng 'Steve' Cai
Steven R. Close
Henry J. Cronin Jr.
Ward N. Marianos Jr.
Hani Melhem
Antoine E. Naaman
Thomas E. Nehil
Andrea J. Schokker

*Deceased
†Chair of subcommittee responsible for preparation of specification.

This material specification provides materials criteria and fabrication requirements for unbonded single-strand tendons.

Keywords: fabrication; post-tensioning; PT coating; tendon; unbonded

CONTENTS

ACI 423.7-14 supersedes ACI 423.7-07, became effective October 22, 2014, and was adopted and published November 2014.

1—SCOPE

1.1

This specification provides materials criteria and fabrication requirements for unbonded single-strand tendons.

1.2

This specification shall not apply to post-tensioned slab-on-ground, mat, or raft foundations on expansive soils.

NOTE 1—For membrane-type structures primarily under tensile forces resulting from temperature effects and concrete shrinkage, the provisions apply where deemed appropriate by Architect/Engineer.

1.3

The text of this standard references notes and footnotes that provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.4

Values stated in inch-pound units are to be regarded as standard. Values given in parentheses are mathematical conversions to SI Units that are provided for information only and are not considered standard.

2—DEFINITIONS

2.1

The following definitions govern in this specification. See "ACI Concrete Terminology" for additional definitions. http://www.concrete.org/Tools/ConcreteTerminology.aspx

anchorage—a device used to maintain elongation in prestressing strand by transferring compression force to concrete.

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

Contract Documents—a 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.

coupler—a mechanical device that connects ends of two strands together, thereby creating a continuous tendon by transferring the post-tensioning force from one strand to the other strand.

encapsulated tendon—a tendon that is completely enclosed in a watertight covering from end to end, including anchorages, sheathing, post-tensioning coating, sleeves, and an encapsulation cap over the strand tails at each end.

encapsulation cap—plastic cap filled with post-tensioning coating that provides a watertight connection to all anchorages protecting the wedges and the tendon tail from moisture infiltration. The watertight connection shall include a mechanical interlock of a type that does not rely on friction alone to be held in place.

f_{pu}—specified tensile strength of prestressing steel, psi (MPa).

fixed anchorage—anchorage located at end of tendon where stressing of tendon is not required (also known as dead-end anchorage).

installation drawings—drawings showing information about the specifics of the post-tensioning system and tendon placement such as the number, size, length, marking, location, elongation, and tendon profiles (also referred to as shop drawings).

intermediate anchorage—anchorage located between the ends of the tendon for application of post-tensioning force.

local zone—rectangular prism (or equivalent rectangular prism for circular or oval anchorages) of concrete immediately surrounding the anchorage device and any confining reinforcement.

non-encapsulated tendon—a tendon that has bare metallic anchorages, and sheathing that is continuous between anchorages but not connected to the anchorages.

post-tensioning—method of prestressing in which prestressing steel is tensioned after concrete has hardened.

post-tensioning coating—material used to protect the prestressing steel against corrosion and reduce friction between prestressing steel and sheathing.

prestressed concrete—structural concrete in which internal stresses are introduced to reduce potential concrete tensile stresses resulting from loads.

prestressing steel—high-strength steel, most commonly a seven-wire strand, used to impart prestress forces to concrete.

sheathing—an extruded high-density polyethylene or polypropylene covering that encases prestressing steel to