ICC-ES Evaluation Report

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This report also contains:

- City of LA Supplement
- FL Supplement w/ HVHZ

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DIVISION: 04 00 00—MASONRY Section: 04 05 19.16—Masonry Anchors	REPORT HOLDER: SIMPSON STRONG-TIE COMPANY INC.	EVALUATION SUBJECT: SIMPSON STRONG-TIE TITEN HD® SCREW ANCHORS IN CRACKED AND UNCRACKED, GROUTED AND UNGROUTED CONCRETE MASONRY UNIT WALLS	

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)

Main references of this report are for the 2024 IBC and IRC. See Table 14 and Table 15 for applicable sections of the code for previous IBC and IRC editions.

Property evaluated:

- Structural

2.0 USES

The Titen HD® screw anchors installed in predrilled holes are used as anchorage in cracked and uncracked concrete masonry unit (CMU) walls to anchor building components to fully grouted, partially grouted, or hollow (ungrouted) lightweight, medium weight or normal-weight concrete masonry wall construction. The anchor system is designed to resist static, wind, and earthquake (Seismic Design Categories A through F) tension and shear loads.

The Titen HD screw anchors are alternatives to cast-in-place anchors described in Section 9.1.6 of TMS 402 as referenced in Section 2108.1 of the IBC.

The anchors are permitted to be used in structures regulated by the IRC, provided an engineered design is submitted in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 Materials:

3.1.1 Titen HD Screw Anchor: The Titen HD screw anchor is a threaded screw anchor available with a hex-washer head, a countersunk head, or a flat-washer head in carbon steel, and with a hex-washer head or a countersunk head in stainless steel. The carbon steel Titen HD screw anchors are manufactured from heat-treated steel complying with SAE J403 Grade 10B21, and has either an electrodeposited coating of zinc in accordance with ASTM B633, Service Condition SC1, Type III; or a mechanically deposited coating of zinc in accordance with ASTM B695, Class 65, Type I. The stainless steel Titen HD screw anchors are manufactured from AISI Type 304 or AISI Type 316 stainless steel material. The leading hardened carbon steel helical-coil cutting thread is made of carbon steel complying with the manufacturer's quality documentation.

Carbon steel Titen HD screw anchors with electrodeposited zinc coating are available with nominal $^1/_4$-, $^3/_8$-, $^1/_2$-, $^5/_8$-, and $^3/_4$-inch (6.4, 9.5, 12.7, 15.9 and 19.1 mm) shank diameters with a hex-washer head, with nominal $^1/_4$- and $^3/_8$-inch (6.4 and 9.5 mm) shank diameters with a countersunk head and with $^1/_2$- and $^5/_8$- inch (12.7 and 15.9 mm) shank diameters with a flat-washer head. Carbon steel Titen HD screw anchors with mechanically deposited zinc coating are available with nominal $^1/_4$-, $^3/_8$-, $^1/_2$-, $^5/_8$-, and $^3/_4$-inch (6.4, 9.5, 12.7, 15.9 and 19.1 mm) shank diameters with a hex-washer head and with $^1/_2$- and $^5/_8$- inch (12.7 and 15.9 mm) shank diameters with a flat-washer head. Stainless steel Titen HD screw anchors with a hex-washer head are available with nominal ¼-, $^3/_8$-, $^1/_2$-, $^5/_8$-, and $^3/_4$-inch (6.4, 9.5, 12.7, 15.9 and 19.1 mm) shank diameters. Stainless steel Titen HD screw anchor with a countersunk head are available with nominal ¼- and $^3/_8$-inch (6.4 and 9.5 mm) shank diameter. Refer to Figure 1A and 1C for an illustration of a typical screw anchor. Refer to Table 16 for catalog number information.

3.1.2 Titen HD Rod Coupler: The Titen HD® Rod Coupler is a carbon steel threaded anchor with an extended shank and an oversized hex-washer head that is internally threaded. The rod coupler is manufactured from heat-treated steel complying with SAE J403 Grade 10B21, and has an electrodeposited coating of zinc, minimum thickness 0.0002 inch (5 µm), in accordance with ASTM B633, SC1, Type III. The Titen HD® Rod Couplers are available with a nominally $^3/_8$-inch (9.5 mm) shank diameter with $^3/_8$-inch diameter (9.5 mm) internal threads, and with a $^1/_2$-inch (12.7 mm) shank diameter with $^3/_8$-inch or $^1/_2$-inch-diameter (9.5 mm or 12.7 mm) internal threads. Figure 1B illustrates the Titen HD® Rod Coupler. Refer to Table 16 for catalog number information

3.1.3 Grout-filled Concrete Masonry: Grouted concrete masonry must comply with IBC Chapter 21. The specified compressive strength of masonry at the time of installation, f'_m, at 28 days must be a minimum of 1,500 psi (10.3 MPa). Fully grouted masonry must be constructed from the following materials:

3.1.3.1 Concrete Masonry Units (CMUs): CMUs must be minimum lightweight, medium-weight, or normal-weight, closed-end or open-end, conforming to ASTM C90. The minimum allowable nominal size of the CMU must be 8 inches (203.2 mm) wide by 8 inches (203.2 mm) high by 16 inches (406.4 mm) long.

3.1.3.2 Grout: Grout must comply with IBC Section 2103.3 or IRC Section R606.2.12, as applicable. Alternatively, the grout must 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).

3.1.3.3 Mortar: Mortar must be Type N, M or S in compliance with IBC Section 2103.2.1 or IRC Section R606.2.8, as applicable.

3.1.4 Hollow (Ungrouted) Concrete Masonry: Ungrouted concrete masonry must comply with Chapter 21 of the IBC. The compressive strength of masonry at the time of installation, f'_m, at 28 days must be a minimum of 1,500 psi (10.3 MPa). Ungrouted concrete masonry must be constructed from the following materials:

3.1.4.1 Concrete Masonry Units (CMUs): CMUs must be minimum lightweight, medium-weight, or normal-weight, closed-end, conforming to ASTM C90. The minimum allowable nominal size of the CMU must be 8 inches (203.2 mm) wide by 8 inches (203.2 mm) high by 16 inches (406.4 mm) long.

3.1.4.2 Mortar: Mortar must be Type N, M or S in compliance with IBC Section 2103.2.1 or IRC Section R606.2.8, as applicable.

3.1.5 Partially Grouted Concrete Masonry: Partially grouted concrete masonry must comply with IBC Chapter 21. Designated cells are to be grouted while other cells remain ungrouted as specified. Grouted portions must comply with Section 3.1.3 and ungrouted portions must comply with Section 3.1.4.

4.0 DESIGN AND INSTALLATION

4.1 Strength Design of Anchors in Fully Grouted Concrete Masonry Unit Construction:

4.1.1 General: Sections 4.1 and 4.2 provide strength design requirements used in fully grouted concrete masonry unit construction, where anchors are used to transmit structural loads by means of tension, shear or a combination of tension and shear.

Strength design of screw anchors in grouted concrete masonry unit construction shall be conducted in accordance with the provisions for the design of screw anchors in concrete in ACI 318-19 Chapter 17, and TMS 402-22 as modified by the sections that follow. Design in accordance with this report cannot be conducted without reference to ACI 318 with the deletions and modifications summarized in Table 1A and TMS 402-22 Eq. 9-5.

This report references sections, tables, and figures in both this report and ACI 318, with the following method used to distinguish between the two document references:

- References to sections, tables, and figures originating from ACI 318 are *italicized*. For example, Section 2.2 of ACI 318-19, will be displayed as *ACI 318-19 Section 2.2*.
- References to sections, tables, and figures originating from this report do not have any special font treatment, for example Section 4.2.1.

Where language from ACI 318 is directly referenced, the following modifications generally apply:

- The term "masonry" shall be substituted for the term "concrete" wherever it occurs.
- The modification factor to reflect the reduced mechanical properties for mixtures with lightweight aggregate and lightweight units, λ_a, shall be taken as 1.0.

The following terms shall be replaced wherever they occur:

***ACI 318-19* term**	**Replacement term**
$f_c^{'}$	$f_m^{'}$
N_{cb}, N_{cbg}	N_{mb}, N_{mbg}
V_{cb}, V_{cbg}	V_{mb}, V_{mbg}
V_{cp}, V_{cpg}	V_{mp}, V_{mpg}

4.1.2 Restrictions for anchor placement are noted in Tables 2, 3, 4 and 5 and Figures 2 through 7. For CMU construction with closed end blocks and hollow head joints, in addition to the ends and edges of walls, the nearest head joint on a horizontal projection from the anchor shall be treated as an edge for design purposes. The minimum distance from the nearest adjacent head joint, $c_{min,HJ}$, shall be 2 inches (50.8 mm) as measured from the centerline of the head joint in CMU construction with hollow head joints. For anchor groups installed in CMU construction with solid head joints, the nearest head joint outside of the group on a horizontal projection to the group shall be treated as an edge. If open-ended units are employed, only the ends and edges of walls shall be considered for edge distance determination. For horizontal ledgers in fully-grouted CMU walls with hollow head joint applications, see Section 4.2.21.

4.2 ACI Modifications Required for Design: Table 1A provides a summary of all applicable *ACI 318* sections for the design of screw anchors in fully grouted masonry. Where applicable, modifying sections contained within this report are also provided.

4.2.1 *ACI 318-19 Section 17.1.1 and 17.1.5* apply with the general changes prescribed in Section 4.1.1.

4.2.2 In lieu of *ACI 318-19 Section 17.1.2:* Design provisions are included for screw anchors that meet the assessment criteria of ICC-ES AC01.

4.2.3 *ACI 318-19 Section 17.1.4, 17.2.1 and 17.4.1* apply with the general changes prescribed in Section 4.1.1.

4.2.4 In lieu of *ACI 318 Section 17.4.2* : The design of anchors in structures assigned to Seismic Design Category (SDC) C, D, E, or F shall satisfy the requirements of this section.

4.2.4.1 The design of anchors in the plastic hinge zones of masonry structures under earthquake forces is beyond the scope of this acceptance criteria.

4.2.4.2 The anchor or group of anchors shall be designed for the maximum tension and shear obtained from the design load combinations that include E, with E_h increased by Ω_0. The anchor design tensile strength shall satisfy the tensile strength requirements of 4.2.4.3.

