# Stainless-Steel Titen HD®
## Heavy-Duty Screw Anchor

SIMPSON Strong-Tie®

**¼" diameter available in Type 316 stainless steel. ⅜", ½", ⅝" and ¾" diameters available in Types 316 and 304 stainless steel.**

(800) 999-5099
strongtie.com

# Drill It. Drive It. Forget It.

Installation of stainless-steel Titen HD screw anchor.

### The Next Era of Stainless-Steel Screw Anchor for Concrete and Masonry

Titen HD screw anchors are a trusted anchor solution because they offer the performance that specifiers need and the ease of installation that contractors demand. Until now, however, they were not for use in permanent exterior or corrosive environments. The Titen HD stainless-steel screw anchor for concrete and masonry sets the new standard for when the job calls for installation in multiple types of environments. It is the ultimate choice to provide fast and efficient installation, combined with long-lasting corrosion resistance for an unsurpassed peace-of-mind.

**Innovative** — The serrated carbon-steel threads on the tip of the stainless-steel Titen HD are vital because they undercut the concrete as the anchor is driven into the hole, making way for the rest of the threads to interlock with the concrete. In order for these threads to be durable enough to cut into the concrete, they are formed from carbon steel that is then hardened and brazed onto the tip of the anchor.

**Corrosion Resistant** — For dry, interior applications, carbon-steel corrosion is not a risk, but in any kind of exterior, coastal or chemical environment the anchor would be susceptible to corrosion. With the introduction of the THDSS, there is finally a state-of-the-art anchor solution that combines the corrosion resistance of Type 300 Series stainless steel with the undercutting ability of heat-treated carbon-steel cutting threads.

### Features:

- Ideal for exterior or corrosive environments
- Less carbon steel, less expansion
- Installs with an impact wrench or by hand tool

**Material:** Type 316 and Type 304 stainless steel with carbon-steel lead threads

Corrosion Resistance Level SEVERE — 316

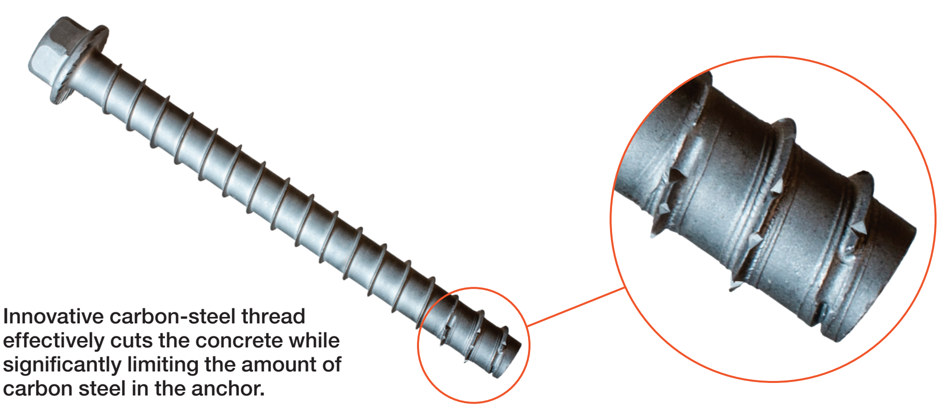
Corrosion Resistance Level HIGH — Type 304

Cracked Concrete CODE LISTED

**Codes:** Code listed in IAPMO UES ER-493 (concrete) and ICC-ES ESR-1056 (masonry)

### Anatomy of the Stainless-Steel Titen HD® (THDSS)

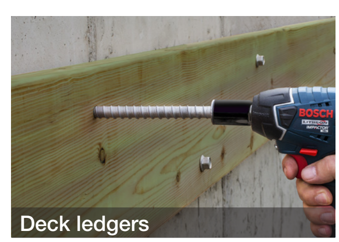
The THDSS screw anchor gets its cutting ability from a proprietary bi-metal design that incorporates a carbon-steel helical-coil thread brazed into the shank of the anchor. The serrated carbon-steel leading thread cuts a channel for the stainless-steel threads to engage into.



