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**SET-XP® EPOXY ADHESIVE ANCHORS FOR MASONRY**

**CSI DIVISION:**

**04 00 00—MASONRY**

**CSI Section:**

**04 05 19.16—Masonry Anchors**

**1.0 SCOPE OF EVALUATION**

**1.1 Compliance to the following codes & regulations:**

- 2018, 2015, 2012, 2009, 2006, and 2003 International Building Code® (IBC)
- 2018, 2015, 2012, 2009, 2006, and 2003 International Residential Code® (IRC)
- 2018, 2015, 2012, and 2009 International Existing Building Code® (IEBC)
- 2018, 2015, and 2012 Uniform Plumbing Code® (UPC)
- 2018, 2015, and 2012 International Plumbing Code® (IPC)
- 2020 City of Los Angeles Building Code (LABC) – attached Supplement
- 2020 City of Los Angeles Residential Code (LARC) – attached Supplement
- 2020 and 2017 Florida Building Code, Building (FBC--Building)
- 2020 and 2017 Florida Building Code, Residential (FBC--Residential)

**1.2 Properties assessed:**

- Structural
- Compliance with NSF/ANSI Standard 61

**1.3 Evaluated in accordance with:**

- ICC-ES Acceptance Criteria for Adhesive Anchors in Masonry Elements (AC58)

**2.0 PRODUCT USE**

Simpson Strong-Tie® SET-XP® epoxy adhesive anchors are post-installed, adhesive anchors used for anchoring building components to fully-grouted and hollow (ungrouted) concrete masonry. Threaded steel rods or deformed steel reinforcing bars installed with SET-XP epoxy adhesive resist dead, live, earthquake, and wind loads, as noted in Section 4.0 of this evaluation report. Post-installed anchors are

alternatives to anchor bolts specified in Section 2107 of the IBC and Chapters 6 and 8 of 2013 [TMS 402/ACI 530/ASCE 5](#) and Chapters 1 and 2 of 2011, 2008, 2005 and 2002 [TMS 402/ACI 530/ASCE 5](#), as applicable. Anchors may also be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

SET-XP epoxy adhesives are certified to [NSF/ANSI Standard 61](#), as referenced in Sections 604 and 607 of the 2018, 2015, and 2012 UPC and Sections 605 and 608 of the 2018, 2015, and 2012 IPC for products used in water distribution systems and water tanks.

**3.0 PRODUCT DESCRIPTION**

**3.1 Product Information:** SET-XP® Epoxy Adhesive Anchor System is comprised of the following components:

- SET-XP epoxy adhesive packaged in cartridges
- Adhesive mixing and dispensing equipment
- Equipment for hole cleaning and adhesive injection
- Plastic-mesh screen tubes used for anchor installations in hollow (ungrouted) concrete masonry construction

SET-XP epoxy adhesive is used with continuously threaded steel rods or deformed steel reinforcing bars. Installation information and parameters are included with each adhesive unit package.

**3.2 Material Information**

**3.2.1 SET-XP® Epoxy Adhesive:** SET-XP epoxy adhesive is an injectable, two-component, 100 percent solids, epoxy-based adhesive mixed as a 1-to-1 volume ratio of hardener-to-resin. SET-XP epoxy adhesive is available in 8.5-ounce (250 mL), 22-ounce (650 mL), and 56-ounce (1656 mL) cartridges. These two components combine and react when dispensed through a static mixing nozzle attached to the cartridge. SET-XP epoxy adhesive in unopened cartridges has a shelf life of two years from the date of manufacture when stored at temperatures between 45°F and 90°F (7°C and 32°C).

**3.2.2 Dispensing Equipment:** SET-XP® epoxy adhesive shall be dispensed using Simpson Strong-Tie® manual dispensing tools, battery-powered dispensing tools or pneumatic dispensing tools.

**3.2.3 Equipment for Hole Preparation:** Hole cleaning equipment consists of hole-cleaning brushes and air nozzles. Brushes shall be Simpson Strong-Tie® hole cleaning brushes, identified by Simpson Strong-Tie catalog number series ETB. Air nozzles shall be equipped with an extension capable of reaching the bottom of the drilled hole.

*The product described in this Uniform Evaluation Service (UES) Report has been evaluated as an alternative material, design or method of construction in order to satisfy and comply with the intent of the provision of the code, as noted in this report, and for at least equivalence to that prescribed in the code in quality, strength, effectiveness, fire resistance, durability and safety, as applicable, in accordance with IBC Section 104.11. This document shall only be reproduced in its entirety.*





**3.2.4 Opti-Mesh™ Plastic Screen Tube:** The Opti-Mesh plastic screen tubes are used in hollow (ungrouted) concrete masonry walls described in Section 4.2.3 of this report. The plastic tubes consist of an integral cap, flanges, and an open mesh collar, and a black plastic mesh tube.

### 3.2.5 Anchor Materials:

**3.2.5.1 Threaded Steel Rods:** Threaded anchor rods, having diameters from 3/8 inch to 3/4 inch (9.5 mm to 19.1 mm), shall be carbon steel conforming to [ASTM F1554](#), Grade 36, or [ASTM A193](#), Grade B7; or stainless steel conforming to ASTM A193, Grade B6, B8, or B8M. Threaded bars shall be clean, straight and free of indentations or other defects along their lengths.

**3.2.5.2 Deformed Reinforcing Bar (Rebar):** Deformed steel rebar, having sizes No. 3 to No. 5, shall conform to [ASTM A615](#) Grade 40 minimum. Embedded portions of reinforcing bars shall be straight, and free of mill scale, rust, mud, oil, and other coatings that may impair the bond with adhesive.

**3.2.6 Grout-filled Concrete Masonry:** The specified compressive strength of masonry,  $f'_m$ , at 28 days shall be a minimum of 1,500 psi (10.3 MPa). Fully grouted masonry walls shall be constructed from the following materials:

**3.2.6.1 Concrete Masonry Units (CMU):** CMU shall be closed-end minimum lightweight, medium-weight, or normal-weight concrete masonry conforming to [ASTM C90](#). Minimum allowable nominal size of CMU shall be 8 inches (203 mm) wide by 8 inches (203 mm) high by 16 inches (406 mm) long (i.e., 8×8×16).

**3.2.6.2 Grout:** Grout shall comply with IBC Section 2103 or IRC Section R606 (2018 and 2015 IRC) or R609 (2012, 2009, 2006 and 2003 IRC), as applicable. Alternatively, the grout shall have a minimum compressive strength when tested in accordance with [ASTM C1019](#) equal to its specified strength, but not less than 2,000 psi (13.8 MPa).

**3.2.6.3 Mortar:** Mortar shall comply with IBC Section 2103 or IRC Section R606 (2018 and 2015 IRC) or Section R607 (2012, 2009, 2006 and 2003 IRC), as applicable. Mortar shall have a minimum compressive strength of 1,500 psi (10.3 MPa).

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design

**4.1.1 General:** Anchor capacities in this report are allowable load values for use in allowable stress design as set forth in Section 2107 of the IBC. For use under the IRC, an engineered design in accordance with IRC Section R301.1.3 shall be submitted to the building official.

Allowable tension and shear loads noted in this report shall

be adjusted for in-service base-material temperatures in accordance with [Figure 1 of this report](#) for anchors installed and cured in base materials having a temperature of 50°F (10°C) and above. Anchors installed or cured at temperatures below 50°F (10°C) are outside the scope of this report. Allowable loads for anchors subjected to combined tension and shear forces shall be determined by the following equation:

$$\left(\frac{P_s}{P_t}\right) + \left(\frac{V_s}{V_t}\right) \leq 1.0$$

Where:

$P_s$  = Applied tension load.

$P_t$  = Allowable tension load.

$V_s$  = Applied shear load.

$V_t$  = Allowable shear load.

### 4.1.2 Design of Anchors in Grout-filled CMU Walls

**4.1.2.1 General:** For installations in fully grouted concrete masonry construction, anchors are permitted to resist dead, live, wind, and earthquake load applications. When using the basic load combinations in accordance with IBC Section 1605.3.1, allowable loads are not permitted to be increased for earthquake or wind loading. When using the alternative basic load combinations in 2003, 2006 and 2009 IBC Section 1605.3.2 that include earthquake or wind loads, the allowable tension and shear loads for anchors are permitted to be increased by 33-1/3 percent, or the alternative basic load combinations may be reduced by a factor of 0.75. When using the alternative basic load combinations in 2018, 2015, and 2012 IBC Section 1605.3.2 that include earthquake or wind loads, no adjustments are permitted.

**4.1.2.2 Threaded Steel Rod Installed in the Vertical Face of Fully Grouted CMU Walls (Resisting Dead, Live, Wind, and Earthquake Load Applications):** [Tables 3 and 9 of this report](#) specify allowable tension and shear values for 3/8-, 1/2-, 5/8-, and 3/4-inch-diameter (9.5, 12.7, 15.9 and 19.1 mm) threaded rod installed in the face of the fully grouted CMU masonry wall construction (face shell, web and bed joint are shown in [Figure 2 of this report](#)), for anchors designed to resist dead, live, wind, and earthquake load applications. Edge and end distances, spacing requirements and allowable load reduction factors are noted in [Table 2 of this report](#). Allowable loads shall be the lesser of bond values given in [Table 3 of this report](#) and steel values given in [Table 9 of this report](#).

