ICC-ES Evaluation Report

ESR-5447

Issued March 2025

Subject to renewal March 2026

This report also contains:

- City of LA Supplement
- City of Chicago Supplement
- CA Supplement
- FL Supplement

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DIVISION: 03 00 00—CONCRETE **Section: 03 38 00—Post-Tensioned Concrete**	**REPORT HOLDER:** **SIGMA CORPORATION** **ADDITIONAL LISTEE:** **NICOR INC**	**EVALUATION SUBJECT:** **POST TENSION ANCHOR**	

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2024, 2021, 2018, and 2015 *International Building Code®* (IBC)
- 2024, 2021, 2018, and 2015 *International Residential Code®* (IRC)

Property evaluated:

- Structural

2.0 USES

2.1 General Use:

The post tension anchor is used as anchorages at fixed end, intermediate, and stressing-end locations, and as couplers for unbonded, monostrand (single-strand), post-tensioning tendons in prestressed concrete designed in accordance with Chapter 25 of ACI 318, under the provisions of IBC Section 1901.2. The components of these systems may be used in structures assigned to Seismic Design Categories A through F. For structures regulated under the IRC, the general use of the post tension anchor must be addressed in an engineered design in accordance with IRC Section R301.1.3.

2.2 Slab-on-ground Foundations on Expansive Soils:

The post tension anchor is also used as anchorages at fixed-end, intermediate, and stressing-end locations, and as couplers for unbonded, monostrand (single-strand), post-tensioning tendons in prestressed concrete slab-on-ground foundations on expansive soils regulated under IBC Section 1808.6.2; and IBC Sections 1904 and 1907. For structures regulated under the IRC, the use of the post tension anchor for slab-on-ground foundations on expansive soils must be addressed in an engineered design in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 General:

The post tension anchor consists of ductile iron anchor castings and steel wedges, as described in Section 3.2. The post tension anchor and two-piece wedge are used to achieve at least 95 percent of the ultimate

tensile strength with a 0.5-inch-diameter (12.7 mm) seven-wire low relaxation steel strand conforming to ASTM A416, Grade 270, as required by ACI 318 Sections 25.8.1, 25.8.3, and 25.9.3.1(a).

Under the 2024 and 2021 IBC and IRC, the post tension anchor and two-piece wedge comply with Sections 2.2.1, 2.2.1.1 and 2.2.1.2 of PTI M10.6-15, as required by Section 10.2.1.1 of PTI DC10.5-2019, as referenced in IBC Section 1808.6.2.

Under the 2018 and 2015 IBC and IRC, the post tension anchor and two-piece wedge comply with Sections 2.2.1, 2.2.1.1 and 2.2.1.2 of PTI M10.2-00 (PTI Specifications for Unbonded Single Strand Tendons) as required by Section 4.2.2.1.1 of PTI DC 10.5-2012, which is referenced in IBC Section 1808.6.2.

3.2 Post Tension Anchor components:

3.2.1 Post Tension Anchor: The anchor casting is a ductile iron casting complying with ASTM A536, Grade 80-55-06. The acceptable Brinell Hardness Number (BHN) range is 187 to 255. The anchors are used with the two-piece wedge described in Section 3.2.2.

3.2.2 Two-piece Wedge: The 0.5-inch (12.7 mm) two-piece wedge is manufactured from steel conforming to ASTM A29/A29M or EN8D-LHT, Brand 20MnCr5. The wedge is heat treated according to the specification and has a case and core hardness as specified in the Sigma quality documentation.

4.0 DESIGN AND INSTALLATION

4.1 General: Concrete prestressed with the post tension anchor anchorage and coupler assemblies must be designed in accordance with Chapter 25 of ACI 318, with the anchorage zones designed in accordance with ACI 318 Sections 25.8.1, 25.8.3 and 25.9.3.1(a).

4.2 Slab-on-ground Foundations on Expansive Soils: The moments, shears and deflections used in the design must be based on PTI DC10.5, referenced in IBC Section 1808.6.2. The foundation must comply with IBC Sections 1904 and 1907 and be designed in accordance with PTI DC10.5. In addition, the prestressed concrete must be designed in accordance with the applicable provisions of Chapter 25 of ACI 318, with the anchorage zones designed in accordance with ACI 318 Sections 25.8.1, 25.8.3 and 25.9.3.1(a).