Innovative carbon-steel thread effectively cuts the concrete while significantly limiting the amount of carbon steel in the anchor.

Water treatment plants

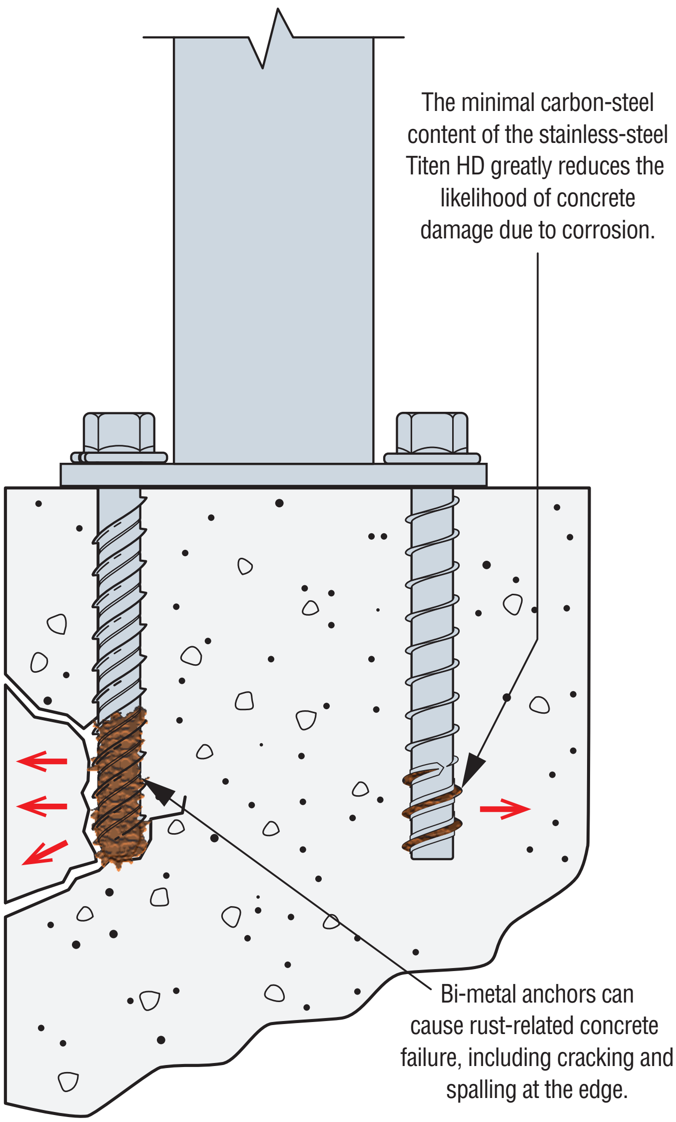
Outdoor fixtures

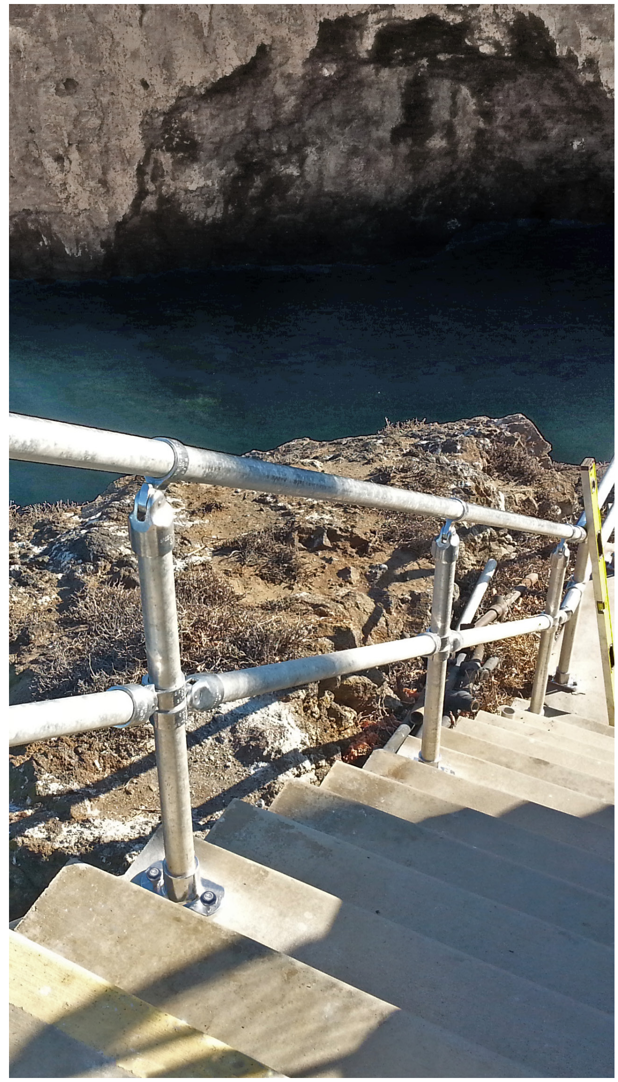


Deck ledgers

# Don't Let Other Bi-Metal Stainless-Steel Anchors Ruin Your Concrete

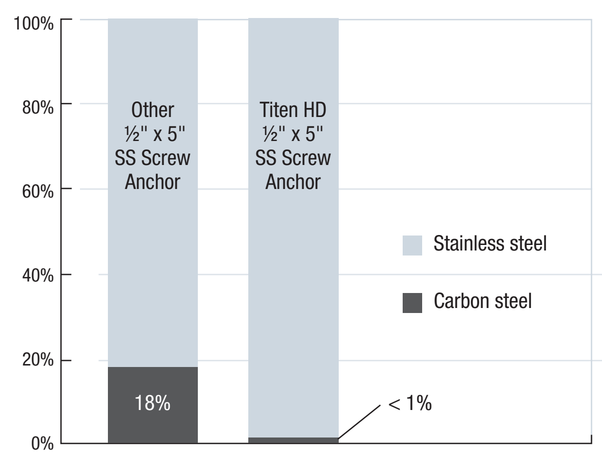
Other stainless-steel bi-metal anchors are made by welding a full carbon segment onto the end of the anchor to facilitate cutting. With time, the carbon-steel segment embedded in the concrete is vulnerable to rust. As carbon steel rusts, it can expand up to ten