**4.1.2.3 Deformed Steel Rebar Installed in the Vertical Face of Fully Grouted CMU Walls (Resisting Dead, Live, Wind, and Earthquake Load Applications):** [Table 3 and 10 of this report](#) specify allowable tension and shear values for No. 3, No. 4 and No. 5 deformed steel rebar installed in the face of the fully grouted CMU masonry wall construction (face shell, web and bed joint are shown in [Figure 2 of this](#)



report), for anchors designed to resist dead, live, wind, and earthquake load applications. Edge and end distances, spacing requirements and allowable load reduction factors are noted in [Table 2 of this report](#). Allowable load shall be the lesser of bond values given in [Table 3 of this report](#) and steel values given in [Table 10](#) of this report.

**4.1.2.4 Threaded Steel Rod Installed in the Top of Fully Grouted CMU Walls (Resisting Dead, Live, Wind, and Earthquake Load Applications):** [Tables 6](#) and [9 of this report](#) specify allowable tension and shear values for 1/2-, 5/8-, and 3/4- inch-diameter (12.7, 15.9 and 22.2 mm) threaded rod installed in the top of the fully grouted CMU masonry wall construction (CMU core openings are shown in [Figures 3A](#) and [3B of this report](#)), for anchors designed to resist dead, live, wind, and earthquake load applications. Edge and end distances, spacing requirements and allowable load reduction factors are noted in [Tables 4](#) and [5 of this report](#). Allowable load shall be the lesser of bond values given in [Table 6 of this report](#) and steel values given in [Table 9](#) of this report.

**4.1.2.5 Deformed Steel Rebar Installed in the Top of Fully Grouted CMU Walls (Resisting Dead, Live, Wind, and Earthquake Load Applications):** [Tables 6](#) and [10](#) of this report specify allowable tension and shear values for No. 4 and No. 5 deformed steel rebar installed in the top of the fully grouted CMU masonry wall construction (CMU core openings are shown in [Figure 3A of this report](#)), for anchors designed to resist dead, live, wind, and earthquake load applications. Edge and end distances, spacing requirements and allowable load reduction factors are noted in [Tables 4](#) and [5 of this report](#). Allowable load shall be the lesser of bond values given in [Table 6](#) and steel values given in [Table 10](#) of this report.

#### 4.1.3 Design of Anchors in Hollow CMU Walls

**4.1.3.1 General:** For installations of threaded rods with Opti-Mesh™ plastic screen tubes through the face shell of hollow concrete masonry walls, the anchors are permitted to resist dead load, live load, and wind load applications. Use of the anchors to resist earthquake loads is outside the scope of this report. Minimum edge and end distances, and allowable tension and shear values are noted in [Tables 7](#) and [8](#) and [Figure 4 of this report](#).

#### 4.2 Installation

**4.2.1 General:** Anchors shall be installed in accordance with the manufacturer's published installation instructions and the requirements of this report. Anchors shall not be installed until the base material has reached its minimum specified compressive strength. Hole diameter, embedment depth, spacing, edge distance and base material shall comply with the requirements in this report.

Anchors installed or cured in masonry at temperatures below 50°F (10°C) are outside the scope of this report. Manufacturer's recommended gel and cure times are shown

in [Table 1 of this report](#). After installation of an anchor, it shall be undisturbed during the gel time and shall be allowed to fully cure before building components are attached.

**4.2.2 Installation in Grout-filled Concrete Masonry:** Anchor holes shall be drilled into the concrete masonry to a predetermined depth, using an electro-pneumatic rotary hammer drill, in either a rotation-and-hammering or rotation-only mode, having a carbide-tipped drill bit conforming to [ANSI B212.15-1994](#). Anchor holes shall be cleaned of dust and debris using oil-free compressed air and a nylon brush. During installation, the holes shall be dry.

A clean, static-mixing nozzle shall be attached to the SET-XP® epoxy adhesive cartridge. Prior to injection of the adhesive into the anchor hole, an initial amount of adhesive shall be dispensed through the nozzle until the two adhesive components are uniformly blended. Initial amount of adhesive shall be discarded. Adhesive shall be injected into the hole, starting at the bottom, until the hole is approximately one-half full. Anchors, which are free of oil, scale, and rust, shall be inserted into the hole with a slow twisting motion to the required embedment depth. As a minimum, the adhesive shall be flush with the concrete masonry surface after insertion of the anchor.

For installations of anchors in the face of the fully grouted masonry wall construction (face shell, web and bed joint), anchor location shall comply with the critical and minimum edge and end distances and the critical and minimum spacing noted in [Table 2](#) and shown in [Figure 2 of this report](#).

For installations of anchors in the top of the fully grouted masonry wall construction, anchor location shall comply with the critical and minimum edge and end distances and the critical and minimum spacing noted in [Tables 4](#) and [5 of this report](#) and shown in [Figures 3A](#) and [3B of this report](#).

Threaded rods and reinforcing bars shall not be bent after installation except as set forth in Section 26.6.3.1 of ACI 318-14 and Section 7.3.2 of ACI 318-11, -08, -05 and -02, with the additional condition that the rods and bars shall be bent cold, and heating of threaded rods and reinforcing bars to facilitate field bending is not permitted.

**4.2.3 Installation in Hollow Concrete Masonry:** Anchor holes shall be drilled into and through the face shell of hollow concrete masonry walls using a rotary hammer drill set on rotation-only mode, with a carbide-tipped drill bit complying with ANSI B212.15-1994. Brush the hole with properly sized nylon brush (2 complete strokes). Allowable anchor location relative to edge and end of the masonry wall and to mortared joints shall comply with [Table 3](#) and [Figure 2 of this report](#). The SET-XP® adhesive shall be injected into a Simpson Strong-Tie Opti-Mesh plastic screen tube, as described in Section 3.2.4 of this report, starting at the bottom, until the tube is completely full. The Opti-Mesh plastic screen tube completely filled with adhesive shall be inserted into the predrilled hole until it is fully seated at the



required embedment. A threaded rod, which shall be free of dirt, grease, oil, or other foreign material, shall then be pushed into the screen, while being turned slightly, to the bottom of the epoxy filled screen tube to ensure complete coating of the rod.

### 4.3 Special Inspection

**4.3.1 IBC and IRC:** For the IBC and IRC, adhesive anchors shall be installed with special inspection in accordance with Section 1704 and 1705 of the IBC. A statement of special inspections complying with Section 1704.3 of the 2018, 2015 or 2012 IBC or Section 1705 of the 2003, 2006, and 2009 IBC shall be prepared and submitted. An approved special inspector shall furnish the building official and the registered design professional in responsible charge with an inspection report that includes the following:

1. Anchor description, including the adhesive product name and expiration date, anchor steel type, nominal anchor diameter and length.

2. Drilled hole description, including verification of drill bit compliance with ANSI B212.15-1994, hole diameter, location, depth and cleanliness.

3. Installation description including verification of masonry compressive strength, verification of anchor installation location (spacing and edge distance), installation temperature, and general installation requirements in accordance with the manufacturer's published installation instructions and this report.

**4.3.2 IEBC:** Adhesive anchors shall be installed with periodic inspection, and direct-tension tests and torque tests shall be done in accordance with Section A107.4 and A107.5 (2018 and 2015 IEBC) or Section A107.4 (2012, 2009, 2006 and 2003 IEBC), as applicable. A statement of special inspections complying with Section 1704.3 of the IBC indicating the schedule for the periodic inspections shall be prepared and submitted. The inspection report shall contain the information specified in Section 4.3.1 of this report. In lieu of testing and periodic special inspection, the IEBC permits continuous special inspection during installation of bolts resisting shear forces only.

**4.4 Compliance with NSF/ANSI Standard 61:** SET-XP® Epoxy Adhesive Anchor Systems comply with the requirements of [NSF/ANSI Standard 61](#), as referenced in Sections 604 and 607 of the 2018, 2015, and 2012 UPC and Section 605 of the 2018, 2015, and 2012 IPC for products used in water distribution systems. SET-XP Epoxy Adhesive Anchor Systems may have a maximum exposed surface area to volume ratio of 216 square inches per 1,000 gallons (0.139 square meters per 3,785 liters) of potable water and/or drinking water treatment chemicals. Focus of NSF/ANSI Standard 61 as it pertains to adhesive anchors is to ensure that the contaminants or impurities imparted from the adhesive product to the potable water do not exceed acceptable levels.

### 5.0 CONDITIONS OF USE

Simpson Strong-Tie SET-XP® Epoxy Adhesive Anchor System described in this report is a suitable alternative to what is specified in the codes listed in Section 1.0 of this report, subject to the following conditions:

**5.1** SET-XP epoxy adhesive anchors shall be installed in accordance with the manufacturer's published installation instructions and this report. Where conflicts occur, the more restrictive shall govern.

**5.2** SET-XP epoxy adhesive anchors are recognized for use to resist short-term and long-term loads, including wind and earthquake loads in accordance with Sections 4.1.2 and 4.1.3 of this report.

**5.3** Anchors shall be installed in fully-grouted or hollow (ungROUTED) concrete masonry in holes predrilled with carbide-tipped drill bits complying with ANSI B212.15-1994.

**5.4** Special inspection in accordance with Section 4.3 of this report shall be provided for all anchor installations.

**5.5** Prior to installation, calculations and details demonstrating compliance with this report shall be submitted to the building official. Calculations and details shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

**5.6** Since an IAPMO Uniform ES Evaluation Criteria for evaluating data to determine the performance of adhesive anchors subjected to fatigue or shock loading is unavailable at this time, the use of these anchors under these conditions is outside the scope of this report.

**5.7** SET-XP epoxy adhesive anchors may be used to resist tension and shear forces in wall installations only if consideration is given to the effects of elevated temperature conditions on anchor performance. [Figure 1 of this report](#) describes load reduction factors for elevated temperatures.