4.3 Installation: The post tension anchor components must be installed in accordance with the manufacturer's published installation instructions and the approved plans. The manufacturer's published installation instructions and the approved plans must be available at the jobsite at all times during installation. The post tension anchor components must only be used in combination with other components described in this report and seven-wire, low-relaxation steel strand complying with ASTM A416, Grade 270.

4.4 Special Inspection: Special inspection must be provided for the installation and stressing of the tendons, in accordance with IBC Section 1705.3. The special inspector's duties include verification of concrete compressive strength at the time the tendons are stressed; compliance with the design engineer's requirements, including prestressing instructions; and checking elongation and jacking force parameters, and the sequence of tendon stressing, as well as end and edge distance and tendon spacing dimensions.

5.0 CONDITIONS OF USE:

The post tension anchor described in this report complies with, or is a suitable alternative to what is specified in, the code noted in Section 1.0 of this report, subject to the following conditions:

5.1 The materials, fabrication and installation must comply with this report and the manufacturer's instructions. In the event of a conflict between this report and the manufacturer's instructions, this report governs.

5.2 Where fire-resistance-rated construction is required, the minimum concrete cover on the tendons, anchor castings, and wedges must comply with IBC Table 721.1(1), Item 4-1.1 or 4-1.2.

5.3 The design and installation of the anchor castings and wedges and the prestressed concrete must be in accordance with Section 4.0 of this report.

5.4 Encapsulation of tendons has not been evaluated and is outside the scope of the evaluation report. Reports of tests of the encapsulated tendons must be provided when required by the authority having jurisdiction.

5.5 Special inspection must be provided in accordance with Section 4.4 of this report.

5.6 The components of the post tension anchor are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Post-tensioning Anchorages and Couplers of Prestressed Concrete (AC303), dated April 2011 (editorially revised January 2024).

7.0 IDENTIFICATION

7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-5447) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.

7.2 In addition, packages of the anchor castings and wedges are labeled with the part designation and tracing codes.

7.3 The anchor castings are identified by embossments with the product name designation and date lot codes.

7.4 The report holder's contact information is the following:

SIGMA CORPORATION
700 GOLDMAN DRIVE
CREAM RIDGE, NEW JERSEY 08514
800-999-2550
www.sigmaco.com

7.5 The additional listee's contact information is the following:

NICOR INC.
100 COMMONS ROAD, SUITE 7-355
DRIPPING SPRINGS, TEXAS 78620
512-466-9056
www.nicor.net

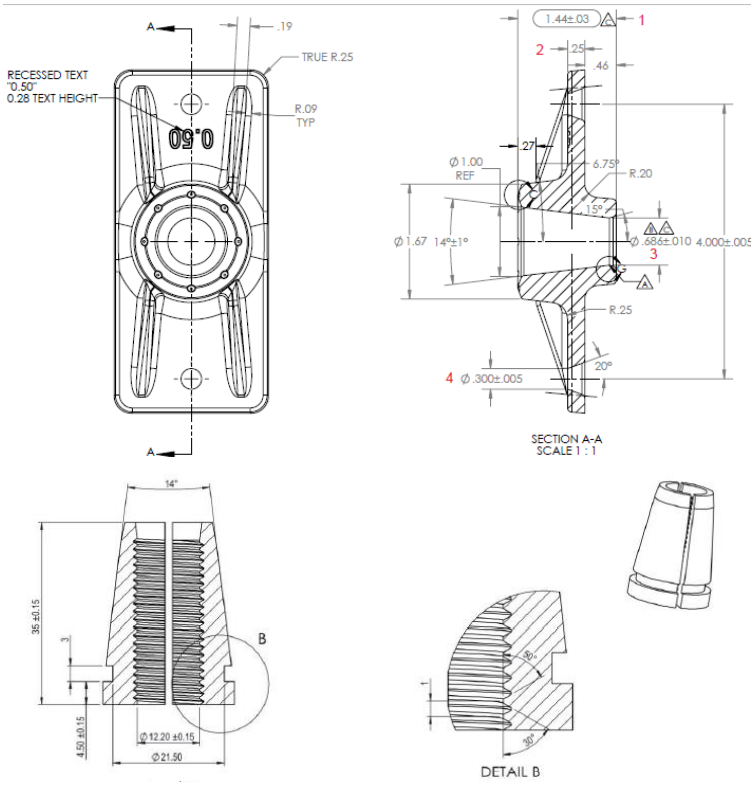

FIGURE 1—POST TENSION ANCHOR SYSTEM COMPONENTS

DIVISION: 03 00 00—CONCRETE
Section: 03 38 00—Post-Tensioned Concrete

REPORT HOLDER:

SIGMA CORPORATION

EVALUATION SUBJECT:

POST TENSION ANCHOR

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the post tension anchor, described in ICC-ES evaluation report ESR-5447, has also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2023 *City of Los Angeles Building Code* (LABC)
- 2023 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The post tension anchor, described in Sections 2.0 through 7.0 of the evaluation report ESR-5447, complies with the LABC Chapters 18 and 19, and the LARC, and is subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The post tension anchor described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-5447.
- The design, installation, conditions of use and identification of the *post tension anchor* are in accordance with the 2021 *International Building Code®* (IBC) and 2021 *International Residential Code®* (IRC) provisions, as applicable, noted in the evaluation report ESR-5447.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 17, 18, and 19, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report, issued March 2025.

DIVISION: 03 00 00—CONCRETE
Section: 03 38 00—Post-Tensioned Concrete

REPORT HOLDER:

SIGMA CORPORATION

EVALUATION SUBJECT:

POST TENSION ANCHOR

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the post tension anchor, described in ICC-ES evaluation report ESR-5447, has also been evaluated for compliance with the Chicago Construction Codes (Title 14 of the Chicago Municipal Code) as noted below.

Applicable code editions:

- 2019 *Chicago Building Code* (Title 14B)

2.0 CONCLUSIONS

The post tension anchor, described in Sections 2.0 through 7.0 of the evaluation report ESR-5447, complies with Title 14B, and is subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The post tension anchor described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-5447. Note that use in slab-on-ground foundations on expansive soils is not applicable, since Section 1808.6 of Title 14B requires removal of expansive soils.
- The design, installation, conditions of use and identification of the post tension anchor are in accordance with the 2018 *International Building Code®* (IBC) provisions noted in the evaluation report ESR-5447.
- The design, installation and inspection are in accordance with additional requirements of Chapters 17 and 19 of Title 14B, as applicable.

This supplement expires concurrently with the evaluation report, issued March 2025.

DIVISION: 03 00 00—CONCRETE
Section: 03 38 00—Post-Tensioned Concrete

REPORT HOLDER:

SIGMA CORPORATION

EVALUATION SUBJECT:

POST TENTION ANCHOR

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that post tension anchor, described in ICC-ES evaluation report ESR-5447, has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2022 *California Building Code* (CBC)

For evaluation of applicable Chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 *California Residential Code* (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The post tension anchor, described in Sections 2.0 through 7.0 of the evaluation report ESR-5447, complies with CBC Chapters 18 and 19, provided the design and installation are in accordance with the 2021 *International Building Code®* (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapter 17, 18 and 19, as applicable.

2.1.1 OSHPD:

The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

2.1.2 DSA:

The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

2.2 CRC:

The post tension anchor, described in Sections 2.0 through 7.0 of the evaluation report ESR-5447, complies with CRC Chapter 3, provided the design and installation are in accordance with the 2021 *International Residential Code®* (IRC) provisions noted in the evaluation report and the additional requirements of CRC Chapter 3.

This supplement expires concurrently with the evaluation report, issued March 2025.

DIVISION: 03 00 00—CONCRETE
Section: 03 38 00—Post-Tensioned Concrete

REPORT HOLDER:

SIGMA CORPORATION

EVALUATION SUBJECT:

POST TENSION ANCHOR

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that post tension anchor, described in ICC-ES evaluation report ESR-5447, has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2023 *Florida Building Code—Building*
- 2023 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The post tension anchor, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-5447, complies with the *Florida Building Code—Building* and the *Florida Building Code-Residential*. The design requirements must be determined in accordance with the *Florida Building Code-Building* or the *Florida Building Code-Residential,* as applicable. The installation requirements noted in ICC-ES evaluation report ESR-5447 for the 2021 *International Building Code®* meet the requirements of the *Florida Building Code-Building* or the *Florida Building Code-Residential,* as applicable.

Use of the post tension anchor for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code-Residential* has not been evaluated and is outside the scope of this supplemental report.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, issued March 2025.