times its original volume, cracking and damaging concrete if installed near an edge. The carbon-steel content of the stainless-steel Titen HD has been minimized. While the helical-coil thread at the tip of the anchor is hardened to cut grooves in the concrete during installation, its mass is likely too small to cause concrete damage when it corrodes.



The stainless-steel Titen HD screw anchor sets the new standard for installation in many corrosive environments.

Carbon-Steel Content Comparison

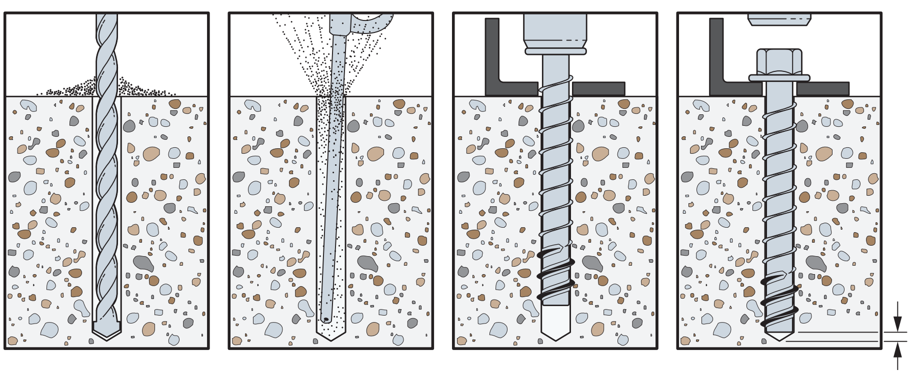



The ratio of carbon-steel vs. stainless-steel content in a ½" x 5" stainless-steel screw anchor.

