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Strength in Concrete

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April 29, 2020

Position Statement

Requirements for Certification of Materials used in Post-Tensioned Slabs-on-Ground

Post-tensioned slab-on-ground foundations are a method of construction commonly used in residential and light commercial projects across large parts of North America. This method of construction is efficient, durable, and economical resulting in a long-lasting high-quality foundation, and can be utilized across a variety of soil types. Quality design, materials and construction are the core of any building process, and this is no different for post-tensioned slabs-on-ground. The purpose of this statement is to provide clear guidance on the requirements for post-tensioning materials when a post-tensioned slab-on-ground is designed with commonly utilized design tools.

The Post-Tensioning Institute (PTI) is the leading resource for design, materials, and construction guidance for post-tensioned construction. The Post-Tensioning Institute, through its consensus-based committee structure, has produced PTI DC10.5 "Standard Requirements for Design and Analysis of Shallow Post-Tensioned Concrete Foundations on Expansive and Stable Soils," now in its fifth edition since 1980. This document, either used standalone or as the basis for most commonly available slab-on-ground design software, provides the underlying design philosophy for essentially all unbonded post-tensioned slabs-on-ground designed and constructed across North America.

For any post-tensioned slab-on-ground designed in accordance with PTI DC10.5 there are accompanying specifications requirements for the fabrication of the post-tensioning tendons used to reinforce the slab. Specifically, PTI DC10.5 requires that these tendons be fabricated in a facility that has been audited and certified by an external program accredited by a national accreditation body such as the American National Standards Institute (ANSI), International Accreditation Service (IAS), or equivalent. It is critical to note that the fabrication requirements listed in the following references apply to the production of the complete post-tensioning tendon. The extrusion of PT coating and plastic sheathing on the strand in an audited and certified facility does not constitute fabrication and as such does not fully satisfy the specified requirements. The requirements outlined below apply to the entire fabrication process, starting with the individual components such as anchors, wedges, PT coating, sheathing, and uncoated strand, and progressing all the way to the finished tendon ready for installation in the field, cut to length, with fixed anchors (where required), and bundled for shipment.

If a project design was completed under PTI DC10.5-12, including custom software packages and spreadsheet tools based on the design philosophy of PTI DC10.5-12, the following references apply:

1. Section 4.2.2.1.1 of PTI DC10.5-12 states "*Tendons shall conform to PTI M10.2-00*"
2. Section 1.6.1 of PTI M10.2-00 states "*Unbonded single strand tendons shall be fabricated in a plant meeting the requirements of Sections 1.6.1.1 or 1.6.1.2.*"
    a. Section 1.6.1.1 "PTI Certified Plants" of PTI M10.2-00 states "*Plants shall be certified by the Post-Tensioning Institute (PTI) according to the procedures set forth in PTI's Manual for Certification of Plant Producing Unbonded Single Strand Tendons.*"

   b. Section 1.6.1.2 “Non-PTI Certified Plant” of PTI M10.2-00 states “*In non-PTI certified plants, conclusive test data certified by an accredited testing laboratory shall substantiate that all characteristics of the unbonded tendons, including the corrosion resistive characteristics, sheathing, and encapsulation system, are equivalent to or superior to the characteristics of tendons fabricated in accordance with this specification (see Section 2.2.5.3).*”

3. Section 2.2.5.3 of PTI M10.2-00 states “*Post-tensioning tendons shall be fabricated in a facility certified by the Post-Tensioning Institute (PTI) or a fully equivalent facility (Section 1.6.1) under conditions that meet the procedures set forth in PTI’s Manual for Certification of Plants Producing Single Strand Tendons.*”

For projects in which the design was completed under recently released PTI DC10.5-19, including custom software packages and spreadsheet tools based on the design philosophy of PTI DC10.5-19, the following references apply:

1. Section 10.2.1.1 of PTI DC10.5-19 states “*Tendons shall conform to PTI M10.6-15*”
2. Section 1.6.1 of PTI M10.6-15 states “*Unbonded single strand tendons used in post-tensioned slab-on-ground foundation construction shall be fabricated in a plant meeting the requirements of Sections 1.6.1.1 or 1.6.1.2.*”
   a. Section 1.6.1.1 “PTI Certified Plants” of PTI M10.6-15 states “*Plants shall be certified by the Post-Tensioning Institute (PTI) according to the procedures set forth in PTI-CRT20 G1.*”
   b. Section 1.6.1.2 “Non-PTI Certified Plant” of PTI M10.6-15 states “*In non-PTI certified plants, conclusive test data certified by an independent testing laboratory shall substantiate that all characteristics of the unbonded tendons, including traceability of all components; corrosion resistive characteristics; sheathing; and anchorage system, including encapsulation, if required, are equivalent to or superior to the characteristics of tendons fabricated in accordance with this specification (refer Section 1.6.1.1).*”

Given consideration of the above, the Post-Tensioning Institute would like to stress that it is clear that unbonded single strand post-tensioning tendons used for slab-on-ground applications designed either directly, or in accordance with the underlying design philosophy of PTI DC10.5, must be supplied in the fully fabricated state from a fabrication facility which has been audited and certified as outlined above. An example of a facility satisfying these requirements would be one certified under the PTI program “Certification of Plants Producing Unbonded Single Strand Tendons”. Further, the supply of bulk extruded strand coming from an audited and certified facility does not comply with the aforementioned requirements since bulk extruded strand is not in a final fabricated state.

Copies of all documents referenced above are available on the PTI website at www.post-tensioning.org/publications/store.

If the Post-Tensioning Institute can provide any additional information on this or any other matter, please contact us at info@post-tensioning.org

Kind Regards,

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