4.2.4.3 The anchor design tensile force for resisting earthquake forces shall be determined from consideration of (a) through (c) for the failure modes given in Table 1B assuming the masonry is cracked unless it can be demonstrated that the masonry remains uncracked.

a) ϕN_{sa} for a single anchor, or for the most highly stressed individual anchor in a group of anchors

b) $0.75\ \phi N_{mb}$ *or* $0.75\ \phi N_{mbg}$

c) $0.75\ \phi N_{pn}$ for a single anchor, or for the most highly stressed individual anchor in a group of anchors

4.2.5 *ACI 318-19 Section 17.3.1* applies with the general changes prescribed in Section 4.1.1.

4.2.6 In lieu of *ACI 318-19 Table 17.5.2*: The design of anchors shall be in accordance with Table 1B.

4.2.7 *ACI 318-19 Section 17.5.2.3* applies with the general changes prescribed in Section 4.1.1.

4.2.8 In lieu of *ACI 318-19 Section 17.5.3*: Strength reduction factor ϕ for anchors in masonry shall be as follows when the LFRD load combinations of ASCE 7 are used:

a) For steel capacity of ductile steel elements as defined in *ACI 318-19 Section 2.3*, ϕ shall be taken as 0.75 in tension and 0.65 in shear. Where the ductility requirements of *ACI-318* are not met, ϕ shall be taken as 0.65 in tension and 0.60 in shear.

b) For shear crushing capacity ϕ shall be taken as 0.50.

c) For cases where the nominal strength of anchors in masonry is controlled by masonry breakout or pullout strength in tension, ϕ shall be taken as 0.65 for anchors qualifying for Category 1 and 0.55 for anchors qualifying for Category 2 as indicated Tables 6 through 9 of this report.

d) For cases where the nominal strength of anchors in masonry is controlled by masonry failure modes in shear, ϕ shall be taken as 0.70.

4.2.9 *ACI 318-19 Section 17.6.1* applies with the general changes prescribed in Section 4.1.1.

4.2.10 In lieu *of ACI 318-19 Section 17.6.2.1:* The nominal breakout strength in tension, N_{mb} of a single anchor or N_{mbg} of a group of anchors, shall not exceed:

a) For a single anchor

$$N_{mb} = \frac{A_{Nm}}{A_{Nmo}} \psi_{ed,N,m} \cdot \psi_{c,N,m} \cdot N_{b,m} \qquad (17.6.2.1a)$$

b) For a group of anchors

$$\boldsymbol{N_{mbg} = \frac{A_{Nm}}{A_{Nmo}} \psi_{ec,N,m} \cdot \psi_{ed,N,m} \cdot \psi_{c,N,m} \cdot N_{b,m}} \qquad (17.6.2.1b)$$

Factors $\boldsymbol{\psi_{ec,N,m}}$, $\boldsymbol{\psi_{ed,N,m}}$, and $\boldsymbol{\psi_{c,N,m}}$ are defined in *ACI 318-19 Sections 17.6.2.3.1, 17.6.2.4*, and Section 4.2.13, respectively. A_{Nm} is the projected masonry failure area of a single anchor or group of anchors that shall be approximated as the base of the rectilinear geometrical figure that results from projecting the failure surface outward 1.5h_{ef} from the centerlines of the anchor, or, in the case of a group of anchors, from a line through a row of adjacent anchors. A_{Nm} shall not exceed $n \cdot A_{Nmo}$ **,** where n is the number of anchors in the group that resist tension. A_{Nmo} is the projected masonry failure area of a single anchor with an edge distance equal to or greater than 1.5h_{ef} **.**

$$A_{Nmo} = 9h_{ef}^2 \qquad (17.6.2.1.4)$$

4.2.11 In lieu of *ACI 318-19 Section 17.6.2.2.1:* The basic masonry breakout strength of a single anchor in tension in cracked masonry, $N_{b,m}$ shall not exceed

$$N_{b,m} = k_{m,cr}\sqrt{f_m'}\ h_{ef}^{1.5} \qquad (17.6.2.2.1)$$

Where

$k_{m,cr}$ = effectiveness factor for breakout strength in cracked masonry
= $\alpha_{masonry} \cdot k_c$

k_c = effectiveness factor for breakout strength in concrete
= 17; and

$\alpha_{masonry}$ = reduction factor for the inhomogeneity of masonry materials in breakout strength determination.
= 0.7

4.2.12 *ACI 318-19 Section 17.6.2.1.2, 17.6.2.3.1 and 17.6.2.4* apply with the general changes prescribed in Section 4.1.1.

4.2.13 In lieu of *ACI 318-19 Section 17.6.2.5:* The basic masonry breakout strength of a single anchor in tension, $N_{b,m}$, must be calculated using the values of $k_{m,uncr}$ as described in Tables 6 through 9. Where analysis indicates no cracking is anticipated, $N_{b,m}$ must be calculated using $k_{m,uncr}$ and $\psi_{c,N,m}$ = 1.0.

4.2.14 *ACI 318-19 Section 17.6.2.6* need not be considered since the modification factor for post installed anchors, $\psi_{cp,N,}$ is not included in Eq. 17.6.2.1a & b.

4.2.15 In lieu of ACI 318-19 Section 17.6.3.1: The nominal pullout strength of a single screw anchor in tension shall not exceed

$$N_{pn} = \psi_{m,p} N_p \qquad (17.6.3.1)$$

where $\psi_{m,p}$ is defined in *ACI 318 Section 17.6.3.3.*

4.2.16 In lieu of *ACI 318-19 Section 17.6.3.2.1:* The nominal pullout strength of a single anchor in cracked and uncracked masonry, $N_{p,cr}$ and $N_{p,uncr}$, respectively, is given in Tables 6 through 9 of this report.

4.2.17 The following apply with the general changes prescribed in Section 4.1.1**:**

(1) *ACI 318-19 Section 17.6.3.3*
(2) *ACI 318-19 Section 17.7.1.1-17.7.2.2*
(3) *ACI 318-19 Section 17.7.2.3 and 17.7.2.4*
(4) *ACI 318-19 Section 17.7.2.6*
(5) *ACI 318-19 Section 17.7.3*
(6) *ACI 318-19 Section 17.8*
(7) *ACI 318-19 Section 26.13.1.5 and 26.13.2.5*

4.2.18 In lieu of *ACI 318-19 Section 17.7.2.5*: For anchors located in a region of masonry construction where cracking is anticipated, $\psi_{m,V}$ shall be taken as 1.0. For cases where analysis indicates no cracking at service load levels, it shall be permitted to take $\psi_{m,V}$ as 1.4.

4.2.19 In lieu of *ACI 318-19 Section 17.9*: Minimum edge distances and spacings shall be as indicated in Tables 2 through 5 of this report.

4.2.20 *[In addition to the ACI 318 provisions] Masonry crushing strength for anchors in shear*—The nominal strength of an anchor in shear as governed by masonry crushing, V_{mc} , shall be calculated using Eq. (4-1).

$$V_{mc} = 1750 \sqrt[4]{f'_m A_{se,V}} \qquad (4\text{-}1)$$

4.2.21 *[In addition to the ACI 318 provisions]* Determination of shear capacity for bolts in horizontal ledgers in fully-grouted CMU walls with hollow head joint applications with an assumed masonry unit length of 16 inches, standard:

Where six or more anchor bolts are placed at uniform horizontal spacing in continuous wood or steel ledgers connecting floor and roof diaphragms to fully grouted CMU walls constructed with hollow head joints (using closed-end block), the horizontal and vertical shear strength of the bolts shall be permitted to be calculated in accordance with Eq. (4-2) and Eq. (4-3), respectively, in lieu of Section 4.1.2.

$$v_{mb,horiz} = 0.75 \cdot V_{gov,horiz} \cdot \frac{12}{s_{horiz}} \text{ (plf or N/m)} \qquad (4\text{-}2)$$

$$v_{mb,vert} = 0.75 \cdot V_{gov,vert} \cdot \frac{12}{s_{horiz}} \text{ (plf or N/m)} \qquad (4\text{-}3)$$

where

s_{horiz} = horizontal anchor spacing in the ledger, (in). For anchor spacings that are multiples of 8 inches, locate the first anchor in the ledger at least 2 inches from the head joint and the center of the block. For other anchor spacings, minimum edge distance as specified in the evaluation report shall apply.

$V_{gov,horiz}$ = $\min(\phi V_{sa}, \phi V_{mb,4}, \phi V_{mc}, \phi V_{mp,4})$ (lb or N)

$V_{gov,vert}$ = $\min(\phi V_{sa}, 2 \cdot \phi V_{mb,4}, \phi V_{mc}, \phi V_{mp,4})$ (lb or N)

V_{sa} = Steel shear capacity for a single bolt as given in Tables 10 and 11 of this report (lb or N)

$V_{mb,4}$ = Masonry breakout capacity in shear for a single bolt with edge distance of 4 in. (lb or N)

V_{mc} = Masonry crushing capacity in shear for a single bolt calculated in accordance with Eq. (4-1) (lb or N)

$V_{mp,4}$ = Masonry pryout capacity in shear for a single bolt with edge distance of 4 in. (lb or N)

ϕ = strength reduction factor corresponding to the respective capacity in accordance with Section 4.2.8.

4.2.22 Interaction shall be calculated in compliance with *ACI 318-19 Section 17.8* as follows:

If $\frac{V_{ua}}{\phi V_n} \leq 0.2$ for the governing strength in shear, then full strength in tension shall be permitted: $\phi N_n \geq N_{ua}$.

If $\frac{N_{ua}}{\phi N_n} \leq 0.2$ for the governing strength in tension, then full strength in shear shall be permitted: $\phi V_n \geq V_{ua}$.

For all other cases:

$$\frac{N_{ua}}{\phi N_n} + \frac{V_{ua}}{\phi V_n} \leq 1.2$$

4.2.23 Satisfying the parabolic equation complying with *ACI 318-19 Section R17.8* may be used in lieu of satisfying Section 4.2.22. The parabolic equation is given as:

$$\left(\frac{N_{ua}}{\phi N_n}\right)^{5/3} + \left(\frac{V_{ua}}{\phi V_n}\right)^{5/3} \leq 1.0$$

4.3 Strength Design in Ungrouted Concrete Masonry Unit Construction:

4.3.1 General: This section provides strength design requirements for anchors used in ungrouted concrete masonry unit construction, where anchors are used to transmit structural loads by means of tension, shear or a combination of tension and shear.

4.3.2 Anchors shall be designed for critical effects of factored loads as determined by elastic analysis. Plastic analysis shall not be permitted.