**5.8** Anchors are not permitted to support fire-resistive construction. Where not otherwise prohibited in the code, SET-XP epoxy adhesive anchors are permitted for installation in fire-resistive construction provided at least one of the following conditions is fulfilled:

- Anchors are used to resist wind or earthquake forces only.
- Anchors that support gravity load-bearing structural elements are within a fire-resistive envelope or a fire resistive membrane, are protected by approved fire-resistive materials, or have been evaluated for resistance to fire exposure in accordance with recognized standards.
- Anchors are used to support nonstructural elements.



**5.9** Use of zinc-plated carbon steel threaded rods or steel reinforcing bars is limited to interior locations. Installations exposed to severe, moderate or negligible exterior weathering conditions, as defined in Figure 1 of [ASTM C62](#) (IBC or IRC), are permitted where stainless steel or zinc-coated anchors are used. Zinc coating shall be either hot-dipped in accordance with [ASTM A153](#) with a Class C or D coating weight or mechanically deposited in accordance with [ASTM B695](#) with a Class 65 coating having a minimum thickness of 2.1 mils (0.533 mm).

**5.10** Anchors installed in masonry shall be installed in dry holes.

**5.11** SET-XP epoxy adhesive anchors shall be installed in masonry having internal base material temperatures between 50°F (10°C) and 110°F (43°C) at the time of anchor installation. Installation of anchors in base material having internal temperatures outside of this range is outside the scope of this report.

**5.12** Since an IAPMO Evaluation Criteria for evaluating the performance of adhesive anchors in cracked masonry is unavailable at this time, the use of the anchors is limited to installation in uncracked masonry. Cracking occurs when  $f_i > f_r$  due to service loads or deformations.

**5.13** When anchors are located where the internal masonry temperature may exceed 70°F (21°C) in service, allowable loads in this report shall be adjusted for in-service temperatures in accordance with [Figure 1 of this report](#). Use of SET-XP epoxy adhesive anchors in base materials having interior temperatures exceeding 150°F (65°C) is outside the scope of this report.

**5.14** Steel anchoring materials in contact with preservative-treated and fire-retardant-treated wood shall be zinc-coated steel or stainless steel. Coating weights for zinc-coated steel shall be in accordance with ASTM A153 Class C or D.

**5.15** SET-XP epoxy adhesive is manufactured and packaged into cartridges by Simpson Strong-Tie Company, Inc., in West Chicago, Illinois, with quality control inspections.

## 6.0 EVIDENCE SUBMITTED

**6.1** Data in accordance with the ICC-ES Acceptance Criteria for Adhesive Anchors in Masonry Elements (AC58), approved March 2018 including the following test series: effects of edge distance on tension performance (Test Series 4 and 5); effects of spacing on tension performance (Test Series 8 and 9); effects of edge distance on shear performance (Test Series 13 and 14); creep (Test Series 17); in-service temperature testing of anchors installed and cured at 50°F (Test Series 18); freeze/thaw (Test Series 20); and earthquake

investigations in fully-grouted concrete masonry construction (Test Series 21).

**6.2** Data in accordance with NSF/ANSI Standard 61, Drinking Water System Components—Health Effects, for the SET-XP® epoxy adhesive.

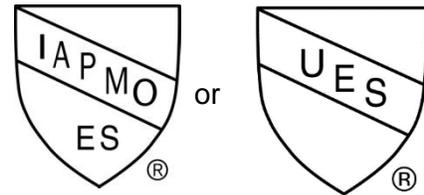
**6.3** A quality control manual.

## 7.0 IDENTIFICATION

**7.1** Simpson Strong-Tie SET-XP®Epoxy Adhesive is identified in the field by labels on the cartridge or packaging, bearing the company name (Simpson Strong-Tie Company, Inc.), product name (SET-XP), the batch number, the expiration date, and the evaluation report number (ER- 265).

**7.2** Threaded rods, nuts, washers and deformed reinforcing bars are standard elements and shall conform to applicable national or international specifications.

This evaluation report is subject to re-examination in one year.



**IAPMO UES ER-265**

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For additional information about this evaluation report please visit [www.uniform-es.org](http://www.uniform-es.org) or email at [info@uniform-es.org](mailto:info@uniform-es.org)

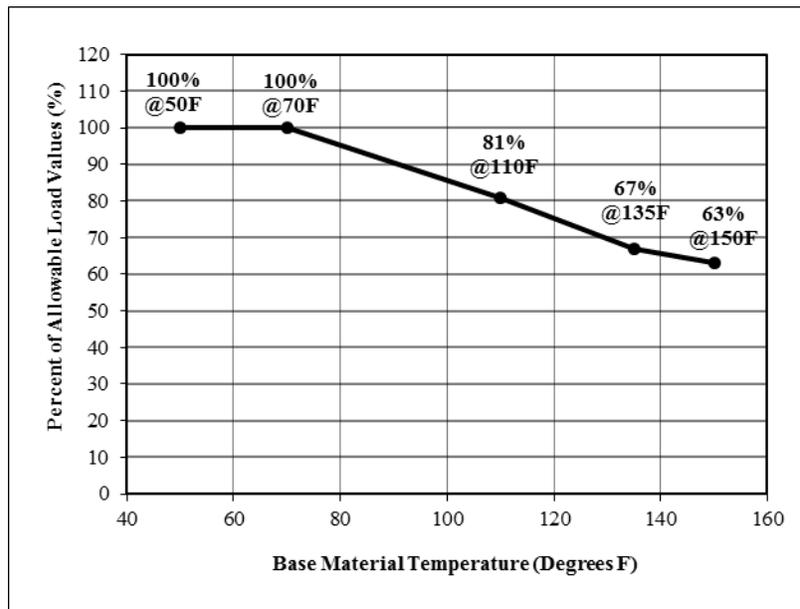


**TABLE 1—MANUFACTURER’S RECOMMENDED CURING TIMES FOR SET-XP® EPOXY ADHESIVE**

| Masonry Temperature |      | Gel Time<br>(minutes) | Cure Time<br>(hours) |
|---------------------|------|-----------------------|----------------------|
| (°F)                | (°C) |                       |                      |
| 50                  | 10   | 75                    | 72                   |
| 60                  | 16   | 60                    | 48                   |
| 70                  | 21   | 45                    | 24                   |
| 90                  | 32   | 35                    | 24                   |
| 110                 | 43   | 20                    | 24                   |

For SI: 1°C = 5/9 (t°F-32).

1. Anchors installed or cured, or both, at temperatures below 50°F (10°C) are outside the scope of this report.
2. Anchors shall be undisturbed during the gel time and shall be allowed to fully cure before attaching building components.
3. The allowable adhesive temperature range during installation is 50° to 90°F.



For SI: 1°C = 5/9 (t°F-32).

**FIGURE 1—LOAD CAPACITY BASED ON IN-SERVICE TEMPERATURE FOR SET-XP® EPOXY ADHESIVE**



**TABLE 2-EDGE, END AND SPACING DISTANCE REQUIREMENTS AND ALLOWABLE LOAD REDUCTION FACTORS FOR THREADED ROD AND REBAR WITH SET-XP® EPOXY ADHESIVE IN THE FACE OF FULLY GROUTED SMU WALL CONSTRUCTION<sup>7</sup>**

| Rod Dia. (inch) or Rebar Size No. | Min. Embed. Depth (inches) | Edge or End Distance <sup>1,8</sup>              |                                 |                                                  |                                 |                     |       | Spacing <sup>2,9</sup>                       |                                 |                                                |                                 |       |
|-----------------------------------|----------------------------|--------------------------------------------------|---------------------------------|--------------------------------------------------|---------------------------------|---------------------|-------|----------------------------------------------|---------------------------------|------------------------------------------------|---------------------------------|-------|
|                                   |                            | Critical (Full Anchor Capacity) <sup>3</sup>     |                                 | Minimum (Reduced Anchor Capacity) <sup>4</sup>   |                                 |                     |       | Critical (Full Anchor Capacity) <sup>5</sup> |                                 | Minimum (Reduced Anchor Capacity) <sup>6</sup> |                                 |       |
|                                   |                            | Critical Edge or End Distance, $c_{cr}$ (inches) | Allowable Load Reduction Factor | Minimum Edge or End Distance, $c_{min}$ (inches) | Allowable Load Reduction Factor |                     |       | Critical Spacing, $s_{cr}$ (inches)          | Allowable Load Reduction Factor | Minimum Spacing, $s_{min}$ (inches)            | Allowable Load Reduction Factor |       |
|                                   |                            | Load Direction                                   |                                 | Load Direction                                   |                                 |                     |       | Load Direction                               |                                 | Load Direction                                 |                                 |       |
|                                   |                            | Tension or Shear                                 | Tension or Shear                | Tension or Shear                                 | Tension                         | Shear <sup>10</sup> |       | Tension or Shear                             | Tension or Shear                | Tension or Shear                               | Tension                         | Shear |
|                                   |                            |                                                  |                                 |                                                  |                                 | Perp.               | Para. |                                              |                                 |                                                |                                 |       |
|                                   |                            | 3/8                                              | 3-3/8                           | 12                                               | 1.00                            | 4                   | 0.91  | 0.72                                         | 0.94                            | 8                                              | 1.00                            | 4     |
| 1/2                               | 4-1/2                      | 12                                               | 1.00                            | 4                                                | 1.00                            | 0.58                | 0.87  | 8                                            | 1.00                            | 4                                              | 0.82                            | 1.00  |
| 5/8                               | 5-5/8                      | 12                                               | 1.00                            | 4                                                | 1.00                            | 0.48                | 0.87  | 8                                            | 1.00                            | 4                                              | 0.82                            | 1.00  |
| 3/4                               | 6-1/2                      | 12                                               | 1.00                            | 4                                                | 1.00                            | 0.44                | 0.85  | 8                                            | 1.00                            | 4                                              | 0.82                            | 1.00  |
| No. 3                             | 3-3/8                      | 12                                               | 1.00                            | 4                                                | 0.96                            | 0.62                | 0.84  | 8                                            | 1.00                            | 4                                              | 0.87                            | 0.91  |
| No. 4                             | 4-1/2                      | 12                                               | 1.00                            | 4                                                | 0.88                            | 0.54                | 0.82  | 8                                            | 1.00                            | 4                                              | 0.87                            | 0.91  |
| No. 5                             | 5-5/8                      | 12                                               | 1.00                            | 4                                                | 0.88                            | 0.43                | 0.82  | 8                                            | 1.00                            | 4                                              | 0.87                            | 1.00  |

For SI: 1 inch = 25.4 mm.