## Stainless-Steel Titen HD Anchor Product Data

| Size (in.) | Model No. (Type 316) | Model No. (Type 304) | Drill Bit Dia. (in.) | Wrench Size (in.) | Quantity | |
|---|---|---|---|---|---|---|
| | | | | | Box | Carton |
| ¼ x 2 | THDC25200H6SS | — | ¼ | ⅜ | 50 | 250 |
| ¼ x 2⅜ | THDC25238H6SS | — | ¼ | ⅜ | 50 | 250 |
| ¼ x 3 | THDC25300H6SS | — | ¼ | ⅜ | 50 | 250 |
| ¼ x 4 | THDC25400H6SS | — | ¼ | ⅜ | 50 | 250 |
| ⅜ x 3 | THD37300H6SS | THD37300H4SS | ⅜ | 9⁄16 | 50 | 200 |
| ⅜ x 4 | THD37400H6SS | THD37400H4SS | ⅜ | 9⁄16 | 50 | 200 |
| ⅜ x 5 | THD37500H6SS | THD37500H4SS | ⅜ | 9⁄16 | 50 | 100 |
| ⅜ x 6 | THD37600H6SS | THD37600H4SS | ⅜ | 9⁄16 | 50 | 100 |
| ½ x 3 | THD50300H6SS | THD50300H4SS | ½ | ¾ | 25 | 100 |
| ½ x 4 | THD50400H6SS | THD50400H4SS | ½ | ¾ | 20 | 80 |
| ½ x 5 | THD50500H6SS | THD50500H4SS | ½ | ¾ | 20 | 80 |
| ½ x 6 | THD50600H6SS | THD50600H4SS | ½ | ¾ | 20 | 80 |
| ½ x 6½ | THD50612H6SS | THD50612H4SS | ½ | ¾ | 20 | 40 |
| ½ x 8 | THD50800H6SS | THD50800H4SS | ½ | ¾ | 20 | 40 |
| ⅝ x 4 | THDB62400H6SS | THDB62400H4SS | ⅝ | 15⁄16 | 10 | 40 |
| ⅝ x 5 | THDB62500H6SS | THDB62500H4SS | ⅝ | 15⁄16 | 10 | 40 |
| ⅝ x 6 | THDB62600H6SS | THDB62600H4SS | ⅝ | 15⁄16 | 10 | 40 |
| ⅝ x 6½ | THDB62612H6SS | THDB62612H4SS | ⅝ | 15⁄16 | 10 | 40 |
| ⅝ x 8 | THDB62800H6SS | THDB62800H4SS | ⅝ | 15⁄16 | 10 | 20 |
| ¾ x 4 | THD75400H6SS | THD75400H4SS | ¾ | 1⅛ | 10 | 40 |
| ¾ x 5 | THD75500H6SS | THD75500H4SS | ¾ | 1⅛ | 5 | 20 |
| ¾ x 6 | THD75600H6SS | THD75600H4SS | ¾ | 1⅛ | 5 | 20 |
| ¾ x 7 | THD75700H6SS | THD75700H4SS | ¾ | 1⅛ | 5 | 10 |
| ¾ x 8½ | THD75812H6SS | THD75812H4SS | ¾ | 1⅛ | 5 | 10 |

### Stainless-Steel Titen HD Screw Anchor Installation




### Installation

**Caution:** Holes in steel fixtures to be mounted should match the diameter specified in the table below if steel is thicker than 12 gauge.