4.3.3 Group effects shall not be considered. Dimensional requirements specified in Tables 4 and 5 shall be observed for the design of individual anchors as follows:

4.3.3.1 The critical edge distance, $c_{cr,ug}$, is the smallest edge distance to consider full capacity of an individual anchor and the minimum edge distance, $c_{a,min,ug}$, shall be the smallest distance an anchor may be installed with a reduced capacity per the multiplier listed in Tables 4 and 5. For anchors installed with edge distances between $c_{cr,ug}$ and $c_{a,min,ug}$, capacities shall be linearly interpolated. The minimum distance from hollow head joints, $c_{min,HJ,}$ shall be 2 inches (50.8 mm) as measured from the centerline of the head joint.

4.3.3.2 For anchor spacings less than the minimum spacing, $s_{min,ug}$, the strength of the group shall equal the strength of a single anchor.

4.3.4 In lieu of *ACI 318-19 Section 17.5.2*: The design of anchors shall be in accordance with Table 1C.

4.3.5 The strength reduction factors, ϕ, shall be in accordance with Section 4.2.8, as applicable.

4.3.6 The nominal steel strength of anchors in tension shall be calculated in accordance with Section 4.2.9.

4.3.7 The nominal pullout strength of anchors in tension, $N_{k,ug}$, shall be taken from Tables 8 and 9.

4.3.8 The nominal steel strength of an anchor in shear, V_{sa}, shall be calculated in accordance with Section 4.2.17 (2).

4.3.9 The masonry anchor strength in shear, $V_{s,ug}$, shall be taken from Tables 12 and 13.

4.3.10 The nominal strength of an anchor in shear as governed by crushing, V_{mc}, shall be calculated in accordance with Section 4.2.20.

4.3.11 Anchors designed for combinations of tension and shear shall satisfy the provisions of Section 4.2.22 or 4.2.23.

4.3.12 The provisions of Section 4.2.17(7) shall apply, as applicable.

4.3.13 *[In addition to the ACI 318 provisions]* Determination of shear capacity for bolts in horizontal ledgers in ungrouted CMU walls with hollow head joint applications with an assumed masonry unit length of 16 inches, standard:

Where six or more anchor bolts are placed at uniform horizontal spacing in continuous wood or steel ledgers connecting floor and roof diaphragms to ungrouted CMU walls constructed with hollow head joints (using closed-end block), the horizontal and vertical shear strength of the bolts shall be permitted to be calculated in accordance with Eq. (4-2) and Eq. (4-3), respectively, in lieu of Section 4.1.2.

$$v_{mb,horiz} = 0.75 \cdot V_{gov,horiz} \cdot \frac{12}{s_{horiz}} \text{ (plf or N/m)} \qquad (4\text{-}2)$$

$$v_{mb,vert} = 0.75 \cdot V_{gov,vert} \cdot \frac{12}{s_{horiz}} \text{ (plf or N/m)} \qquad (4\text{-}3)$$

where

s_{horiz} = horizontal anchor spacing in the ledger, (in). For anchor spacings that are multiples of 8 inches, locate the first anchor in the ledger at least 2 inches from the head joint and the center of the block. For other anchor spacings, minimum edge distance as specified in the evaluation report shall apply.

$V_{gov,horiz}$ = $\min(\phi V_{sa}, \phi V_{s,ug}, \phi V_{mc,ug})$ (lb or N)

$V_{gov,vert}$ = $\min(\phi V_{sa}, \phi V_{s,ug}, \phi V_{mc,ug})$ (lb or N)

V_{sa} = Steel shear capacity for a single bolt in accordance with Section 4.3.8 (lb or N)

$V_{s,ug}$ = Masonry anchor shear capacity for a single anchor as given in Tables 12 and 13 (lb or N)

$V_{mc,ug}$ = Masonry crushing capacity in shear for a single bolt calculated in accordance with Eq. (4-1) (lb or N)

ϕ = strength reduction factor corresponding to the respective capacity in accordance with Section 4.2.8.

4.4 Strength Design in Partially Grouted Concrete Masonry Unit Construction:

4.4.1 In all cases, the minimum distance from hollow head joints shall be 2 inches (50.8 mm) as measured from the centerline of the head joint.

4.4.2 For cases where the location of grouted cells is known, the following provisions shall apply:

4.4.2.1 Group effects shall not be considered between anchors in grouted masonry and anchors in ungrouted masonry.

4.4.2.2 Anchors located in grouted cells shall be designed in accordance with Sections 4.1 and 4.2, whereby the distance to the extent of the ungrouted cell shall be taken as a free edge.

4.4.2.3 Anchors in ungrouted cells shall be designed in accordance with Section 4.3.

4.4.3 For cases where the location of grouted cells is unknown, the design of anchors shall be in accordance with Section 4.3.

4.5 Conversion of Strength Design to Allowable Stress Design:

4.5.1 For mechanical anchors designed using load combinations with allowable stress design in accordance with IBC Section 1605.1 (Section 1605.3 for 2018 and 2015 IBC) allowable loads shall be established using the equations below:

$$T_{allowable,ASD} = \frac{\phi N_n}{\alpha} \qquad (4\text{-}4)$$

and

$$V_{allowable,ASD} = \frac{\phi V_n}{\alpha} \qquad (4\text{-}5)$$

where

$T_{allowable,ASD}$ = Allowable tensile load (lb. or kN);

$V_{allowable,ASD}$ = Allowable shear load (lb. or kN);

N_n = Lowest design strength of an anchor or anchor group in tension as determined in accordance with this report, as applicable (lb. or kN);

V_n = Lowest design strength of an anchor or anchor group in shear as determined in accordance with this report, as applicable (lb. or kN);

α = Conversion factor calculated as a weighted average of the load factors for the controlling load combination. In addition, α shall include all applicable factors to account for non-ductile failure modes and required overstrength; and

ϕ = relevant strength reduction factor for load case and Anchor Category.

The requirements for member thickness, edge distance and anchor spacing, described in this report, apply. Interaction shall be calculated in accordance with *ACI 318-19 Section 17.8* and Section 4.2.22.

4.6 Installation:

Installation parameters are provided in Figures 2 through 7, and Tables 2 through 5 of this report. Anchor locations must comply with this report and plans and specifications approved by the code official. The Titen HD anchors must be installed in accordance with the manufacturer's published instructions and this report. In case of conflict, this report governs. Installation in head joints shall only be permitted in fully grouted walls constructed with open-ended units.

For installation in grout-filled concrete masonry, Titen HD screw anchors must be installed by drilling a pilot hole into the substrate using a handheld electro-pneumatic rotary hammer drill with a carbide-tipped drill bit conforming to ANSI B212.15-1994. The pilot hole must have the same diameter as the nominal diameter of the anchor. The hole is drilled to the specified embedment depth detailed in Tables 2 and 3. Dust and debris in the hole must be removed by using oil-free compressed air. The Titen HD screw anchor must be installed into the hole to the required embedment using a socket wrench or powered impact wrench. The maximum installation torque and maximum impact wrench torque rating requirements for the Titen HD® products are detailed in Tables 2 and 3. For installation in fully grouted CMU, Titen HD® products may be loosened by a maximum one turn and reinstalled with a socket wrench or powered impact wrench to facilitate fixture attachment or realignment.

For installation in ungrouted concrete masonry, rotary hammer drill must be set to rotation-only mode when drilling into hollow (ungrouted) CMU, with a carbide-tipped drill bit conforming to ANSI B212.15-1994. The pilot hole must have the same diameter as the nominal diameter of the anchor The hole is drilled to the specified embedment depth detailed in Tables 4 and 5. Dust and debris in the hole must be removed by using oil-free compressed air. The Titen HD screw anchor must be installed into the hole to the required embedment using a socket wrench until the underside of the head contacts the fixture being attached.

4.7 Special Inspection:

At a minimum, periodic special inspection under the IBC and IRC must be provided in accordance with Sections 1704 and 1705 of the IBC. The special inspector shall be on the jobsite initially during anchor installation to verify anchor type and dimensions, masonry type, masonry compressive strength, hole dimensions, hole cleaning, installation outside of hollow head joints, anchor spacing, edge distances, masonry thickness, anchor embedment and adherence to the manufacturer's printed installation instructions (MPII) and this report. The special inspector must be present as often as required in accordance with the "statement of special inspection". Under the IBC, additional requirements as set forth in Sections 1704, 1705, 1706 and 1707 must be observed, where applicable.

Subsequent installations of the same anchor type and size by the same construction personnel shall be permitted to be performed in the absence of the special inspector. Any change in the anchor product being installed or the personnel performing the installation shall require an initial inspection in accordance with the list provided in this section. For ongoing installations over an extended period, the special inspector shall make regular inspections to confirm correct handling and installation of the product.

5.0 CONDITIONS OF USE:

The Titen HD Screw Anchors described in this report are suitable alternatives to what is specified in the codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Anchors must be installed in accordance with this report and the manufacturer's printed installation instructions. In case of conflict, this report governs.

5.2 Anchor sizes, dimensions and minimum embedment depths are as set forth in the tables of this report.

5.3 Anchors have been evaluated for use in cracked and uncracked grouted and ungrouted concrete masonry unit (CMU) construction with a minimum compressive strength of 1,500 psi (10.3 MPa) at the time of anchor installation.

5.4 Strength design values are established in accordance with Section 4.1, 4.2, 4.3 and 4.4 of this report.

5.5 Allowable stress design values are established in accordance with Section 4.5 of this report.

5.6 Design of anchors must avoid location of anchors in hollow head joints.

5.7 Construction documents prepared or reviewed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed specifying the screw anchors must indicate compliance with this evaluation report and applicable codes and must be submitted to the code official for approval.

5.8 Since an ICC-ES acceptance criteria for evaluating data to determine the performance of screw anchors subjected to fatigue or shock loading is unavailable at this time, the use of these anchors under these conditions is beyond the scope of this report.

5.9 The design of anchors must be in accordance with the provisions for cracked masonry where analysis indicates that cracking could occur ($f_t \geq f_r$) in the vicinity of the anchor due to service loads or deformations over the anchor service life.

5.10 Anchors may be used to resist short-term loading due to wind or seismic forces in structures assigned to Seismic Design Categories A through F under the IBC.

Loads applied to the anchors must be adjusted in accordance with Section 1605.1 of the IBC for strength design or allowable stress design, as applicable.