- Edge distance ( $c_{cr}$  or  $c_{min}$ ) is the distance measured from anchor centerline to edge or end of CMU masonry wall. [Figure 2](#) of this report shows critical and minimum edge and end distances.
- Anchor spacing ( $s_{cr}$  or  $s_{min}$ ) is the distance measured from centerline to centerline of two anchors.
- Critical edge distance,  $c_{cr}$ , is the least edge distance at which tabulated allowable load of an anchor is achieved where a load reduction factor equals 1.0 (no load reduction).
- Minimum edge distance,  $c_{min}$ , is the least edge distance where an anchor has an allowable load capacity, which shall be determined by multiplying the allowable loads assigned to anchors installed at critical edge distance,  $c_{cr}$ , in [Table 3](#) of this report by the load reduction factors shown above.
- Critical spacing,  $s_{cr}$ , is the least anchor spacing at which tabulated allowable load of an anchor is achieved such that anchor performance is not influenced by adjacent anchors.
- Minimum spacing,  $s_{min}$ , is the least spacing where an anchor has an allowable load capacity, which shall be determined by multiplying the allowable loads assigned to anchors installed at critical spacing distance,  $s_{cr}$ , in [Table 3](#) of this report by the load reduction factors shown above.
- Reduction factors are cumulative. Multiple reduction factors for more than one spacing or edge or end distance shall be calculated separately and multiplied.
- Load reduction factor for anchors loaded in tension or shear with edge distances between critical and minimum shall be obtained by linear interpolation.
- Load reduction factor for anchors loaded in tension with spacing between critical and minimum shall be obtained by linear interpolation.
- Perpendicular shear loads act towards the edge or end. Parallel shear loads act parallel to the edge or end (shown in [Figure 5](#) of this report). Perpendicular and parallel shear load reduction factors are cumulative when the anchor is located between the critical and minimum edge and end distance.



**TABLE 3—ALLOWABLE TENSION AND SHEAR VALUES FOR THREADED ROD AND REBAR WITH SET-XP® EPOXY ADHESIVE IN THE FACE OF FULLY GROUTED CMU WALL CONSTRUCTION<sup>1,3,4,5,6,8,9,10,11</sup>**

| Diameter (inch) or Rebar Size No.                     | Drill Bit Diameter (inch) | Minimum Embedment <sup>2</sup> (inches) | Allowable Load based on Bond Strength <sup>7</sup> (pounds) |       |
|-------------------------------------------------------|---------------------------|-----------------------------------------|-------------------------------------------------------------|-------|
|                                                       |                           |                                         | Tension                                                     | Shear |
| <b>Threaded Rod Installed in the Face of CMU Wall</b> |                           |                                         |                                                             |       |
| 3/8                                                   | 1/2                       | 3-3/8                                   | 1,490                                                       | 1,145 |
| 1/2                                                   | 5/8                       | 4-1/2                                   | 1,825                                                       | 1,350 |
| 5/8                                                   | 3/4                       | 5-5/8                                   | 1,895                                                       | 1,350 |
| 3/4                                                   | 7/8                       | 6-1/2                                   | 1,895                                                       | 1,350 |
| <b>Rebar Installed in the Face of CMU Wall</b>        |                           |                                         |                                                             |       |
| No. 3                                                 | 1/2                       | 3-3/8                                   | 1,395                                                       | 1,460 |
| No. 4                                                 | 5/8                       | 4-1/2                                   | 1,835                                                       | 1,505 |
| No. 5                                                 | 3/4                       | 5-5/8                                   | 2,185                                                       | 1,505 |

For SI: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.48 N.

1. Allowable load shall be the lesser of bond values given in Table 3 of this report and steel values given in [Tables 9 or 10](#) of this report as applicable.
2. Embedment depth is measured from the outside face of masonry wall.
3. Critical and minimum edge distance and spacing shall comply with [Table 2 of this report](#). [Figure 2 of this report](#) shows critical and minimum edge and end distances.
4. Minimum allowable nominal width of CMU wall shall be 8 inches (203 mm). Anchors are limited to one per masonry cell.
5. Anchors are permitted to be installed at any location in the face of the fully grouted masonry wall construction (cell, web, bed joint), except anchors are not permitted to be installed within 1½ inches of the head joint as shown in [Figure 2 of this report](#).
6. Tabulated load values are for anchors installed in fully grouted masonry walls constructed from materials complying with Section 3.2.6 of this report.
7. Tabulated allowable loads are based on a safety factor of 5.0 for installations under the IBC and the IRC.
8. Tabulated allowable load values shall be adjusted for increased base material temperatures in accordance with [Figure 1 of this report](#), as applicable.
9. Threaded rod and rebar installed in fully grouted masonry walls with SET-XP adhesive are permitted to resist dead, live, seismic and wind loads. Section 4.1 of this report provides additional design requirement details.
10. Threaded rods shall meet or exceed the tensile strength of [ASTM F1554](#), Grade 36 steel, which is 58,000psi.
11. For installations exposed to severe, moderate or negligible exterior weathering conditions, as defined in Figure 1 of [ASTM C62](#) (IBC or IRC), allowable tension loads shall be multiplied by 0.80 and stainless steel or zinc coated anchors per section 5.9 of this report shall be used.



**TABLE 4 - EDGE AND END DISTANCE REQUIREMENTS AND ALLOWABLE LOAD REDUCTION FACTORS FOR THREADED ROD AND REBAR WITH SET-XP® EPOXY ADHESIVE IN THE TOP OF FULLY GROUTED CMU WALL CONSTRUCTION<sup>1,4,5</sup>**

| Rod Dia. (inch) or Rebar Size No. | Min. Embed. Depth (inches) | Critical Edge and End (Full Anchor Capacity) <sup>2</sup> |                                 |                                 | Minimum End (Reduced Anchor Capacity) <sup>3</sup> |                                       |                    |      | Minimum Edge (Reduced Anchor Capacity) <sup>3</sup> |                                        |                    |      |
|-----------------------------------|----------------------------|-----------------------------------------------------------|---------------------------------|---------------------------------|----------------------------------------------------|---------------------------------------|--------------------|------|-----------------------------------------------------|----------------------------------------|--------------------|------|
|                                   |                            | Critical Edge, $c_{cr}$ (inches)                          | Critical End, $c_{cr}$ (inches) | Allowable Load Reduction Factor | Min. End, $c_{min}$ (inches)                       | Min. End Allow. Load Reduction Factor |                    |      | Min. Edge, $c_{min}$ (inches)                       | Min. Edge Allow. Load Reduction Factor |                    |      |
|                                   |                            |                                                           |                                 |                                 |                                                    |                                       |                    |      |                                                     |                                        |                    |      |
|                                   |                            | Tension or Shear                                          | Tension or Shear                | Tension or Shear                | Tension or Shear                                   | Tension                               | Shear <sup>6</sup> |      | Tension or Shear                                    | Tension                                | Shear <sup>6</sup> |      |
|                                   |                            |                                                           |                                 |                                 | Perp.                                              | Para.                                 |                    |      | Perp.                                               | Para.                                  |                    |      |
| 1/2                               | 4-1/2                      | 2-3/4                                                     | 20                              | 1.00                            | 3-13/16                                            | 0.88                                  | 0.84               | 0.66 | 1 3/4                                               | 0.83                                   | 0.63               | 0.77 |
|                                   | 12                         | 2-3/4                                                     | 20                              | 1.00                            | 3-13/16                                            | 0.64                                  | 0.91               | 0.34 | 1 3/4                                               | 0.95                                   | 0.55               | 0.69 |
| 5/8                               | 5-5/8                      | 2- 3/4                                                    | 20                              | 1.00                            | 4-1/4                                              | 0.90                                  | 1.00               | 0.50 | 1 3/4                                               | 0.82                                   | 0.57               | 0.71 |
|                                   | 15                         | 2-3/4                                                     | 20                              | 1.00                            | 4-1/4                                              | 0.38                                  | 0.85               | 0.29 | 1 3/4                                               | 0.91                                   | 0.72               | 0.73 |
| 7/8                               | 7-7/8                      | 2-3/4                                                     | 20                              | 1.00                            | 4-1/4                                              | 0.98                                  | 0.72               | 0.57 | --                                                  | --                                     | --                 | --   |
|                                   | 21                         | 2-3/4                                                     | 20                              | 1.00                            | 4-1/4                                              | 0.63                                  | 0.96               | 0.64 | --                                                  | --                                     | --                 | --   |
| No. 4                             | 4-1/2                      | 2-3/4                                                     | 20                              | 1.00                            | 4-1/4                                              | 0.96                                  | 0.90               | 0.76 | --                                                  | --                                     | --                 | --   |
|                                   | 12                         | 2-3/4                                                     | 20                              | 1.00                            | 4-1/4                                              | 0.58                                  | 1.00               | 0.46 | --                                                  | --                                     | --                 | --   |
| No. 5                             | 5-5/8                      | 2-3/4                                                     | 20                              | 1.00                            | 4-1/4                                              | 1.00                                  | 0.86               | 0.60 | --                                                  | --                                     | --                 | --   |
|                                   | 15                         | 2-3/4                                                     | 20                              | 1.00                            | 4-1/4                                              | 0.41                                  | 0.76               | 0.49 | --                                                  | --                                     | --                 | --   |

For SI: 1 inch = 25.4 mm.