**Caution:** Use a Titen HD screw anchor one time only — installing the anchor multiple times may result in excessive thread wear and reduce load capacity.

Do not use impact wrenches to install into hollow CMU.

**Caution:** Oversized holes in base material will reduce or eliminate the mechanical interlock of the threads with the base material and reduce the anchor's load capacity.

1. Drill a hole in the base material using a carbide drill bit (complying with ANSI B212.15) with the same diameter as the nominal diameter of the anchor to be installed. Drill the hole to the specified minimum hole depth overdrill (see table below) to allow the thread tapping dust to settle, and blow it clean using compressed air. (Overhead installations need not be blown clean.) Alternatively, drill the hole deep enough to accommodate embedment depth and the dust from drilling and tapping.
2. Insert the anchor through the fixture and into the hole.
3. Tighten the anchor into the base material until the hex-washer head contacts the fixture.

## Additional Installation Information

| Titen HD Diameter (in.) | Wrench Size (in.) | Recommended Fixture Hole Size (in.) | Min. Hole Depth Overdrill (in.) |
|---|---|---|---|
| ¼ | ⅜ | ⅜ to 7⁄16 | ⅛ |
| ⅜ | 9⁄16 | ½ to 9⁄16 | ¼ |
| ½ | ¾ | ⅝ to 11⁄16 | ½ |
| ⅝ | 15⁄16 | ¾ to 13⁄16 | ½ |
| ¾ | 1⅛ | ⅞ to 15⁄16 | ½ |

Fixture hole sizes are for structural steel thicker than 12 gauge only. Larger holes are not required for wood or cold-formed steel members.

## Stainless-Steel Titen HD Installation Information[1]

| Characteristic | Symbol | Units | Nominal Anchor Diameter (in.) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ¼ | | ⅜ | | ½ | | ⅝ | | ¾ | |
| **Installation Information** | | | | | | | | | | | | |
| Nominal Diameter | $d_a (d_o)$[4] | in. | ¼ | | ⅜ | | ½ | | ⅝ | | ¾ | |
| Drill Bit Diameter | $d_{bit}$ | in. | ¼ | | ⅜ | | ½ | | ⅝ | | ¾ | |
| Minimum Baseplate Clearance Hole Diameter[2] | $d_c$ | in. | ⅜ | | ½ | | ⅝ | | ¾ | | ⅞ | |
| Maximum Installation Torque[3] | $T_{inst,max}$ | ft.-lbf | N/A | | 40 | | 70 | | 85 | | 150 | |
| Maximum Impact Wrench Torque Rating | $T_{impact,max}$ | ft.-lbf | 125 | | 150 | | 345 | | 345 | | 380 | |
| Minimum Hole Depth | $h_{hole}$ | in. | 2¼ | 3⅛ | 2¾ | 3½ | 3¾ | 4½ | 4½ | 6 | 6 | 6¾ |
| Nominal Embedment Depth | $h_{nom}$ | in. | 2⅛ | 3 | 2½ | 3¼ | 3¼ | 4 | 4 | 5½ | 5½ | 6¼ |
| Effective Embedment Depth | $h_{ef}$ | in. | 1.27 | 2.01 | 1.40 | 2.04 | 1.86 | 2.50 | 2.31 | 3.59 | 3.49 | 4.13 |
| Critical Edge Distance | $c_{ac}$ | in. | 3 | 3 | 4½ | 5½ | 6 | 5¾ | 6 | 6⅜ | 6¾ | 7⅜ |
| Minimum Edge Distance | $c_{min}$ | in. | 1½ | 1½ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ |
| Minimum Spacing | $s_{min}$ | in. | 1½ | 1½ | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 |
| Minimum Concrete Thickness | $h_{min}$ | in. | 3½ | 4⅜ | 4 | 5 | 5 | 6¼ | 6 | 8½ | 8¾ | 10 |
| **Anchor Data** | | | | | | | | | | | | |
| Yield Strength | $f_{ya}$ | psi | 88,000 | | 98,400 | | 91,200 | | 83,200 | | 92,000 | |
| Tensile Strength | $f_{uta}$ | psi | 110,000 | | 123,000 | | 114,000 | | 104,000 | | 115,000 | |
| Minimum Tensile and Shear Stress Area | $A_{se}$[5] | in.$^2$ | 0.0430 | | 0.0990 | | 0.1832 | | 0.276 | | 0.414 | |
| Axial Stiffness in Service Load Range — Uncracked Concrete | $\beta_{uncr}$ | lb./in. | 139,300 | | 807,700 | | 269,085 | | 111,040 | | 102,035 | |
| Axial Stiffness in Service Load Range — Cracked Concrete | $\beta_{cr}$ | lb./in. | 103,500 | | 113,540 | | 93,675 | | 94,400 | | 70,910 | |