5.11 Anchors are not permitted to support fire-resistance-rated construction. Where not otherwise prohibited by the applicable code, anchors are permitted for use with fire-resistance-rated construction provided that at least one of the following conditions is fulfilled:

- Anchors are used to resist wind or seismic forces in Seismic Design Categories A through F.
- Anchors that support gravity load-bearing structural elements are within a fire-resistance-rated envelope or a fire-resistance-rated membrane, are protected by approved fire-resistance-rated materials, or have been evaluated for resistance to fire exposure in accordance with recognized standards.
- Anchors are used to support nonstructural elements.

5.12 Anchors are installed in substrates in holes predrilled with carbide-tipped masonry drill bits complying with ANSI B212.15-1994, and having the same diameter as the nominal diameter of the anchor. Rotary hammer drill must be set to rotation-only mode when drilling into hollow (ungrouted) CMU.

5.13 Special inspection, when required, must be provided in accordance with Section 4.7.

5.14 Use of carbon steel Titen HD screw anchors with electrodeposited zinc coating in accordance with ASTM B633 as described in Section 3.1.1 is limited to dry, interior locations.

5.15 Use of stainless steel Titen HD screw anchors and carbon steel Titen HD screw anchors with mechanically deposited zinc coating in accordance with ASTM B695 as described in Section 3.1.1 are permitted for exterior exposure or damp environments, and for interior locations where anchors are in contact with preservative-treated and fire-retardant-treated wood.

5.16 The Titen HD screw anchors are manufactured by Simpson Strong-Tie Company under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Mechanical Anchors in Cracked and Uncracked Masonry Elements, AC01 (24) 2nd Edition, published April 2025.

7.0 IDENTIFICATION

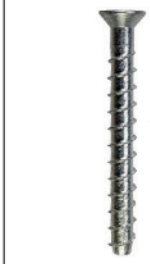
7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-5915) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.

7.2 In addition, Titen HD screw anchor packaging is marked with the Simpson Strong-Tie Company name; product name (Titen HD); anchor diameter and length; anchor type; and the evaluation report number (ESR-5915). In addition, the ≠ symbol and anchor length (in inches) is stamped on the head of each screw anchor.

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

SIMPSON STRONG-TIE COMPANY INC.
5956 WEST LAS POSITAS BOULEVARD
PLEASANTON, CALIFORNIA 94588
(800) 999-5099
www.strongtie.com

Hex-washer head



Countersunk head

Flat-washer head

FIGURE 1A—CARBON STEEL TITEN HD® SCREW ANCHOR

Rod coupler

FIGURE 1B—CARBON STEEL TITEN HD® ROD COUPLER

Hex-washer Head

Countersunk head

FIGURE 1C— STAINLESS STEEL TITEN HD® SCREW ANCHOR

TABLE 1A — ACI 318-19 AND -14 SECTIONS APPLICABLE OR MODIFIED BY THIS REPORT

ACI 318-19 Section	*(ACI 318-14 Section)*	**Modified by this Report Section:**
2.2	*(2.2)*	Unchanged*
2.3	*(2.3)*	
17.1.1 and 17.1.5	*(17.1.1 – 17.1.2)*	
17.1.2	*(17.1.3)*	Section 4.2.2
17.1.4, 17.2.1, 17.4.1, & 17.5.1.3.1	*(17.1.4 – 17.2.2)*	Unchanged*
17.4.2	*(17.2.3)*	Section 4.2.4
17.3.1	*(17.2.7)*	Unchanged*
17.5.2	*(17.3.1.1)*	Section 4.2.6
17.5.2.3	*(17.3.1.3)*	Unchanged*
17.5.2 excluding 17.5.2.1	*(17.3.2 excluding 17.3.2.1)*	
17.5.3	*(17.3.3)*	Section 4.2.8
17.6.1	*(17.4.1)*	Unchanged*
17.6.2.1	*(17.4.2.1)*	Section 4.2.10
17.6.2.2.1	*(17.4.2.2)*	Section 4.2.11
17.6.2.1.2 & 17.6.2.3.1, & 17.6.2.4	*(17.4.2.3 – 17.4.2.5)*	Unchanged*
17.6.2.5	*(17.4.2.6)*	Section 4.2.13
17.6.2.6	*(17.4.2.7)*	Section 4.2.14
17.6.3.1	*(17.4.3.1)*	Section 4.2.15
17.6.3.2.1	*(17.4.3.2)*	Section 4.2.16
17.6.3.3	*17.4.3.6*	Unchanged*
17.7.1.1 – 17.7.2.2	*(17.5.1.1 – 17.5.2.2)*	
17.7.2.1.2 & 17.7.2.3 – 17.7.2.4	*(17.5.2.4 – 17.5.2.6)*	
17.7.2.5	*(17.5.2.7)*	Section 4.2.18
17.7.2.6	*(17.5.2.8)*	Unchanged*
17.7.3	*(17.5.3)*	
17.8	*(17.6)*	
R17.8	*(R17.6)*	
17.9	*(17.7)*	Section 4.2.19
26.13.1.5 and 26.13.2.5	*(17.8.1)*	Unchanged*

*Sections marked as unchanged adopt the general changes prescribed in Section 4.1.1.

TABLE 1B—REQUIRED STRENGTH OF ANCHORS IN GROUTED CMU

Failure mode	Single anchor	Anchor group[1]	
		Individual anchor in a group	Anchors as a group
Steel strength in tension	$\phi N_{sa} \geq N_{ua}$	$\phi N_{sa} \geq N_{ua,i}$	
Masonry breakout strength in tension	$\phi N_{mb} \geq N_{ua}$		$\phi N_{mbg} \geq N_{ua,g}$
Pullout strength in tension	$\phi N_{pn} \geq N_{ua}$	$\phi N_{pn} \geq N_{ua,i}$	
Steel strength in shear	$\phi V_{sa} \geq V_{ua}$	$\phi V_{sa} \geq V_{ua,i}$	
Masonry breakout strength in shear	$\phi V_{mb} \geq V_{ua}$		$\phi V_{mbg} \geq V_{ua,g}$
Masonry crushing strength in shear	$\phi V_{mc} \geq V_{ua}$	$\phi V_{mc} \geq V_{ua,i}$	
Masonry pryout strength in shear	$\phi V_{mp} \geq V_{ua}$		$\phi V_{mpg} \geq V_{ua,g}$

[1]Required strengths for steel, pullout, and crushing failure modes shall be calculated for the most highly stressed anchor in the group.

TABLE 1C—REQUIRED STRENGTH OF ANCHORS IN UNGROUTED CMU

Failure mode	Single anchor
Steel strength in tension	$\phi N_{sa} \geq N_{ua}$
Pullout strength in tension	$\phi N_{k,ug} \geq N_{ua}$
Steel strength in shear	$\phi V_{sa} \geq V_{ua}$
Masonry anchor strength in shear	$\phi V_{s,ug} \geq V_{ua}$
Masonry crushing strength in shear	$\phi V_{mc,ug} \geq V_{ua}$

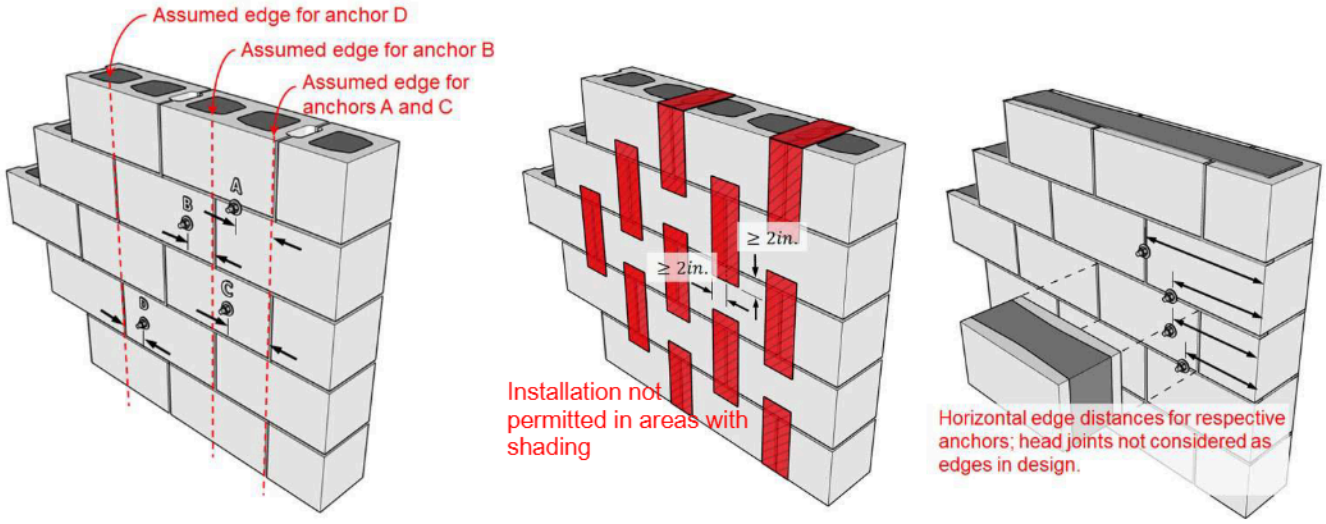


FIGURE 2—(a) Edge distance considerations in fully grouted CMU construction with hollow head joints, (b) exclusion zones in fully grouted construction with hollow head joints, and (c) edge distance considerations in fully grouted CMU construction with solid head joints . Note: dimensions to upper and lower edges omitted for clarity.