- Edge and end distances ( $c_{cr}$  or  $c_{min}$ ) are the distances measured from anchor centerline to edge or end of CMU masonry wall. [Figures 3A and 3B of this report](#) show critical and minimum edge and end distances.
- Critical edge and end distances,  $c_{cr}$ , are the least edge distances at which tabulated allowable load of an anchor is achieved where a load reduction factor equals 1.0 (no load reduction).
- Minimum edge and end distances,  $c_{min}$ , are the least edge distances where an anchor has an allowable load capacity, which shall be determined by multiplying the allowable loads assigned to anchors installed at critical edge distance,  $c_{cr}$ , in [Table 6 of this report](#) by the load reduction factors shown above.
- Reduction factors are cumulative. Multiple reduction factors for more than one spacing ([Table 5 of this report](#)) or edge or end distance shall be calculated separately and multiplied.
- Load reduction factor for anchors loaded in tension or shear with edge and end distances between critical and minimum shall be obtained by linear interpolation.
- Perpendicular shear loads act towards the edge or end. Parallel shear loads act parallel to the edge or end (illustrated in [Figure 5 of this report](#)). Perpendicular and parallel shear load reduction factors are cumulative when the anchor is located between the critical and minimum edge and end distance.



**TABLE 5 – SPACING DISTANCE REQUIREMENTS AND ALLOWABLE LOAD REDUCTION FACTORS FOR THREADED ROD AND REBAR WITH SET-XP® EPOXY ADHESIVE IN THE TOP OF FULLY GROUTED CMU WALL CONSTRUCTION<sup>1,4,5</sup>**

| Rod Dia. (inch) or Rebar Size No. | Min. Embed. Depth (inches) | Critical Spacing (Full Anchor Capacity) <sup>2</sup> |                                 | Minimum Spacing (Reduced Anchor Capacity) <sup>3</sup> |                                 |       |
|-----------------------------------|----------------------------|------------------------------------------------------|---------------------------------|--------------------------------------------------------|---------------------------------|-------|
|                                   |                            | Critical Spacing, $s_{cr}$ (inches)                  | Allowable Load Reduction Factor | Minimum Spacing, $s_{cr}$ (inches)                     | Allowable Load Reduction Factor |       |
|                                   |                            | Load Direction                                       |                                 | Load Direction                                         |                                 |       |
|                                   |                            | Tension or Shear                                     | Tension or Shear                | Tension or Shear                                       | Tension                         | Shear |
| 1/2                               | 4-1/2                      | 18                                                   | 1.00                            | 8                                                      | 0.80                            | 0.92  |
|                                   | 12                         | 48                                                   | 1.00                            | 8                                                      | 0.63                            | 0.98  |
| 5/8                               | 5-5/8                      | 22.5                                                 | 1.00                            | 8                                                      | 0.86                            | 1.00  |
|                                   | 15                         | 60                                                   | 1.00                            | 8                                                      | 0.56                            | 1.00  |
| 7/8                               | 7-7/8                      | 31.5                                                 | 1.00                            | 8                                                      | 0.84                            | 0.82  |
|                                   | 21                         | 84                                                   | 1.00                            | 8                                                      | 0.51                            | 0.98  |
| No. 4                             | 4-1/2                      | 18                                                   | 1.00                            | 8                                                      | 0.97                            | 0.93  |
|                                   | 12                         | 48                                                   | 1.00                            | 8                                                      | 0.75                            | 1.00  |
| No. 5                             | 5-5/8                      | 22.5                                                 | 1.00                            | 8                                                      | 1.00                            | 1.00  |
|                                   | 15                         | 60                                                   | 1.00                            | 8                                                      | 0.82                            | 1.00  |

For SI: 1 inch = 25.4 mm.

- Anchor spacing ( $s_{cr}$  or  $s_{min}$ ) is the distance measured from centerline to centerline of two anchors.
- Critical spacing,  $s_{cr}$ , is the least anchor spacing at which tabulated allowable load of an anchor is achieved such that anchor performance is not influenced by adjacent anchors.
- Minimum spacing,  $s_{min}$ , is the least spacing where an anchor has an allowable load capacity, which shall be determined by multiplying the allowable loads assigned to anchors installed at critical spacing distance,  $s_{cr}$ , in [Table 6 of this report](#) by the load reduction factors shown in this table.
- Reduction factors are cumulative. Multiple reduction factors for more than one spacing or edge or end ([Table 4 of this report](#)) distance shall be calculated separately and multiplied.
- Load reduction factor for anchors loaded in tension with spacing between critical and minimum shall be obtained by linear interpolation.



**TABLE 6 - ALLOWABLE TENSION AND SHEAR VALUES FOR THREADED ROD AND REBAR WITH SET-XP® EPOXY ADHESIVE IN THE TOP OF FULLY GROUTED CMU WALL CONSTRUCTION<sup>1,2,4,5,6,7,9,10,11,12</sup>**

| Diameter (inch) or Rebar Size No.                    | Drill Bit Diameter (inch) | Minimum Embedment <sup>3</sup> (inches) | Allowable Load based on Bond Strength <sup>8</sup> (pounds) |             |                |
|------------------------------------------------------|---------------------------|-----------------------------------------|-------------------------------------------------------------|-------------|----------------|
|                                                      |                           |                                         | Tension                                                     | Shear Perp. | Shear Parallel |
| <b>Threaded Rod Installed in the Top of CMU Wall</b> |                           |                                         |                                                             |             |                |
| 1/2                                                  | 5/8                       | 4-1/2                                   | 1,485                                                       | 590         | 1,050          |
|                                                      |                           | 12                                      | 2,440                                                       | 665         | 1,625          |
| 5/8                                                  | 3/4                       | 5-5/8                                   | 1,700                                                       | 565         | 1,435          |
|                                                      |                           | 15                                      | 2,960                                                       | 660         | 1,785          |
| 7/8                                                  | 1                         | 7-7/8                                   | 1,610                                                       | 735         | 1,370          |
|                                                      |                           | 21                                      | 4,760                                                       | 670         | 1,375          |
| <b>Rebar Installed in the Top of CMU Wall</b>        |                           |                                         |                                                             |             |                |
| No. 4                                                | 5/8                       | 4-1/2                                   | 1,265                                                       | 550         | 865            |
|                                                      |                           | 12                                      | 2,715                                                       | 465         | 1,280          |
| No. 5                                                | 3/4                       | 5-5/8                                   | 1,345                                                       | 590         | 1,140          |
|                                                      |                           | 15                                      | 3,090                                                       | 590         | 1,285          |

For SI: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.48 N.

1. Allowable load shall be the lesser of bond values given in Table 6 of this report and steel values given in [Tables 9 or 10](#) of this report as applicable.
2. Allowable loads are for installations in the grouted CMU core opening.
3. Embedment depth is measured from the horizontal surface of the grouted CMU core opening on top of the masonry wall.
4. Critical and minimum edge distance and spacing shall comply with [Tables 4 and 5](#). [Figures 3A of this report](#) and [3B of this report](#) shows critical and minimum edge and end distances.
5. Minimum allowable nominal width of CMU wall shall be 8 inches (203 mm).
6. Anchors are permitted to be installed in the CMU core opening shown in [Figures 3A and 3B of this report](#). Anchors are limited to one installation per CMU core opening.
7. Tabulated load values are for anchors installed in fully grouted masonry walls constructed from materials complying with Section 3.2.6 of this report.
8. Tabulated allowable loads are based on a safety factor of 5.0 for installations under the IBC and the IRC.
9. Tabulated allowable load values shall be adjusted for increased base material temperatures in accordance with [Figure 1 of this report](#), as applicable.
10. Threaded rod and rebar installed in fully grouted masonry walls with SET-XP adhesive are permitted to resist dead, live, seismic and wind loads. Section 4.1 of this report provides additional design requirement details.
11. Threaded rods shall meet or exceed the tensile strength of ASTM F1554, Grade 36 steel, which is 58,000 psi
12. For installations exposed to severe, moderate or negligible exterior weathering conditions, as defined in Figure 1 of ASTM C62 (IBC or IRC), allowable tension loads shall be multiplied by 0.80 and stainless steel or zinc coated anchors complying with Section 5.9 of this report shall be used.