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 Chapter 17 or ACI 318-11 Appendix D, as applicable.
2. The minimum hole size must comply with applicable code requirements for the connected element.
3. $T_{inst,max}$ applies to installations using a calibrated torque wrench.
4. For the 2006 IBC $d_o$ replaces $d_a$. The notation in parenthesis is for the 2006 IBC.
5. $A_{se,N} = A_{se,V} = A_{se}$

## Stainless-Steel Titen HD Characteristic Tension Strength Design Values[1]

| Characteristic | Symbol | Units | Nominal Anchor Diameter (in.) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ¼ | | ⅜ | | ½ | | ⅝ | | ¾ | |
| Anchor Category | 1, 2 or 3 | — | 3 | | 1 | | | | | | | |
| Nominal Embedment Depth | $h_{nom}$ | in. | 2⅛ | 3 | 2½ | 3¼ | 3¼ | 4 | 4 | 5½ | 5½ | 6¼ |
| **Steel Strength in Tension ( ACI 318-14 17.4.1 or ACI 318-11 Section D.5.1)** | | | | | | | | | | | | |
| Tension Resistance of Steel | $N_{sa}$ | lbf | 4,730 | | 12,177 | | 20,885 | | 28,723 | | 47,606 | |
| Strength Reduction Factor — Steel Failure[2] | $\phi_{sa}$ | — | 0.75 | | | | | | | | | |
| **Concrete Breakout Strength in Tension (ACI 318-14 17.4.2 or ACI 318 Section D.5.2)** | | | | | | | | | | | | |
| Effective Embedment Depth | $h_{ef}$ | in. | 1.27 | 2.01 | 1.40 | 2.04 | 1.86 | 2.50 | 2.31 | 3.59 | 3.49 | 4.13 |
| Critical Edge Distance | $c_{ac}$ | in. | 3 | 3 | 4½ | 5½ | 6 | 5¾ | 6 | 6⅜ | 6¾ | 7⅜ |
| Effectiveness Factor — Uncracked Concrete | $k_{uncr}$ | — | 24 | 24 | 27 | 24 | 27 | 24 | 24 | 24 | 27 | 27 |
| Effectiveness Factor — Cracked Concrete | $k_{cr}$ | — | 17 | 17 | 21 | 17 | 17 | 17 | 17 | 17 | 17 | 21 |
| Modification Factor | $\Psi_{c,N}$ | — | 1 | | | | | | | | | |
| Strength Reduction Factor — Concrete Breakout Failure[3] | $\phi_{cb}$ | — | 0.45 | | 0.65 | | | | | | | |
| **Pullout Strength in Tension (ACI 318-14 17.4.3 or ACI 318-11 Section D.5.3)** | | | | | | | | | | | | |
| Pullout Resistance Uncracked Concrete (f'c = 2,500 psi) | $N_{p,uncr}$ | lbf | 1,725[5] | 3,550[8] | N/A[4] | N/A[4] | N/A[4] | N/A[4] | 3,820[5] | 9,080[7] | N/A[4] | N/A[4] |
| Pullout Resistance Cracked Concrete (f'c = 2,500 psi) | $N_{p,cr}$ | lbf | 695[5] | 1,225[5] | 1,675[5] | 2,415[5] | 1,995[5] | N/A[4] | N/A[4] | N/A[4] | N/A[4] | N/A[4] |
| Strength Reduction Factor — Pullout Failure[6] | $\phi_p$ | — | 0.45 | | 0.65 | | | | | | | |
| **Tension Strength for Seismic Applications (ACI 318-14 17.2.3.3 or ACI 318-11 Section D.3.3.3)** | | | | | | | | | | | | |
| Nominal Pullout Strength for Seismic Loads (f'c = 2,500 psi) | $N_{p,eq}$ | lbf | 695[5] | 1,225[5] | 1,675[5] | 2,415[5] | 1,995[5] | N/A[4] | N/A[4] | N/A[4] | N/A[4] | N/A[4] |
| Strength Reduction Factor for Pullout Failure[6] | $\phi_{eq}$ | — | 0.45 | | 0.65 | | | | | | | |