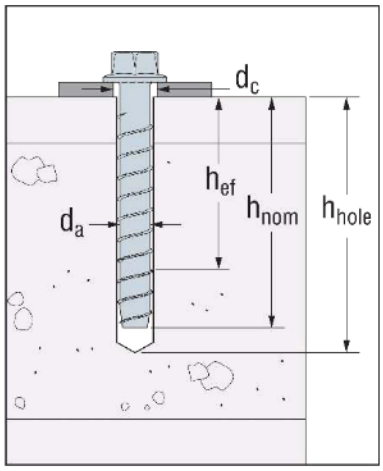


FIGURE 3— TITEN HD SCREW ANCHOR INSTALLATION

TABLE 2—TITEN HD SCREW ANCHOR INSTALLATION INFORMATION FOR CARBON STEEL INCLUDING ROD COUPLER— FULLY GROUTED CMU CONSTRUCTION

Characteristic		Symbol	Units	Titen HD Screw Anchor Nominal Anchor Diameter (in.) or Titen HD Rod Coupler Model No.				
				1/4	3/8 THD37634RC	1/2 THD5093437RC THD50934RC	5/8	3/4
Installation Information								
Nominal Diameter		d_a	in.	1/4	3/8	1/2	5/8	3/4
Drill Bit Diameter		d_{bit}	in.	1/4	3/8	1/2	5/8	3/4
Internal Thread Diameter for Titen HD Rod Coupler Models		d_{rh}	-	N/A	3/8-inch	3/8-inch or 1/2-inch	N/A	N/A
Minimum Baseplate Clearance Hole Diameter		d_c	in.	3/8	1/2	5/8	3/4	7/8
Nominal Embedment		h_{nom}	in.	2-1/2	2-3/4	3-1/2	4-1/2	5-1/2
Effective Embedment		h_{ef}	in.	1.94	1.98	2.56	3.39	4.22
Minimum Hole Depth		h_{hole}	in.	2-5/8	3	4	5	6
Minimum Masonry Thickness		h_{min}	in.	7-5/8				
Maximum Installation Torque[4]		$T_{inst,max}$	ft-lbf	-	28	40	40	80
Maximum Impact Wrench Torque Rating[3]		$T_{impact,max}$	ft-lbf	100	145	345	345	380
Minimum Distance to Hollow Head Joint[1]		$c_{min,HJ}$	in.	2				
Face of Wall	Minimum Edge Distance[1]	c_{min}	in.	4				
	Minimum Anchor Spacing	s_{min}	in.	4				
Top of Wall c_{min} = 1.75 in.	Minimum Edge Distance[1,2]	$c_{min,top}$	in.	1-3/4				N/A
	Minimum Anchor Spacing	$s_{min,top}$	in.	4	4	6	6	N/A
Top of Wall, c_{min} = 2.75 in.	Minimum Edge Distance[1,2]	$c_{min,top}$	in.	N/A	N/A	2-3/4		N/A
	Minimum Anchor Spacing	$s_{min,top}$	in.	N/A	N/A	6	6	N/A
End of Wall	Minimum Edge Distance	$c_{min,edge}$	in.	3-13/16	3-13/16	N/A	N/A	N/A
	Minimum End Distance[5]	$c_{min,end}$	in.	1-3/4	1-3/4	N/A	N/A	N/A
	Minimum Anchor Spacing[5]	$s_{min,end}$	in.	4	4	N/A	N/A	N/A

For **SI**: 1 inch = 25.4 mm, 1 ft-lb = 1.356 Nm

[1] The minimum distance from the center of an anchor to the centerline of a hollow head joint (vertical mortar joint) is $c_{min,HJ}$ as shown in Figure 2. See Section 4.1.2.

[2] The minimum end distance from the center of an anchor to the end of the top of the CMU wall is 4 inches.

[3] Because of the variability in measurement procedures, the published torque of an impact tool may not correlate properly with the above setting torques. Over-torquing can damage the anchor and/or reduce its holding capacity.

[4] Maximum Installation Torque applies to installations using a calibrated torque wrench. Maximum Installation Torque not established for 1/4-inch diameter anchor.

[5] Minimum edge and end distances are measured from the anchor centerline to the edge and end of the CMU masonry wall, respectively. Refer to Figure 5.

[6] N/A denotes that installation is beyond the scope of this report.

TABLE 3 TITEN HD SCREW ANCHOR INSTALLATION INFORMATION FOR STAINLESS STEEL — FULLY GROUTED CMU CONSTRUCTION

Characteristic		Symbol	Units	Titen HD Screw Anchor Nominal Anchor Diameter (in.)				
				1/4	3/8	1/2	5/8	3/4
Installation Information								
Nominal Diameter		d_a	in.	1/4	3/8	1/2	5/8	3/4
Drill Bit Diameter		d_{bit}	in.	1/4	3/8	1/2	5/8	3/4
Minimum Baseplate Clearance Hole Diameter		d_c	in.	3/8	1/2	5/8	3/4	7/8
Nominal Embedment		h_{nom}	in.	2-1/2	2-3/4	3-1/2	4-1/2	5-1/2
Effective Embedment		h_{ef}	in.	1.59	1.62	2.08	2.74	3.49
Minimum Hole Depth		h_{hole}	in.	2-5/8	3	4	5	6
Minimum Masonry Thickness		h_{min}	in.	7 5/8				
Maximum Installation Torque[3]		$T_{inst,max}$	ft-lbf	-	21	40	44	95
Maximum Impact Wrench Torque Rating[2]		$T_{impact,max}$	ft-lbf	100	145	345	345	380
Minimum Distance to Hollow Head Joint[1]		$c_{min,HJ}$	in.	2				
Face of Wall	Minimum Edge Distance[1]	c_{min}	in.	4				
	Minimum Anchor Spacing	s_{min}	in.	4				

For **SI**: 1 inch = 25.4 mm, 1 ft-lb = 1.356 Nm

[1] The minimum distance from the center of an anchor to the centerline of a hollow head joint (vertical mortar joint) is $c_{min,HJ}$ as shown in Figure 2. See Section 4.1.2.

[2] Because of the variability in measurement procedures, the published torque of an impact tool may not correlate properly with the above setting torques. Over-torquing can damage the anchor and/or reduce its holding capacity.

[3] Maximum Installation Torque applies to installations using a calibrated torque wrench. Maximum Installation Torque not established for 1/4-inch diameter anchor.

TABLE 4 — TITEN HD SCREW ANCHOR INSTALLATION INFORMATION FOR CARBON STEEL INCLUDING ROD COUPLER — UNGROUTED (HOLLOW) CMU CONSTRUCTION

Characteristic		Symbol	Units	Titen HD Screw Anchor Nominal Anchor Diameter (in.) or Titen HD Rod Coupler Model No.				
				1/4	3/8 THD37634RC	1/2 THD5093437RC THD50934RC	5/8	3/4
Installation Information								
Nominal Diameter		d_a	in.	1/4	3/8	1/2	5/8	3/4
Drill Bit Diameter		d_{bit}	in.	1/4	3/8	1/2	5/8	3/4
Internal Thread Diameter for Titen HD Rod Coupler Models		d_{rh}	-	N/A	$^3/_8$-inch	$^3/_8$-inch or $^1/_2$-inch	N/A	N/A
Minimum Baseplate Clearance Hole Diameter		d_c	in.	3/8	1/2	5/8	3/4	7/8
Nominal Embedment		h_{nom}	in.	1-3/4	1-3/4	1-3/4	1-3/4	1-3/4
Effective Embedment		h_{ef}	in.	1.31	1.14	1.10	1.08	1.03
Minimum Hole Depth		h_{hole}	in.	1-7/8	2	2	2	2
Minimum Masonry Thickness		h_{min}	in.	7 5/8				
Minimum Distance to Hollow Head Joint[1]		$c_{min,HJ}$	in.	2				
Critical Edge Distance, Tension, Face of wall		$c_{cr,ug}$	in.	4				
Critical Edge Distance, Shear, Face of wall[3]		$c_{cr,ug}$	in.	3	4-1/2	6	7-1/2	9
Face of Wall	Minimum Edge Distance, Tension[2]	$c_{a,min,ug}$	in.	2				
	Multiplier for Tension at $c_{a,min,ug}$	-	-	0.80				
	Minimum Edge Distance, Shear[2,3]	$c_{a,min,ug}$	in.	1-1/2	2-1/4	3	3-3/4	4-1/2
	Multiplier for Shear at $c_{a,min,ug}$[3]	-	-	0.50				
	Minimum Anchor Spacing	$s_{min,ug}$	in.	8				
End of Wall	Minimum Edge Distance	$c_{min,edge,ug}$	in.	3-13/16	3-13/16	N/A	N/A	N/A
	Minimum End Distance[2]	$c_{min,end,ug}$	in.	1-3/4	1-3/4	N/A	N/A	N/A
	Minimum Anchor Spacing	$s_{min,end,ug}$	in.	8	8	N/A	N/A	N/A

For **SI**: 1 inch = 25.4 mm, 1 ft-lb = 1.356 Nm

[1] The minimum distance from the center of an anchor to the centerline of a hollow head joint (vertical mortar joint) $c_{min,HJ}$ as shown in Figure 2. See Section 4.1.2.

[2] Minimum edge and end distances are measured from the anchor centerline to the edge and end of the CMU masonry wall, respectively. Refer to Figure 6.

[3] Installation parameters for shear are not applicable to Titen HD Rod Coupler models.

[4] N/A denotes that installation is beyond the scope of this report.

TABLE 5 — TITEN HD SCREW ANCHOR INSTALLATION INFORMATION FOR STAINLESS STEEL — UNGROUTED (HOLLOW) CMU CONSTRUCTION

Characteristic		Symbol	Units	Titen HD Screw Anchor Nominal Anchor Diameter (in.)			
				3/8	1/2	5/8	3/4
Installation Information							
Nominal Diameter		d_a	in.	3/8	1/2	5/8	3/4
Drill Bit Diameter		d_{bit}	in.	3/8	1/2	5/8	3/4
Minimum Baseplate Clearance Hole Diameter		d_c	in.	1/2	5/8	3/4	7/8
Nominal Embedment		h_{nom}	in.	2-1/2	2-1/2	2-1/2	2-1/2
Effective Embedment		h_{ef}	in.	1.41	1.23	1.04	0.94
Minimum Hole Depth		h_{hole}	in.	3	3	3	3
Minimum Masonry Thickness		h_{min}	in.	7 5/8			
Minimum Distance to Hollow Head Joint[1]		$c_{min,HJ}$	in.	2			
Critical Edge Distance, Tension, Face of wall		$c_{cr,ug}$	in.	4			
Critical Edge Distance, Shear, face of wall		$c_{cr,ug}$	in.	4-1/2	6	7-1/2	9
Face of Wall	Minimum Edge Distance, Tension[1]	$c_{a,min,ug}$	in.	2			
	Multiplier for Tension at $c_{a,min,ug}$	-	-	0.80			
	Minimum Edge Distance, Shear[1]	$c_{a,min,ug}$	in.	2-1/4	3	3-3/4	4-1/2
	Multiplier for Shear at $c_{a,min,ug}$	-	-	0.50			
	Minimum Anchor Spacing	$s_{min,ug}$	in.	8			

For **SI**: 1 inch = 25.4 mm, 1 ft-lb = 1.356 Nm

[1] The minimum distance from the center of an anchor to the centerline of a hollow head joint (vertical mortar joint) is $c_{min,HJ}$ as shown in Figure 2. See Section 4.1.2.