**TABLE 7 - EDGE, END AND SPACING DISTANCE REQUIREMENTS AND ALLOWABLE LOAD REDUCTION FACTORS FOR THREADED ROD WITH SET-XP® EPOXY ADHESIVE IN THE FACE OF HOLLOW CMU WALL CONSTRUCTION<sup>7</sup>**

| Rod Dia. (in) | Edge or End Distance <sup>1,8</sup>           |                                 |                                                |                                 |       | Spacing <sup>2,9</sup>                       |                                 |                                                |                                 |       |
|---------------|-----------------------------------------------|---------------------------------|------------------------------------------------|---------------------------------|-------|----------------------------------------------|---------------------------------|------------------------------------------------|---------------------------------|-------|
|               | Critical (Full Anchor Capacity) <sup>3</sup>  |                                 | Minimum (Reduced Anchor Capacity) <sup>4</sup> |                                 |       | Critical (Full Anchor Capacity) <sup>5</sup> |                                 | Minimum (Reduced Anchor Capacity) <sup>6</sup> |                                 |       |
|               | Critical Edge or End Distance, $c_{cr}$ (in.) | Allowable Load Reduction Factor | Minimum Edge or End Distance, $c_{min}$ (in.)  | Allowable Load Reduction Factor |       | Critical Spacing, $s_{cr}$ (in)              | Allowable Load Reduction Factor | Minimum Spacing, $s_{min}$ (in)                | Allowable Load Reduction Factor |       |
|               | Load Direction                                |                                 | Load Direction                                 |                                 |       | Load Direction                               |                                 | Load Direction                                 |                                 |       |
|               | Tension or Shear                              | Tension or Shear                | Tension or Shear                               | Tension                         | Shear | Tension or Shear                             | Tension or Shear                | Tension or Shear                               | Tension                         | Shear |
|               | 3/8                                           | 12                              | 1.00                                           | 4                               | 1.00  | 0.74                                         | 8                               | 1.00                                           | 4                               | 0.82  |
| 1/2           | 12                                            | 1.00                            | 4                                              | 0.96                            | 0.69  | 8                                            | 1.00                            | 4                                              | 0.79                            | 0.73  |
| 5/8           | 12                                            | 1.00                            | 4                                              | 0.96                            | 0.55  | 8                                            | 1.00                            | 4                                              | 0.75                            | 0.73  |

For SI: 1 inch = 25.4 mm.

- Edge and end distances ( $c_{cr}$  or  $c_{min}$ ) are the distances measured from anchor centerline to edge or end of CMU masonry wall. [Figure 4 of this report](#) shows critical and minimum edge and end distances.
- Anchor spacing ( $s_{cr}$  or  $s_{min}$ ) is the distance measured from centerline to centerline of two anchors.
- Critical edge and end distances,  $c_{cr}$ , are the least edge distances at which tabulated allowable load of an anchor is achieved where a load reduction factor equals 1.0 (no Load reduction).
- Minimum edge and end distances,  $c_{min}$ , are the least edge distances where an anchor has an allowable load capacity, which shall be determined by multiplying the allowable loads assigned to anchors installed at critical edge distance,  $c_{cr}$ , in [Table 8 of this report](#) by the load reduction factors shown above.
- Critical spacing,  $s_{cr}$ , is the least anchor spacing at which tabulated allowable load of an anchor is achieved such that anchor performance is not influenced by adjacent anchors.
- Minimum spacing,  $s_{min}$ , is the least spacing where an anchor has an allowable load capacity, which shall be determined by multiplying the allowable loads assigned to anchors installed at critical spacing distance,  $s_{cr}$ , in [Table 8 of this report](#) by the load reduction factors shown above.
- Reduction factors are cumulative. Multiple reduction factors for more than one spacing or edge or end distance shall be calculated separately and multiplied.
- Load reduction factor for anchors loaded in tension or shear with edge and end distances between critical and minimum shall be obtained by linear interpolation.
- Load reduction factor for anchors loaded in tension with spacing between critical and minimum shall be obtained by linear interpolation.

**TABLE 8 - ALLOWABLE TENSION AND SHEAR VALUES FOR THREADED ROD WITH SET-XP® EPOXY ADHESIVE IN THE FACE OF HOLLOW CMU WALL CONSTRUCTION<sup>1,3,4,5,6,8,9,10,11</sup>**

| Diameter (inch) | Drill Bit Diameter (inch) | Minimum Embed <sup>2</sup> (inches) | Allowable Load based on Bond Strength <sup>7</sup> (pounds) |       |
|-----------------|---------------------------|-------------------------------------|-------------------------------------------------------------|-------|
|                 |                           |                                     | Tension                                                     | Shear |
| 3/8             | 9/16                      | 1-1/4                               | 215                                                         | 385   |
| 1/2             | 3/4                       | 1-1/4                               | 220                                                         | 410   |
| 5/8             | 7/8                       | 1-1/4                               | 225                                                         | 435   |

For SI: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.48 N.

- Allowable load shall be the lesser of bond values given in Table 8 of this report and steel values given in [Table 9](#) of this report as applicable.
- Embedment depth is considered the minimum wall thickness of 8 inch x 8 inch x 16 inch [ASTM C90](#) concrete masonry blocks and is measured from the outside to the inside face of the block wall. The minimum length Opti-Mesh™ plastic screen tube for use in hollow CMU is 3½ inches.
- Critical and minimum edge distance and spacing shall comply with [Table 7 of this report](#). [Figure 4 of this report](#) shows critical and minimum edge and end distances.
- Anchors are permitted to be installed in the face shell of hollow masonry wall construction as shown in [Figure 4 of this report](#).
- Anchors are limited to one or two anchors per masonry cell and shall comply with the spacing and edge distance requirements of [Table 7 of this report](#).
- Tabulated load values are for anchors installed in hollow masonry walls constructed from materials per Sections 3.2.6.1 and 3.2.6.3 of this report.
- Tabulated allowable loads are based on a safety factor of 5.0 for installations under the IBC and the IRC.
- Tabulated allowable load values shall be adjusted for increased base material temperatures in accordance with [Figure 1 of this report](#), as applicable.
- Threaded rod installed in hollow masonry walls with SET-XP adhesive are permitted to resist dead load, live load and wind load applications. Section 4.1 of this report provides additional design requirement details.
- Threaded rods shall meet or exceed the tensile strength of ASTM F1554, Grade 36, which is 58,000 psi.
- For installations exposed to severe, moderate or negligible exterior weathering conditions, as defined in Figure 1 of ASTM C62 (IBC or IRC), allowable tension loads shall be multiplied by 0.80 and stainless steel or zinc coated anchors complying with Section 5.9 of this report shall be used.



**TABLE 9 - ALLOWABLE TENSION AND SHEAR VALUES FOR THREADED ROD BASED ON STEEL STRENGTH<sup>1, 7</sup>**

| THREADED ROD DIAMETER (inch) | TENSILE STRESS AREA (inch <sup>2</sup> ) | TENSION LOAD BASED ON STEEL STRENGTH <sup>2</sup> (pounds) |                                  |                                   |                                           | SHEAR LOAD BASED ON STEEL STRENGTH <sup>3</sup> (pounds) |                                  |                                  |                                           |
|------------------------------|------------------------------------------|------------------------------------------------------------|----------------------------------|-----------------------------------|-------------------------------------------|----------------------------------------------------------|----------------------------------|----------------------------------|-------------------------------------------|
|                              |                                          | ASTM F1554, GRAD E 36 <sup>4</sup>                         | ASTM A193, GRADE B7 <sup>6</sup> | STAINLESS STEEL                   |                                           | ASTM F1554, GRADE 36 <sup>4</sup>                        | ASTM A193, GRADE B7 <sup>6</sup> | STAINLESS STEEL                  |                                           |
|                              |                                          |                                                            |                                  | ASTM A193, GRAD E B6 <sup>5</sup> | ASTM A193, GRADES B8 AND B8M <sup>7</sup> |                                                          |                                  | ASTM A193, GRADE B6 <sup>5</sup> | ASTM A193, GRADES B8 AND B8M <sup>7</sup> |
| 3/8                          | 0.078                                    | 1,495                                                      | 3,220                            | 2,830                             | 1,930                                     | 770                                                      | 1,660                            | 1,460                            | 995                                       |
| 1/2                          | 0.142                                    | 2,720                                                      | 5,860                            | 5,155                             | 3,515                                     | 1,400                                                    | 3,020                            | 2,655                            | 1,810                                     |
| 5/8                          | 0.226                                    | 4,325                                                      | 9,325                            | 8,205                             | 5,595                                     | 2,230                                                    | 4,805                            | 4,225                            | 2,880                                     |
| 3/4                          | 0.334                                    | 6,395                                                      | 13,780                           | 12,125                            | 8,265                                     | 3,295                                                    | 7,100                            | 6,245                            | 4,260                                     |
| 7/8                          | 0.462                                    | 8,845                                                      | 19,055                           | 16,770                            | 11,435                                    | 4,555                                                    | 9,815                            | 8,640                            | 5,890                                     |

For SI: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.48 N.