For **SI**: 1 in. = 25.4 mm, 1 ft.-lbf. = 1.356 N-m, 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 318-14 Chapter 17 or ACI 318-11 Appendix D, as applicable.
2. The tabulated value of $\phi_{sa}$ applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 are used, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of $\phi$ must be determined in accordance with ACI 318 D.4.4(b), as applicable.
3. The tabulated values of $\phi_{cb}$ applies when both the load combinations of Section 1605.2 of the IBC, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2, as applicable, are used and the requirements of ACI 318-11 D.4.3(c) for Condition B are met. Condition B applies where supplementary reinforcement is not provided in concrete. For installations where complying reinforcement can be verified, the $\phi_{cb}$ factors described in ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c), as applicable, may be used for Condition A. If the load combinations of ACI 318 Appendix C are used, the appropriate value of $\phi$ must be determined in accordance with ACI 318 D.4.4(c) for Condition B.
4. N/A denotes that pullout resistance does not govern and does not need to be considered.
5. The characteristic pullout resistance for greater compressive strengths may be increased by multiplying the tabular value by $(f'_c/2,500)^{0.5}$.
6. The tabulated value of $\phi_p$ or $\phi_{eq}$ applies when both the load combinations of ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2, as applicable, are used and the requirements of ACI 318-11 D.4.3(c) for Condition B are met. Condition B applies where supplementary reinforcement is not provided in concrete. For installations where complying reinforcement can be verified, the $\phi_p$ or $\phi_{eq}$ factors described in ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c), as applicable, may be used for Condition A. If the load combinations of ACI 318 Appendix C are used, the appropriate value of $\phi$ must be determined in accordance with ACI 318 D.4.4(c) for Condition B.
7. The characteristic pullout resistance for greater compressive strengths may be increased by multiplying the tabular value by $(f'_c/2,500)^{0.5}$.
8. The characteristic pullout resistance for greater compressive strengths may be increased by multiplying the tabular value by $(f'_c/2,500)^{0.3}$.