TABLE 6—TITEN HD SCREW ANCHOR TENSION DESIGN INFORMATION FOR CARBON STEEL INCLUDING ROD COUPLER — FULLY GROUTED CMU CONSTRUCTION[1,4,5]

Characteristic		Symbol	Units	Titen HD Screw Anchor Nominal Anchor Diameter (in.) or Titen HD Rod Coupler Model No.				
				1/4	3/8 THD37634RC	1/2 THD5093437RC THD50934RC	5/8	3/4
Installation Information								
Nominal Diameter		d_a	in.	1/4	3/8	1/2	5/8	3/4
Nominal Embedment		h_{nom}	in.	2 1/2	2 3/4	3 1/2	4 1/2	5 1/2
Effective Min. Embedment		h_{ef}	in.	1.94	1.98	2.56	3.39	4.22
Steel Strength in Tension								
Minimum Tensile Stress Area		A_{se}	in^2	0.042	0.099	0.183	0.276	0.414
Specified Yield Strength		f_{ya}	psi	100,000	97,000			
Specified Tensile Strength		f_{uta}	psi	125,000	110,000			
Anchor Steel Strength in Tension		N_{sa}	lbf	5,195	10,890	20,130	30,360	45,540
Strength Reduction Factor- Steel Failure[2]		ϕ_{sa}	-	0.65				
Masonry Strength in Tension								
Effectiveness Factor- Uncracked Masonry[3]		$k_{m,uncr}$	-	17				
Effectiveness Factor- Cracked Masonry[3]		$k_{m,cr}$	-	12				
Modification Factor for Uncracked Concrete[3]		$\psi_{c,N,m}$	-	1.0				
Anchor Category		1 or 2	-	2	1			
Strength Reduction Factor- Masonry Failure[2]		ϕ_{mb}	-	0.55	0.65			
Face of Wall	Pullout Strength Uncracked Masonry	$N_{p,uncr}$	lbf	1,785	2,470	2,935	3,085	4,000
	Pullout Strength Cracked Masonry	$N_{p,cr}$	lbf	1,320	1,330	2,495	3,050	2,880
	Pullout Strength Seismic	$N_{p,eq}$	lbf	1,320	1,330	2,495	3,050	2,880
Top of Wall, c_{min} = 1.75 in.	Pullout Strength Uncracked Masonry	$N_{p,uncr}$	lbf	1,785	2,290	2,380	2,080	N/A
	Pullout Strength Cracked Masonry	$N_{p,cr}$	lbf	1,320	1,235	2,020	2,060	N/A
	Pullout Strength Seismic	$N_{p,eq}$	lbf	1,320	1,235	2,020	2,060	N/A
Top of Wall, c_{min} = 2.75 in.	Pullout Strength Uncracked Masonry	$N_{p,uncr}$	lbf	N/A	N/A	2,405	3,085	N/A
	Pullout Strength Cracked Masonry	$N_{p,cr}$	lbf	N/A	N/A	2,045	3,050	N/A
	Pullout Strength Seismic	$N_{p,eq}$	lbf	N/A	N/A	2,045	3,050	N/A
End of Wall	Pullout Strength Uncracked Masonry	$N_{p,uncr}$	lbf	1,330	1,510	N/A	N/A	N/A
	Pullout Strength Cracked Masonry	$N_{p,cr}$	lbf	980	815	N/A	N/A	N/A
	Pullout Strength Seismic	$N_{p,eq}$	lbf	980	815	N/A	N/A	N/A
Axial Stiffness in Service Load Range		β_{uncr}	lb/in.	83,500	90,500	67,000	70,500	66,000
		β_{cr}	lb/in.	75,000	54,000	58,500	61,500	80,500

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa, 1 in^2 = 645 mm^2, 1 lb/in = 0.175 N/mm.

[1] The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19 Chapter 17.
[2] The strength reduction factor applies when the strength design load combinations ASCE 7 are used.
[3] For all design cases, $\psi_{c,N,m} = 1.0$. The appropriate effectiveness factor for cracked masonry ($k_{m,cr}$) or uncracked masonry ($k_{m,uncr}$) must be used.
[4] N/A denotes that installation is beyond the scope of this report.
[5] For all design cases, $\psi_{m,p} = 1.0$.

TABLE 7— TITEN HD SCREW ANCHOR TENSION DESIGN INFORMATION FOR STAINLESS STEEL— FULLY GROUTED CMU CONSTRUCTION[1,4]

Characteristic		Symbol	Units	Titen HD Screw Anchor Nominal Anchor Diameter (in.)				
				1/4	3/8	1/2	5/8	3/4
Installation Information								
Nominal Diameter		d_a	in.	1/4	3/8	1/2	5/8	3/4
Nominal Embedment		h_{nom}	in.	2 1/2	2 3/4	3 1/2	4 1/2	5 1/2
Effective Embedment- Stainless Steel		h_{ef}	in.	1.59	1.62	2.08	2.74	3.49
Steel Strength in Tension								
Minimum Tensile Stress Area		A_{se}	in^2	0.042	0.099	0.183	0.276	0.414
Specified Yield Strength		f_{ya}	psi	88,000	98,400	91,200	83,200	92,000
Specified Tensile Strength		f_{uta}	psi	110,000	123,000	114,000	104,000	115,000
Anchor Steel Strength in Tension		N_{sa}	lbf	4,620	12,175	20,860	28,705	47,610
Strength Reduction Factor- Steel Failure[2]		ϕ_{sa}	-	0.75				
Masonry Strength in Tension								
Effectiveness Factor- Uncracked Masonry[3]		$k_{m,uncr}$	-	17				
Effectiveness Factor- Cracked Masonry[3]		$k_{m,cr}$	-	12				
Modification Factor for Uncracked Concrete[3]		$\psi_{c,N,m}$	-	1.0				
Anchor Category		1 or 2	-	2	1	2	1	1
Strength Reduction Factor- Masonry Failure[2]		ϕ_{mb}	-	0.55	0.65	0.55	0.65	0.65
Face of Wall	Pullout Strength Uncracked Masonry	$N_{p,uncr}$	lbf	745	710	1,640	2,225	3,475
	Pullout Strength Cracked Masonry	$N_{p,cr}$	lbf	355	475	1,215	2,225	2,500
	Pullout Strength Seismic	$N_{p,eq}$	lbf	355	475	1,215	2,225	2,500
Axial Stiffness in Service Load Range		β_{uncr}	lb/in.	67,500	72,000	66,000	94,000	110,500
		β_{cr}	lb/in.	201,500	43,000	53,000	83,000	79,000

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa, 1 in^2 = 645 mm^2, 1 lb/in = 0.175 N/mm.

[1] The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19 Chapter 17.
[2] The strength reduction factor applies when the strength design load combinations ASCE 7 are used.
[3] For all design cases, $\psi_{c,N,m} = 1.0$. The appropriate effectiveness factor for cracked masonry ($k_{m,cr}$) or uncracked masonry ($k_{m,uncr}$) must be used.
[4] For all design cases, $\psi_{m,p} = 1.0$

TABLE 8— TITEN HD SCREW ANCHOR TENSION DESIGN INFORMATION FOR CARBON STEEL INCLUDING ROD COUPLER — UNGROUTED (HOLLOW) CMU CONSTRUCTION[1,3]

Characteristic		Symbol	Units	Titen HD Screw Anchor Nominal Anchor Diameter (in.) or Titen HD Rod Coupler Model No.				
				1/4	3/8 THD37634RC	1/2 THD5093437RC THD50934RC	5/8	3/4
Installation Information								
Nominal Diameter		d_a	in.	1/4	3/8	1/2	5/8	3/4
Nominal Embedment		h_{nom}	in.	1-3/4	1-3/4	1-3/4	1-3/4	1-3/4
Effective Embedment		h_{ef}	in.	1.31	1.14	1.10	1.08	1.03
Steel Strength in Tension								
Minimum Tensile Stress Area		A_{se}	in^2	0.042	0.099	0.183	0.276	0.414
Specified Yield Strength		f_{ya}	psi	100,000	97,000			
Specified Tensile Strength		f_{uta}	psi	125,000	110,000			
Anchor Steel Strength in Tension		N_{sa}	lbf	5,195	10,890	20,130	30,360	45,540
Strength Reduction Factor- Steel Failure[2]		ϕ_{sa}	-	0.65				
Masonry Strength in Tension								
Anchor Category		1 or 2	-	2				
Strength Reduction Factor- Masonry Failure[2]		ϕ_{mb}	-	0.55				
Face of Wall	Pullout Strength Uncracked Masonry	$N_{k,ug,uncr}$	lbf	205	365	210	210	340
	Pullout Strength Seismic	$N_{k,ug,eq,uncr}$	lbf	205	325	180	180	275
End of Wall[3]	Pullout Strength Uncracked Masonry	$N_{k,ug,uncr}$	lbf	320	320	N/A	N/A	N/A
	Pullout Strength Seismic	$N_{k,ug,eq,uncr}$	lbf	320	280	N/A	N/A	N/A
Axial Stiffness in Service Load Range		β_{uncr}	lb/in.	73,000	154,000	64,500	63,500	87,000

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa, 1 in^2 = 645 mm^2, 1 lb/in = 0.175 N/mm.

[1] The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19 Chapter 17.
[2] The strength reduction factor applies when the strength design load combinations ASCE 7 are used.
[3] N/A denotes that installation is beyond the scope of this report.

TABLE 9— TITEN HD SCREW ANCHOR TENSION DESIGN INFORMATION FOR STAINLESS STEEL— UNGROUTED (HOLLOW) CMU CONSTRUCTION[1]

Characteristic		Symbol	Units	Titen HD Screw Anchor Nominal Anchor Diameter (in.)			
				3/8	1/2	5/8	3/4
Installation Information							
Nominal Diameter		d_a	in.	3/8	1/2	5/8	3/4
Nominal Embedment- Stainless Steel		h_{nom}	in.	2-1/2	2-1/2	2-1/2	2-1/2
Effective Embedment- Stainless Steel		h_{ef}	in.	1.41	1.23	1.04	0.94
Steel Strength in Tension							
Minimum Tensile and Shear Stress Area		A_{se}	in^2	0.099	0.183	0.276	0.414
Specified Yield Strength		f_{ya}	psi	98,400	91,200	83,200	92,000
Specified Tensile Strength		f_{uta}	psi	123,000	114,000	104,000	115,000
Anchor Steel Strength in Tension		N_{sa}	lbf	12,175	20,860	28,705	47,610
Strength Reduction Factor- Steel Failure[2]		ϕ_{sa}	-	0.75			
Masonry Strength in Tension							
Anchor Category		1 or 2	-	1	2	1	2
Strength Reduction Factor- Masonry Failure[2]		ϕ_{mb}	-	0.65	0.55	0.65	0.55
Face of Wall	Pullout Strength Uncracked Masonry	$N_{k,ug,uncr}$	lbf	300	375	290	330
	Pullout Strength Seismic	$N_{k,ug,eq,uncr}$	lbf	300	375	290	330
Axial Stiffness in Service Load Range		β_{uncr}	lb/in.	99,500	84,500	69,000	60,000

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa, 1 in^2 = 645 mm^2, 1 lb/in = 0.175 N/mm.