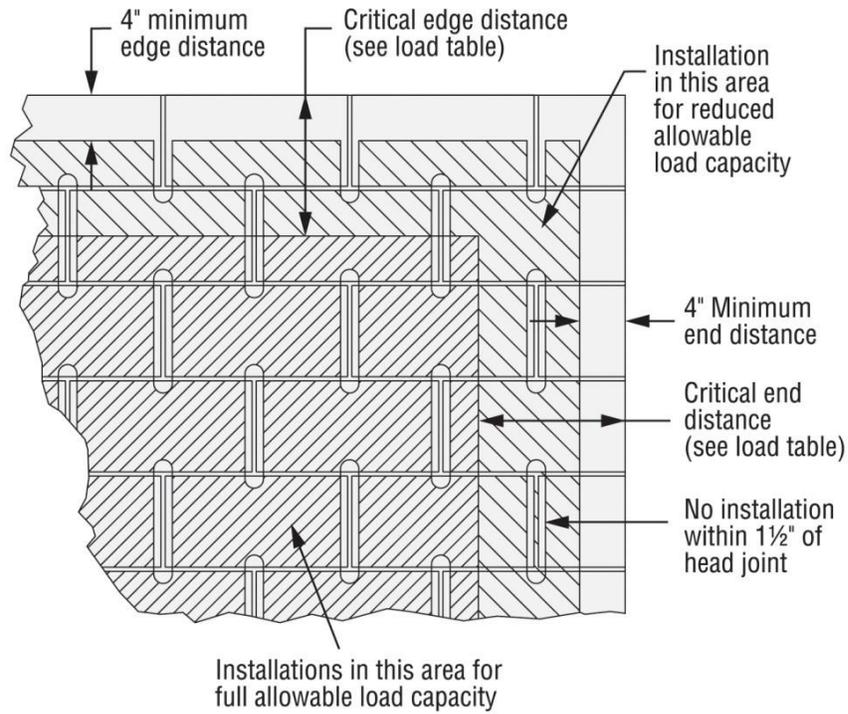
1. Allowable load shall be the lesser of bond values given in [Tables 3, 6 and 8 of this report](#) and steel values given in Table 9 of this report.
2. Allowable Tension Steel Strength based on AC58 Section 3.3.3 ( $F_t = 0.33 \times F_u \times \text{Tensile Stress Area}$ )
3. Allowable Shear Steel Strength based on AC58 Section 3.3.3 ( $F_v = 0.17 \times F_u \times \text{Tensile Stress Area}$ )
4. Minimum specified tensile strength ( $F_u = 58$  ksi) of ASTM F1554, Grade 36 used to calculate allowable steel strength.
5. Minimum specified tensile strength ( $F_u = 110$  ksi) of [ASTM A193](#), Grade B6 used to calculate allowable steel strength.
6. Minimum specified tensile strength ( $F_u = 125$  ksi) of ASTM A193, Grade B7 used to calculate allowable steel strength.
7. Minimum specified tensile strength ( $F_u = 75$  ksi) of ASTM A193, Grades B8 and B8M used to calculate allowable steel strength.

**TABLE 10 - ALLOWABLE TENSION AND SHEAR VALUES FOR DEFORMED REINFORCING BAR BASED ON STEEL STRENGTH<sup>1</sup>**

| REBAR SIZE NUMBER | TENSILE STRESS AREA (inch <sup>2</sup> ) | TENSION LOAD (pounds)           |                                 | SHEAR LOAD (pounds)               |                                   |
|-------------------|------------------------------------------|---------------------------------|---------------------------------|-----------------------------------|-----------------------------------|
|                   |                                          | BASED ON STEEL STRENGTH         |                                 | BASED ON STEEL STRENGTH           |                                   |
|                   |                                          | ASTM A615 GRADE 40 <sup>2</sup> | ASTM A615 GRADE 60 <sup>3</sup> | ASTM A615 GRADE 40 <sup>4,5</sup> | ASTM A615 GRADE 60 <sup>4,6</sup> |
| #3                | 0.11                                     | 2,200                           | 2,640                           | 1,310                             | 1,685                             |
| #4                | 0.20                                     | 4,000                           | 4,800                           | 2,380                             | 3,060                             |
| #5                | 0.31                                     | 6,200                           | 7,440                           | 3,690                             | 4,745                             |

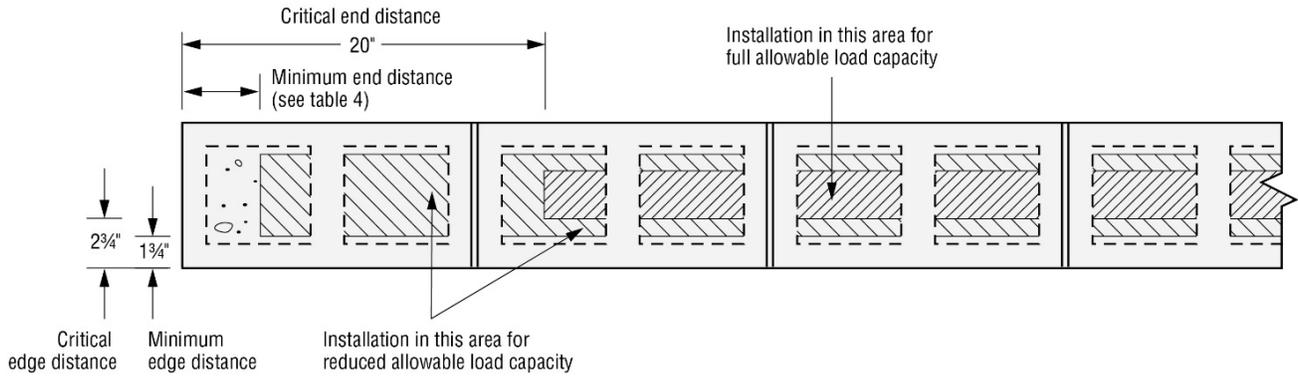
For SI: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.48 N.

1. Allowable load shall be the lesser of bond values given in [Tables 3 and 6 of this report](#) and steel values given in Table 10 of this report.
2. Allowable tension steel strength based on AC58 Section 3.3.3 (20,000 psi  $\times$  tensile stress area) for Grade 40 rebar.
3. Allowable tension steel strength based on AC58 Section 3.3.3 (24,000 psi  $\times$  tensile stress area) for Grade 60 rebar.
4. Allowable shear steel strength based on AC58 Section 3.3.3 ( $F_v = 0.17 \times F_u \times \text{tensile stress area}$ ).
5.  $F_u = 70,000$  psi for Grade 40 rebar.
6.  $F_u = 90,000$  psi for Grade 60 rebar.

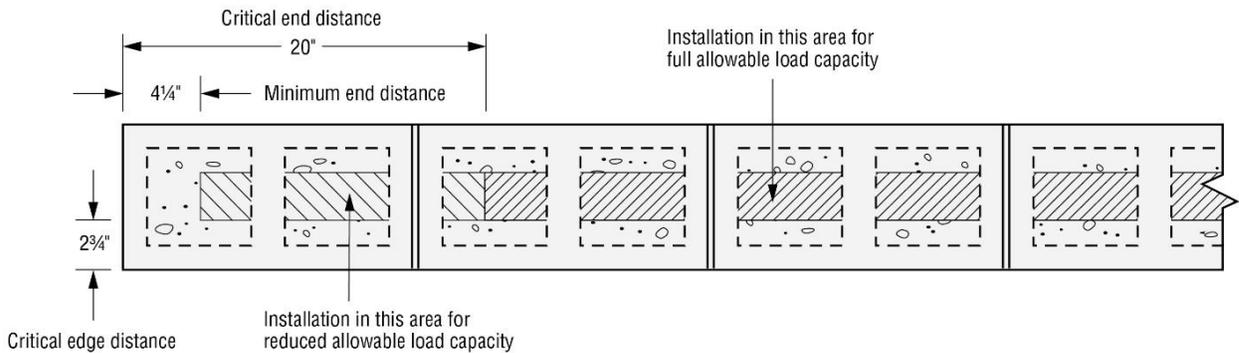


**Shaded Area = Placement for Full and Reduced Allowable Load Capacity in Grout-Filled CMU**

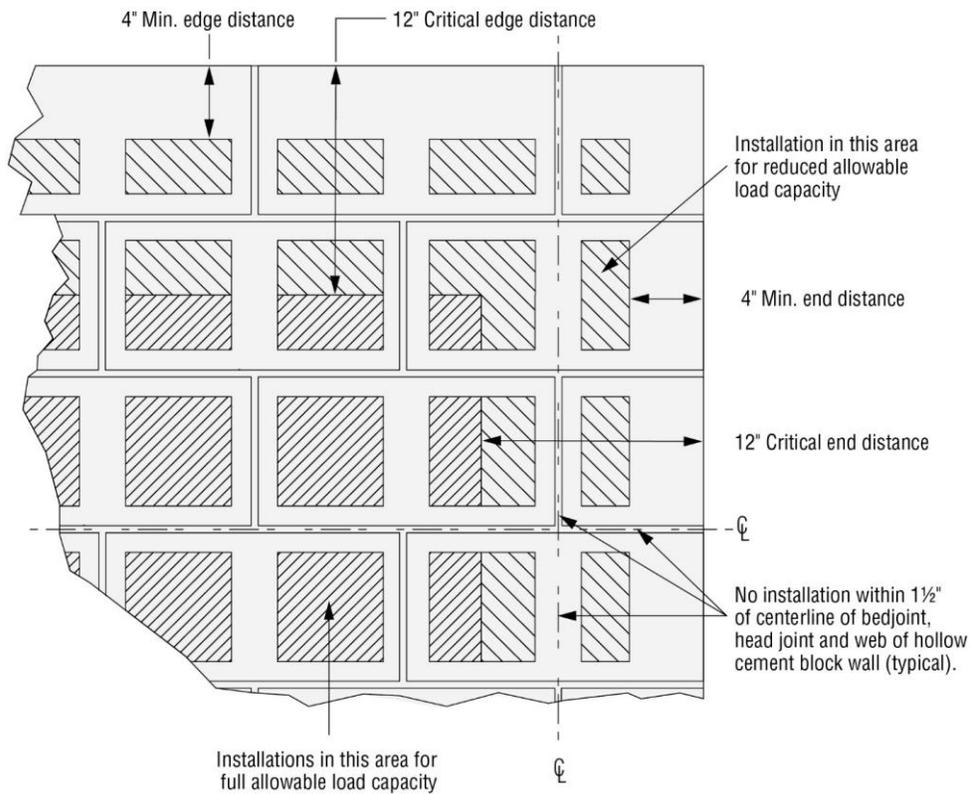
**FIGURE 2—ALLOWABLE ANCHOR LOCATIONS FOR FULL AND REDUCED LOAD CAPACITY WHEN INSTALLATION IS IN THE FACE OF FULLY GROUTED CMU MASONRY WALL CONSTRUCTION**



