

**Addenda to the *Specification for Unbonded Single Strand Tendons*, 2nd Edition
November 2003**

[Update your specification by changing the items identified.]

Specification

Commentary

C1.1 Scope

Make the following changes to the first paragraph:

The intent of this document is to provide detailed specifications for all common structural uses of unbonded post-tensioning tendons. ~~It is not intended to apply to tendons used in ground supported post-tensioned slabs for light commercial and residential construction.~~

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2.2.6 Anchorages and Couplers in Aggressive Environments

2.2.6.1 Anchorages

Delete the existing paragraph and replace it with the following:

Anchorage used in all aggressive environment applications other than ground supported post-tensioned slabs for residential and light commercial construction shall be protected against corrosion by encapsulation.

Anchorage used in ground supported post-tensioned slabs for residential and light commercial construction shall be protected against corrosion by encapsulation when there are elevated levels of chlorides in the soil, or in environments in which the concrete is exposed to direct or indirect applications of deicing chemicals, seawater, brackish water, or spray from these sources.

When anchorages are to be protected against corrosion by encapsulation, a watertight connection of the sheathing to the strand anchorage and a watertight enclosure of the wedge cavity and prestressing steel is required to provide corrosion protection of the anchor, wedge, and prestressing steel at the fixed-end, intermediate anchorage, and stressing-end. Anchorages shall be designed to attain watertight encapsulation of prestressing steel and all connections shall have demonstrated the ability to remain watertight when subject to hydrostatic pressure of 1.25 psi [0.0086 MPa] for a period of 24 hours.

Commentary

The commentary for this section remains unchanged.

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[Update your specification by changing the items identified.]

Specification

Commentary

2.3.2 Minimum Thickness and Diameter

2.3.2.1 Minimum Thickness

Delete the existing paragraph and replace it with the following:

Minimum thickness of sheathing used in all environments and all applications other than ground supported post-tensioned slabs for residential and light commercial construction shall be 0.050 in. [1.25 mm] for polyethylene or polypropylene with a minimum density of 0.034 lb/in³ [0.941 grams/cm³], or equivalent if other materials are used.

Minimum thickness of sheathing used in ground supported post-tensioned slabs for residential and light commercial construction shall be 0.040 in. [1.02 mm] for polyethylene or polypropylene with a minimum density of 0.034 lb/in³ [0.941 grams/cm³], or equivalent if other materials are used.

Add the following commentary to this section:

Tendons using 0.025 in. sheathing were utilized for many years in all types of construction projects. After reviewing the role that sheathing plays in providing corrosion protection, sheathing thickness was increased to 0.040 in. in the mid 1990's. When this Specification was republished in 2000, the sheathing thickness for tendons used in all applications except ground supported residential and light commercial construction was increased to 0.050 in. to provide an assumed increase in the level of durability and protection (even though the durability of 0.040 in. thick sheathing appeared satisfactory). Ground supported slabs used in residential and light commercial construction are typically not subjected to severe environments, and the probability of a tendon failure due to damaged sheathing is considered low. In addition, such a failure would not pose the same life/safety concerns as the failure of tendons used in elevated structures. For these reasons, a thickness of 0.040 in. is deemed acceptable for tendons used in ground supported residential and light commercial construction.

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Add the following wording to the beginning of each of the sections identified below:

3.2 Tendon Installation

3.2.1 General

This section applies to all applications other than ground supported post-tensioned slabs for residential and light commercial construction.

Installation of tendons used in ground supported post-tensioned slabs for residential and light commercial construction shall conform to PTT's *Construction and Maintenance Procedures Manual for Post-Tensioned Slab-On-Ground Construction*, latest edition.

3.4 Tendon Stressing

3.4.1 General

This section applies to all applications other than ground supported post-tensioned slabs for residential and light commercial construction.

Stressing of tendons used in ground supported post-tensioned slabs for residential and light commercial construction shall conform to PTT's *Construction and Maintenance Procedures Manual for Post-Tensioned Slab-On-Ground Construction*, latest edition.

3.5 Tendon Finishing

3.5.1 General

This section applies to all applications other than ground supported post-tensioned slabs for residential and light commercial construction.

Finishing of tendons used in ground supported post-tensioned slabs for residential and light commercial construction shall conform to PTT's *Construction and Maintenance Procedures Manual for Post-Tensioned Slab-On-Ground Construction*, latest edition.

Commentary

The commentary for these sections remains unchanged.

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Addendum #2 March 2007

[Update your specification by changing the items identified]

Specification

Commentary

2.3.2.1 Minimum Thickness

Minimum thickness of sheathing used in all environments and all applications other than ground supported post-tensioned slabs for residential and light commercial construction shall be 0.050 in. [1.25 mm] for polyethylene or polypropylene with a minimum density of 0.0341 lb/in³ [0.941 grams/cm³], or equivalent if other materials are used.

Minimum thickness of sheathing used in ground supported post-tensioned slabs for residential and light commercial construction shall be 0.040 in. [1.02 mm] for polyethylene or polypropylene with a minimum density of 0.034 lb/in³ [0.941 grams/cm³], or equivalent if other materials are used.