[1] The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19 Chapter 17.
[2] The strength reduction factor applies when the strength design load combinations ASCE 7 are used.

TABLE 10— TITEN HD SCREW ANCHOR SHEAR DESIGN INFORMATION FOR CARBON STEEL — FULLY GROUTED CMU CONSTRUCTION[1,3]

Characteristic		Symbol	Units	Titen HD Screw Anchor Nominal Anchor Diameter (in.)				
				1/4	3/8	1/2	5/8	3/4
Installation Information								
Nominal Diameter		d_a	in.	1/4	3/8	1/2	5/8	3/4
Carbon Steel- Steel Strength in Shear								
Nominal Embedment		h_{nom}	in.	2-1/2	2-3/4	3-1/2	4-1/2	5-1/2
Effective Min. Embedment		h_{ef}	in.	1.94	1.98	2.56	3.39	4.22
Face of Wall	Steel Strength in Shear	V_{sa}	lbf	1,620	3,145	8,814	6,340	7,650
	Steel Strength in Shear, Seismic	$V_{sa,eq}$	lbf	1,620	3,050	7,845	6,340	7,650
Top of Wall, c_{min} = 1.75 in.	Steel Strength in Shear [4]	V_{sa}	lbf	1,220	1,365	1,130	2,290	N/A
	Steel Strength in Shear, Seismic [4]	$V_{sa,eq}$	lbf	1,220	1,325	1,005	2,290	N/A
Top of Wall, c_{min} = 2.75 in.	Steel Strength in Shear [4]	V_{sa}	lbf	N/A	N/A	1,400	3,550	N/A
	Steel Strength in Shear, Seismic [4]	$V_{sa,eq}$	lbf	N/A	N/A	1,245	3,550	N/A
End of Wall	Steel Strength in Shear [5]	V_{sa}	lbf	1,485	2,495	N/A	N/A	N/A
	Steel Strength in Shear, Seismic [5]	$V_{sa,eq}$	lbf	1,485	2,420	N/A	N/A	N/A
Strength Reduction Factor- Steel Failure, Carbon Steel [2]		ϕ_{sa}	-	0.60				
Masonry Breakout Strength in Shear								
Load Bearing Length of Anchor in Shear		l_e	in.	1.94	1.98	2.56	3.39	4.22
Strength Reduction Factor - Masonry Breakout Failure [2]		ϕ_{mb}	-	0.70				
Masonry Crushing Strength in Shear								
Minimum Shear Stress Area		$A_{se,V}$	in^2	0.042	0.099	0.183	0.276	0.414
Strength Reduction Factor - Masonry Crushing Failure [2]		ϕ_{mc}	-	0.50				
Masonry Pryout Strength in Shear								
Coefficient for Pryout Strength		k_{mp}	-	1.0		2.0		
Strength Reduction Factor - Masonry Pryout Failure [2]		ϕ_{mp}	-	0.70				

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa, 1 in^2 = 645 mm^2, 1 lb/in = 0.175 N/mm.

[1] The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19 Chapter 17.
[2] The strength reduction factor applies when the strength design load combinations ASCE 7 are used.
[3] N/A denotes that installation is beyond the scope of this report.
[4] Top of wall shear values are for shear parallel to wall edge.
[5] End of wall shear values for shear in vertical direction. Refer to Figure 5.

TABLE 11 — TITEN HD SCREW ANCHOR SHEAR DESIGN INFORMATION FOR STAINLESS STEEL — FULLY GROUTED CMU CONSTRUCTION[1]

Characteristic		Symbol	Units	Titen HD Screw Anchor Nominal Anchor Diameter (in.)				
				1/4	3/8	1/2	5/8	3/4
Installation Information								
Nominal Diameter		d_a	in.	1/4	3/8	1/2	5/8	3/4
Stainless Steel- Steel Strength in Shear								
Nominal Embedment		h_{nom}	in.	2-1/2	2-3/4	3-1/2	4-1/2	5-1/2
Effective Embedment		h_{ef}	in.	1.59	1.62	2.08	2.74	3.49
Face of Wall	Steel Strength in Shear	V_{sa}	lbf	2,430	2,605	5,890	6,245	7,395
	Steel Strength in Shear, Seismic	$V_{sa,eq}$	lbf	1,750	2,420	4,595	6,245	7,395
Strength Reduction Factor- Steel Failure, Stainless Steel[2]		ϕ_{sa}	-	0.65				
Masonry Breakout Strength in Shear								
Load Bearing Length of Anchor in Shear		l_e	in.	1.59	1.62	2.08	2.74	3.49
Strength Reduction Factor - Masonry Breakout Failure[2]		ϕ_{mb}	-	0.70				
Masonry Crushing Strength in Shear								
Minimum Shear Stress Area		$A_{se,V}$	in^2	0.042	0.099	0.183	0.276	0.414
Strength Reduction Factor - Masonry Crushing Failure [2]		ϕ_{mc}	-	0.50				
Masonry Pryout Strength in Shear								
Coefficient for Pryout Strength		k_{mp}	-	1.0			2.0	
Strength Reduction Factor - Masonry Pryout Failure[2]		ϕ_{mp}	-	0.70				

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa, 1 in^2 = 645 mm^2, 1 lb/in = 0.175 N/mm.
[1] The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19 Chapter 17.
[2] The strength reduction factor applies when the strength design load combinations ASCE 7 are used.

TABLE 12— TITEN HD SCREW ANCHOR SHEAR DESIGN INFORMATION FOR CARBON STEEL — UNGROUTED (HOLLOW) CMU CONSTRUCTION[1,3]

Characteristic		Symbol	Units	Titen HD Screw Anchor Nominal Anchor Diameter (in.)				
				1/4	3/8	1/2	5/8	3/4
Installation Information								
Nominal Diameter		d_a	in.	1/4	3/8	1/2	5/8	3/4
Masonry Anchor Strength in Shear								
Nominal Embedment		h_{nom}	in.	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4
Effective Embedment		h_{ef}	in.	1.31	1.14	1.10	1.08	1.03
Face of Wall	Masonry Anchor Strength in Shear	$V_{s,ug}$	lbf	325	615	690	1,305	860
	Masonry Anchor Strength in Shear, Seismic	$V_{s,ug,eq}$	lbf	325	615	690	905	815
End of Wall	Masonry Anchor Strength in Shear [4]	$V_{s,ug}$	lbf	300	585	N/A	N/A	N/A
	Masonry Anchor Strength in Shear, Seismic [4]	$V_{s,ug,eq}$	lbf	300	585	N/A	N/A	N/A
Strength Reduction Factor- Masonry Anchor Strength in Shear [2]		ϕ_{sa}	-	0.70				
Masonry Crushing Strength in Shear								
Minimum Shear Stress Area		$A_{se,V}$	in^2	0.042	0.099	0.183	0.276	0.414
Strength Reduction Factor - Masonry Crushing in Shear [2]		ϕ_{mc}	-	0.50				

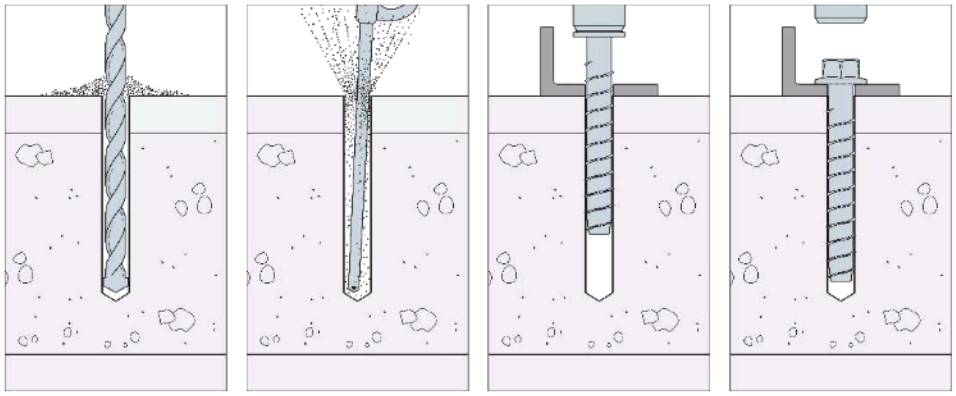
For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa, 1 in^2 = 645 mm^2, 1 lb/in = 0.175 N/mm.
[1] The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19 Chapter 17.
[2] The strength reduction factor applies when the strength design load combinations ASCE 7 are used.
[3] N/A denotes that installation is beyond the scope of this report.
[4] End of wall shear values for shear in vertical direction. Refer to Figure 6.

TABLE 13— TITEN HD SCREW ANCHOR SHEAR DESIGN INFORMATION FOR STAINLESS STEEL — UNGROUTED (HOLLOW) CMU CONSTRUCTION[1]

Characteristic		Symbol	Units	Titen HD Screw Anchor Nominal Anchor Diameter (in.)			
				3/8	1/2	5/8	3/4
Installation Information							
Nominal Diameter		d_a	in.	3/8	1/2	5/8	3/4
Masonry Anchor Strength in Shear							
Nominal Embedment		h_{nom}	in.	2 1/2	2 1/2	2 1/2	2 1/2
Effective Min. Embedment		h_{ef}	in.	1.41	1.23	1.04	0.94
Face of Wall	Masonry Anchor Strength in Shear, Static	$V_{s,ug}$	lbf	1,230	2,320	2,025	1,850
	Masonry Anchor Strength in Shear, Seismic	$V_{s,ug,eq}$	lbf	1,230	1,520	1,115	1,850
Strength Reduction Factor-Masonry Anchor Strength in Shear[2]		ϕ_{sa}	-	0.70			
Masonry Crushing Strength in Shear							
Minimum Shear Stress Area		$A_{se,V}$	in^2	0.099	0.183	0.276	0.414
Strength Reduction Factor - Masonry Crushing in Shear[2]		ϕ_{mc}	-	0.50			

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa, 1 in^2 = 645 mm^2, 1 lb/in = 0.175 N/mm.