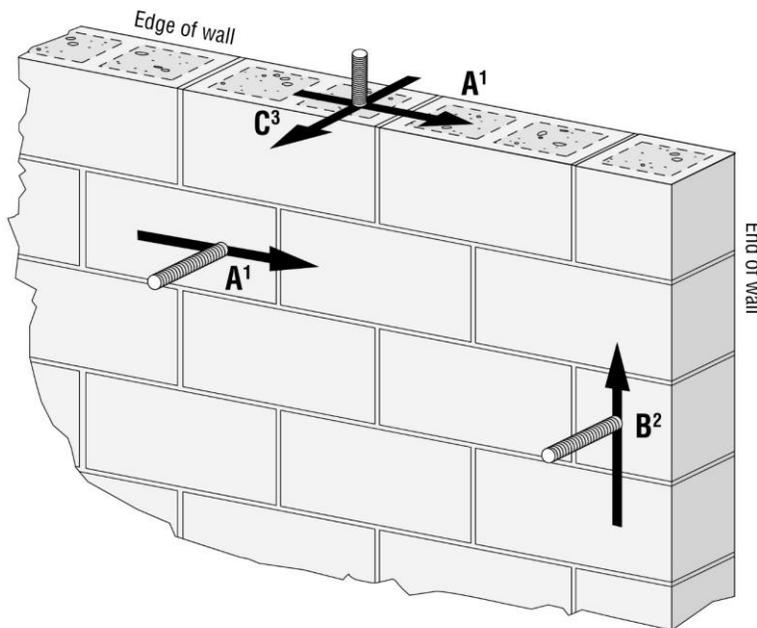
**FIGURE 3A – 1/2 INCH AND 5/8 INCH DIAMETER THREADED ROD ALLOWABLE ANCHOR LOCATIONS FOR FULL AND REDUCED LOAD CAPACITY WHEN INSTALLATION IS IN THE TOP OF FULLY GROUTED CMU MASONRY WALL CONSTRUCTION**



**FIGURE 3B – 7/8 INCH DIAMETER THREADED ROD AND NO. 4 AND NO. 5 REBAR ALLOWABLE ANCHOR LOCATIONS FOR FULL AND REDUCED LOAD CAPACITY WHEN INSTALLATION IS IN THE TOP OF FULLY GROUTED CMU MASONRY WALL CONSTRUCTION**



**FIGURE 4 – ALLOWABLE ANCHOR LOCATIONS FOR FULL AND REDUCED LOAD CAPACITY WHEN INSTALLATION IS IN THE FACE OF HOLLOW CMU MASONRY WALL CONSTRUCTION**



1. Direction of shear load A is parallel to edge of wall and perpendicular to end of wall.
2. Direction of shear load B is parallel to end of wall and perpendicular to edge of wall.
3. Direction of shear load C is perpendicular to edge of wall.

**FIGURE 5—DIRECTION OF SHEAR LOAD IN RELATION TO EDGE AND END OF WALL**



## CITY OF LOS ANGELES SUPPLEMENT

### SET-XP<sup>®</sup> EPOXY ADHESIVE ANCHORS FOR MASONRY

#### REPORT HOLDER:

**Simpson Strong-Tie Company Inc.**  
**225956 West Las Positas Boulevard**  
**Pleasanton, California 94588**  
**(800) 999-5099**

[www.strongtie.com](http://www.strongtie.com)

CSI division: 04 00 00—MASONRY

CSI Section: 04 05 19.16—Masonry Anchors

#### 1.0 RECOGNITION

The Simpson Strong-Tie<sup>®</sup> SET-XP Epoxy Adhesive Anchors recognized in ER-265 have been evaluated for use to resist dead, live, wind, and seismic tension and shear loads. The structural performance properties of the Simpson Strong-Tie<sup>®</sup> SET-XP Epoxy Adhesive Anchors were evaluated for compliance with the following codes:

- 2020 City of Los Angeles Building Code (LABC)
- 2020 City of Los Angeles Residential Code (LARC)

#### 2.0 LIMITATIONS

The Simpson Strong-Tie<sup>®</sup> SET-XP Epoxy Adhesive Anchors described in IAPMO UES ER-265 complies with the 2020 and 2017 LABC Chapter 21 and LARC subject to the following limitations:

- 2.1 The design, installation, conditions of use and identification of the Simpson Strong-Tie<sup>®</sup> SET-XP adhesive anchors shall be in accordance with the 2018 IBC or IRC (2020 LABC and 2020 LARC), or 2015 IBC or IRC (2020 LABC and 2020 LARC) as noted in ER-265.
- 2.2 Prior to installation, calculations and details demonstrating compliance with this approval report and the 2020 LABC or 2020 LARC shall be submitted to the structural plan check section for review and approval. The calculations and details shall be prepared by a registered engineer, licensed in the State of California.
- 2.3 The design and installation of the Simpson Strong-Tie<sup>®</sup> AT-XP adhesive anchors shall be in accordance with 2020 LABC Chapters 16 and 17 or Section 2114, as applicable.

2.4 The design information listed in the report and tables of ER-265 is valid for the anchorage to concrete only. Connected members also shall be analyzed for structural capacities in accordance with the applicable requirements in the 2020 LABC or LARC.

2.5 Periodic special inspection shall be provided by the Registered Deputy Inspector in accordance with Section 1705 of the 2020 LABC during installations of the Simpson Strong-Tie<sup>®</sup> AT-XP adhesive anchors.

2.6 Under the 2020 LARC a design in accordance with Section R301.1.3 shall be submitted.

This supplement expires concurrently with ER-265.

For additional information about this evaluation report please visit

[www.uniform-es.org](http://www.uniform-es.org) or email us at [info@uniform-es.org](mailto:info@uniform-es.org)



### FLORIDA SUPPLEMENT

#### SET-XP™ EPOXY ADHESIVE ANCHORS FOR MASONRY

##### REPORT HOLDER:

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(800) 999-5099  
[www.strongtie.com](http://www.strongtie.com)

**CSI Division: 04 00 00 MASONRY**  
**CSI Section: 04 05 19.16 Masonry Anchors**

#### 1.0 RECOGNITION

Simpson Strong-Tie® SET-XP Epoxy Adhesive Anchors recognized in ER-265 has been evaluated for use to resist dead, live, wind, and seismic tension and shear loads. The structural performance properties of the Simpson Strong-Tie® SET-XP™ adhesive anchors were evaluated for compliance with the following codes:

- 2020 and 2017 Florida Building Code, Building (FBC--Building)
- 2020 and 2017 Florida Building Code, Residential (FBC--Residential)

#### 2.0 LIMITATIONS

Simpson Strong-Tie® SET-XP™ adhesive anchors described in IAPMO UES ER-265 complies with the 2020 and 2017 FBC--Building and the 2020 and 2017 FBC--Residential, subject to the following limitations:

1. The design and installation of the Simpson Strong-Tie® SET-XP™ adhesive anchors shall be in accordance with the 2018 or 2015 International Building Code and the 2018 or 2015 International Residential Code as noted in ER-265.
2. Load combinations shall be in accordance with Sections 1605.2 or 1605.3 of the FBC--Building, as applicable.
2. Design wind loads shall be in accordance with Section 1609.5 of the FBC--Building or Section R301.2.1.1 of the FBC--Residential, as applicable, and Section 1620 of the FBC--Building where used in High-velocity Hurricane Zones (HVHZ).
3. Use of Simpson Strong-Tie® SET-XP™ adhesive anchors in High-velocity Hurricane Zones (HVHZ) as set forth in Section 2321.5.2 of the FBC--Building and Section 4409 of the FBC--Residential to resist wind uplift is permitted. The anchors shall be designed to resist the uplift forces as required in Section 1620

(HVHZ) of the FBC--Building or 700 pounds (3114 N), whichever is greater, per FBC--Building Section 2321.7.

4. Use of Simpson Strong-Tie® SET-XP™ adhesive anchors in High-velocity Hurricane Zones (HVHZ) as set forth in Section 2122.7 of the FBC--Building and Section 4407 of the FBC--Residential to resist wind forces is permitted. The anchors shall be designed to resist the horizontal forces as required in Section 1620 (HVHZ) of the FBC--Building or 200 pounds per lineal foot (2919 N/m) of wall, whichever is greater, per FBC--Building Section 2122.7.3.
5. Use of Simpson Strong-Tie® SET-XP™ adhesive anchors with stainless steel or galvanized carbon steel threaded rod complies with the High-Velocity Hurricane Zone (HVHZ) provisions set forth in Sections 2324.2 of the FBC--Building.
6. Use of Simpson Strong-Tie® SET-XP™ adhesive anchors with carbon steel threaded rods or reinforcing bars in applications exposed to the weather within High-velocity Hurricane Zones (HVHZ) set forth in the FBC--Building and the FBC--Residential is beyond 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 (or the building official when the report holder does not possess an approval by the Commission) is required to provide oversight and determine that the products are being manufactured as described in this evaluation report to establish continual product performance.

This supplement expires concurrently with ER-265.

**For additional information about this evaluation report please visit**  
[www.uniform-es.org](http://www.uniform-es.org) or email us at [info@uniform-es.org](mailto:info@uniform-es.org)