C2.3.2.1 Minimum Thickness

~~*Due to the manufacturing process slight variations in the wall thickness may occur locally around the sheath perimeter. Due to the manufacturing process, slight variations in sheathing thickness may occur around the perimeter. Local reduction in sheathing thickness of up to 10% are acceptable provided an average of 4 equidistant readings along the circumference equals or exceeds the required thickness.*~~

Equivalency can be determined by testing, subject to the approval of the Engineer; which demonstrates that all requirements of Section 2.3 are satisfied by the alternate material.

Tendons using 0.025 in. sheathing were utilized for many years in all types of construction projects. After reviewing the role that sheathing plays in providing corrosion protection, sheathing thickness was increased to 0.040 in. in the mid 1990's. When this Specification was republished in 2000, the sheathing thickness for tendons used in all applications except ground supported residential and light commercial construction was increased to 0.050 in. to provide an assumed increase in the level of durability and protection (even though the durability of 0.040 in. thick sheathing appeared satisfactory). Ground supported slabs used in residential and light commercial construction are typically not subjected to severe environments, and the probability of a tendon failure due to damaged sheathing is considered low. In addition, such a failure would not pose the same life/safety concerns as the failure of tendons used in elevated structures. For these reasons, a thickness of 0.040 in. is deemed acceptable for tendons used in ground supported residential and light commercial construction.

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2.4.4 Performance Criteria

P-T coating shall satisfy the requirements listed in Table 1.

All P-T coating types shall be tested every five years or whenever any change is made to their chemical composition.

3.5.1.1 Cutting of Tendon Tails

Tendon tails shall not be cut until acceptance or approval of measured elongation has been given and then shall be done as soon as possible. ~~The strand length protruding beyond the wedges after cutting of the tendon tail shall be between 0.5 in. [15 mm] and 0.75 in. [20 mm].~~ The strand length protruding beyond the wedges after cutting of the tendon tail shall not be less than ½ in. [13 mm]. Minimum concrete cover to the tendon tail from the exterior edge of the concrete shall be ¾ in. [20 mm] for non-aggressive environments and 1 in. [25 mm] from the exterior edge of concrete to the encapsulating device for aggressive environments.

Commentary

C2.4.4 Performance Criteria

The corrosion tests in Table 1 are based on a coating thickness of 0.005 in. [0.125 mm]. The quantities of P-T coating specified in Section 2.4.3 provide a minimum coating over the crests of the strand of approximately 0.015 in. [0.40 mm].

Testing is required at five-year intervals even if no chemical changes have been made to the composition of the P-T coating since the previous test.

~~*It is recommended that all P-T coating types be tested every five years, even if no chemical changes have been made to their composition during that period.*~~

C3.5.1.1 Cutting of Tendon Tails

In aggressive environments, it is recommended that the cutting of the tendon tails be performed within one working day after approval of elongations by the Engineer. The elongation report should be submitted on the same day as the stressing operation is completed and the elongation report should be approved or rejected within 96 hours after stressing. Encapsulation caps should be installed within one working day after cutting off tendon tails. The length of tendon tails should be compatible with the requirements of the encapsulation cap manufacturer to ensure a watertight connection of the encapsulation cap.

Addendum #3 December 2011

[Update your specification by changing the items identified]

Specification

Commentary

PART 1 - GENERAL

1.1 Scope

These specifications were developed to provide specific performance criteria for materials for unbonded single strand tendons, and detailed recommendations for the fabrication and installation of unbonded single strand tendons. Specifications are presented for tendons in non-aggressive environments and for tendons in aggressive environments. Where appropriate, a commentary follows most major sections of the document.

The more restrictive materials, fabrication, and construction requirements for tendons used in aggressive environments are essential to the long-term durability of tendons used in such circumstances.

Tendons used in all applications governed by ACI 318 shall be encapsulated in conformance with the requirements of 2.2.6.

CI.1 Scope

The intent of this document is to provide detailed specifications for all common uses of unbonded post-tensioning tendons..

The intent of this requirement is to maximize the durability of post-tensioning tendons used in all applications governed by ACI 318, regardless of environmental classification. Encapsulated tendons provide additional protection of the prestressing steel regardless of location of the structure or exposure to moisture intrusion from any source.

There are certain special structures or applications that either because of their service requirements or structural behavior might impose additional requirements on the post-tensioning system that exceed the minimum requirements of this standard

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specification. In such cases a special specification should be developed.

Structures exposed to aggressive environments include all structures subjected to direct or indirect applications of deicing chemicals, seawater, brackish water, or spray from these sources; structures in the immediate vicinity of seacoasts exposed to salt-laden air; and structures where anchorage areas are in direct contact with soil. Stressing pockets that are not maintained in a normally dry condition after construction should also be considered exposed to an aggressive environment. Nearly all enclosed buildings (office buildings, apartment buildings, warehouses, manufacturing facilities) are considered to be nonaggressive environments. The Engineer should decide if the structure, or a part of the structure, is exposed to an aggressive environment. Consideration should be given to such areas as the location of stressing end and intermediate anchors, construction joints, planters, balconies and swimming pools.

The durability of prestressed structures in aggressive environments requires the use of consistently higher quality concrete and superior construction than required in non-aggressive environments.

This specification is not intended to apply to nonstructural applications, such as topping slabs, waterproofing slabs on fill, and post-tensioning used only for control

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of cracking or deflection. For nonflexural or membrane type structures primarily under tensile forces, the provisions, where appropriate, are intended to apply.

This specification should be considered a minimum standard and, due to experience or project considerations, may be made more restrictive by the Engineer.