[1] The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19 Chapter 17.
[2] The strength reduction factor applies when the strength design load combinations ASCE 7 are used.



1. Drill. Drill hole to specified diameter and depth. Rotary-hammer drill for grouted CMU; rotation-mode only for ungrouted CMU.

2. Blow. Dust and debris in the hole must be removed by using oil-free compressed air. Air nozzle must reach bottom of hole.

3. Install. Install anchor through fixture using socket wrench. Powered impact wrench may be used for grouted CMU only.

4. Tighten. Tighten anchor until the head contacts the fixture without exceeding the specified maximum torque.

FIGURE 4- MANUFACTURERS PRINTED INSTALLATION INSTRUCTIONS (MPII)

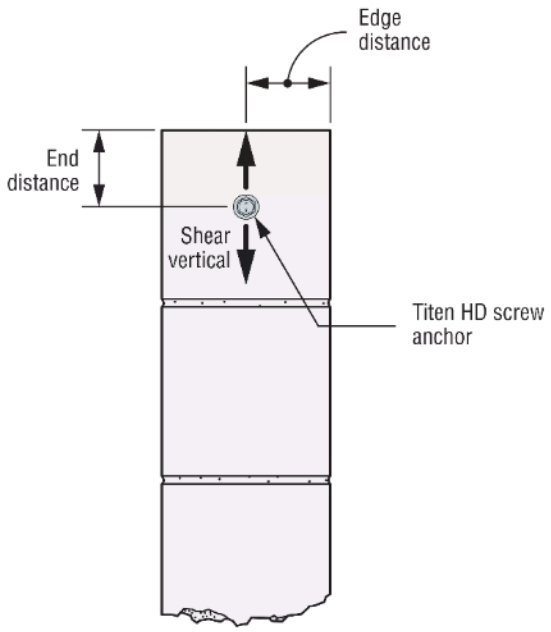


FIGURE 5—EDGE AND END DISTANCES FOR THE CARBON STEEL TITEN HD ANCHOR INSTALLED IN THE END OF GROUT-FILLED CMU MASONRY WALL CONSTRUCTION (Refer to Table 2)

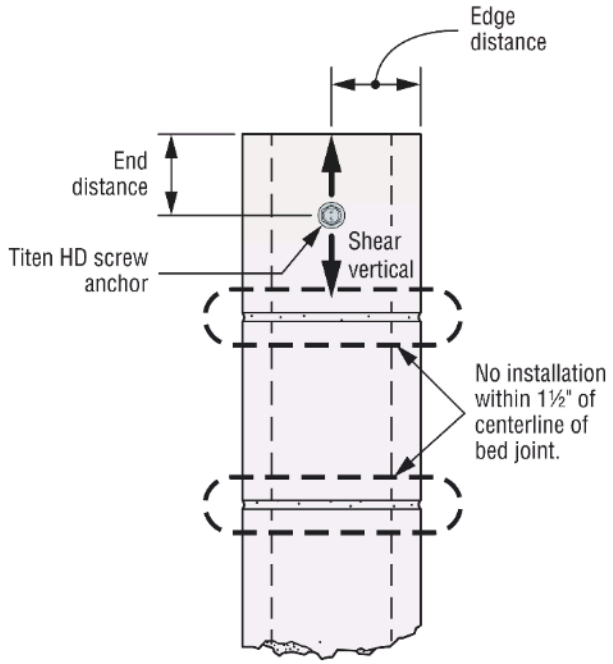


FIGURE 6—EDGE AND END DISTANCES FOR THE CARBON STEEL TITEN HD ANCHOR INSTALLED IN THE END OF HOLLOW CMU MASONRY WALL CONSTRUCTION (Refer to Table 4)

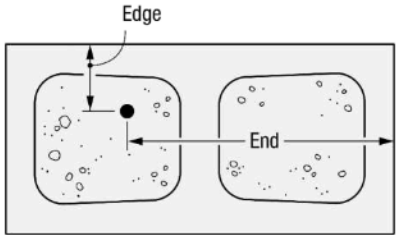


FIGURE 7 – ANCHOR INSTALLATION IN THE TOP OF FULLY GROUTED CMU CONSTRUCTION

TABLE 14— APPLICABLE SECTIONS OF THE IBC CODE UNDER EACH EDITION OF THE IBC AND IRC

IBC			
2024 IBC	**2021 IBC**	**2018 IBC**	**2015 IBC**
Section 1605.1		Section 1605.2 or 1605.3	
Section 1704			
Section 1705			
Section 1705.1.1			
Chapter 21			
Section 2103.2.1			
Section 2103.3			
Section 2108.1			
IRC			
2024 IRC	**2021 IRC**	**2018 IRC**	**2015 IRC**
Section R301.1.3			
Section R606.2.8			Section R606.2.7
Section R606.2.12			Section R606.2.11

TABLE 15— APPLICABLE SECTIONS OF ACI 318 AND TMS 402 UNDER EACH EDITION OF THE IBC

2024 IBC	**2021 IBC**	**2018 IBC**	**2015 IBC**
TMS 402-22	TMS 402-16		TMS 402-13
Section 8.1.4	Section 8.1.3		Section 8.1.4
Section 9.1.6			
Eq. 9-5	Eq. 9-7		
ACI 318-19		ACI 318-14	

TABLE 16—TITEN HD® SCREW ANCHOR AND ROD HANGER IDENTIFICATION INFORMATION

Anchor Size	Head Type	Catalog Number
Carbon Steel Titen HD		
1/4"	Hex-Washer	THDB25xxxH
	Hex-Washer – Mechanically Galvanized	THDB25xxxHMG
	Countersunk	THDB25xxxCS
3/8"	Hex-Washer	THD37xxxH
	Hex-Washer – Mechanically Galvanized	THD37xxxHMG
	Countersunk	THD37xxxCS
1/2"	Hex-Washer	THD50xxxH
	Hex-Washer – Mechanically Galvanized	THD50xxxHMG
	Flat-Washer	THD50xxxWH
	Flat-Washer – Mechanically Galvanized	THD50xxxWHMG
5/8"	Hex-Washer	THDB62xxxH
	Hex-Washer – Mechanically Galvanized	THDB62xxxHMG
	Flat-Washer	THDB62xxxWH
	Flat-Washer – Mechanically Galvanized	THDB62xxxWHMG
3/4"	Hex-Washer	THD75xxxH
	Hex-Washer – Mechanically Galvanized	THD75xxxHMG
3/8" shank diameter / 3/8" Rod Coupler	Rod Coupler	THD37634RC
1/2" shank diameter / 3/8" Rod Coupler	Rod Coupler	THD5093437RC
1/2" shank diameter / 1/2" Rod Coupler	Rod Coupler	THD50934RC
Type 316 Stainless Steel Titen HD		
1/4"	Hex-Washer	THDC25xxxH6SS
	Countersunk	THDC25xxxCS6SS
3/8"	Hex-Washer	THD37xxxH6SS
	Countersunk	THD37xxxCS6SS
1/2"	Hex-Washer	THD50xxxH6SS
5/8"	Hex-Washer	THDB62xxxH6SS
3/4"	Hex-Washer	THD75xxxH6SS
Type 304 Stainless Steel Titen HD		
3/8"	Hex-Washer	THD37xxxH4SS
1/2"	Hex-Washer	THD50xxxH4SS
5/8"	Hex-Washer	THDB62xxxH4SS
3/4"	Hex-Washer	THD75xxxH4SS

DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:

SIMPSON STRONG-TIE COMPANY INC.

EVALUATION SUBJECT:

SIMPSON STRONG-TIE TITEN HD® SCREW ANCHORS IN CRACKED AND UNCRACKED, GROUTED AND UNGROUTED CONCRETE MASONRY UNIT WALLS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Simpson Strong-Tie Titen HD screw anchors, described in ICC-ES evaluation report ESR-5915, have also been evaluated for compliance with the codes noted below as adopted by Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2026* *City of Los Angeles Building Code* (LABC)
- 2026* *City of Los Angeles Residential Code* (LARC)

*For evaluation for compliance with the anticipated requirements of the 2026 LABC and LARC

2.0 CONCLUSIONS

The Simpson Strong-Tie Titen HD screw anchors, described in Sections 2.0 through 7.0 of the evaluation report ESR-5915, comply with LABC Chapter 21, and LARC, and are subjected to the conditions of use described in this report.

3.0 CONDITIONS OF USE

The Simpson Strong-Tie Titen HD screw anchors described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-5915.
- The design, installation, conditions of use and identification of the anchors are in accordance with the 2024 *International Building Code®* (IBC) and 2024 *International Residential Code®* (IRC) provisions, as applicable, noted in the evaluation report ESR-5915.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.
- The strength and allowable design values determined per the evaluation report and tables are for the connection of the anchors to the masonry substrate. The connection between the anchors and the connected members must be checked for capacity (which may govern).
- For use in wall anchorage assemblies to flexible diaphragm applications, anchors must be designed per the requirements of City of Los Angeles Information Bulletin P/BC 2026-071.

This supplement expires concurrently with the evaluation report, issued April 2026 and revised May 2026.

DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:

SIMPSON STRONG-TIE COMPANY INC.

EVALUATION SUBJECT:

SIMPSON STRONG-TIE TITEN HD® SCREW ANCHORS IN CRACKED AND UNCRACKED, GROUTED AND UNGROUTED CONCRETE MASONRY UNIT WALLS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Simpson Strong-Tie Titen HD® screw anchors, described in ICC-ES evaluation report ESR-5915, have 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 Simpson Strong-Tie Titen HD® screw anchors, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-5915, comply 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-5915 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 Simpson Strong-Tie Titen HD® screw anchors have also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential,* with the following condition:

a) Design and installation must meet the requirements of Section 2122.7 of the *Florida Building Code—Building.*

b) For connections subject to uplift, the connection must be designed for no less than 700 pounds (3114 N) in accordance with item 3 of Subsection 2321.7 of the *Florida Building Code—Building.*

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). Florida Rule 61G20-3 is applicable to products and/or systems which comprise the building envelope and structural frame for compliance with the structural requirements of the Florida Building Code.

This supplement expires concurrently with the evaluation report, issued April 2026 and revised May 2026.