## Stainless-Steel Titen HD Characteristic Shear Strength Design Values[1]

| Characteristic | Symbol | Units | Nominal Anchor Diameter (in.) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ¼ | | ⅜ | | ½ | | ⅝ | | ¾ | |
| Anchor Category | 1, 2 or 3 | — | 3 | | 1 | | | | | | | |
| Nominal Embedment Depth | $h_{nom}$ | in. | 2⅛ | 3 | 2½ | 3¼ | 3¼ | 4 | 4 | 5½ | 5½ | 6¼ |
| **Steel Strength in Shear (ACI 318-14 17.5.1 or ACI 318-11 Section D.6.1)** | | | | | | | | | | | | |
| Shear Resistance of Steel | $V_{sa}$ | lbf | 2,285 | | 3,790 | 4,780 | 6,024 | 7,633 | 10,422 | 10,649 | 13,710 | 19,161 |
| Strength Reduction Factor — Steel Failure[2] | $\phi_{sa}$ | — | 0.65 | | | | | | | | | |
| **Concrete Breakout Strength in Shear (ACI 318-14 17.5.2 or ACI 318-11 Section D.6.2)** | | | | | | | | | | | | |
| Nominal Diameter | $d_a(d_o)$[4] | in. | 0.250 | | 0.375 | | 0.500 | | 0.625 | | 0.750 | |
| Load Bearing Length of Anchor in Shear | $l_e$ | in. | 1.27 | 2.00 | 1.40 | 2.04 | 1.86 | 2.50 | 2.31 | 3.59 | 3.49 | 4.13 |
| Strength Reduction Factor — Concrete Breakout Failure[3] | $\phi_{cb}$ | — | 0.70 | | | | | | | | | |
| **Concrete Pryout Strength in Shear (ACI 318-14 17.5.3 or ACI 318-11 Section D.6.3)** | | | | | | | | | | | | |
| Coefficient for Pryout Strength | $k_{cp}$ | — | 1.0 | | | | | 2.0 | 1.0 | 2.0 | | |
| Strength Reduction Factor — Concrete Pryout Failure[3] | $\phi_{cp}$ | — | 0.70 | | | | | | | | | |
| **Shear Strength for Seismic Applications (ACI 318-14 17.2.3.3 or ACI 318-11 Section D.3.3.3)** | | | | | | | | | | | | |
| Shear Resistance — Single Anchor for Seismic Loads (f'c = 2,500 psi) | $V_{sa,eq}$ | lbf | 1,370 | 1,600 | 3,790 | 4,780 | 5,345 | 6,773 | 9,367 | 9,367 | 10,969 | 10,969 |
| Strength Reduction Factor - Steel Failure[2] | $\phi_{eq}$ | — | 0.65 | | | | | | | | | |

For **SI**: 1 in. = 25.4 mm, 1 lbf. = 4.45 N.

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 Chapter 17 or ACI 318-11 Appendix D, as applicable.
2. The tabulated value of $\phi_{sa}$ and $\phi_{eq}$ applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2, as applicable, are used. If the load combinations of ACI 318 Appendix C are used, the appropriate value of f must be determined in accordance with ACI 318 D.4.4(b).
3. The tabulated values of $\phi_{cb}$ and $\phi_{cp}$ applies when both the load combinations of Section 1605.2 of the IBC ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-11 D.4.4(c) for Condition B are met. Condition B applies where supplementary reinforcement is not provided in concrete. For installations where complying reinforcement can be verified, the $\phi_{cb}$ and $\phi_{cp}$ factors described in ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c), as applicable, can be used for Condition A. If the load combinations of ACI 318 Appendix C are used, the appropriate value of $\phi_{cb}$ must be determined in accordance with ACI 318 D.4.5(c) for Condition B.
4. The notation in parenthesis is for the 2006 IBC.

## Stainless-Steel Titen HD Tension Design Strengths in Normal-Weight Concrete ($f'_C$ = 2,500 psi)

| Anchor Dia. (in.) | Nominal Embed. Depth (in.) | Min. Concrete Thickness $h_{min}$ (in.) | Critical Edge Distance $C_{ac}$ (in.) | Minimum Edge Distance $C_{min}$ (in.) | Tension Design Strength (lb.) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Edge Distances = $C_{ac}$ on all sides | | | | Edge Distances = $C_{min}$ on one side and $C_{ac}$ on three sides | | | |
| | | | | | SDC A-B[5] | | SDC C-F[6,7] | | SDC A-B[5] | | SDC C-F[6,7] | |
| | | | | | Uncracked | Cracked | Uncracked | Cracked | Uncracked | Cracked | Uncracked | Cracked |
| ¼ | 2⅛ | 3½ | 3 | 1½ | 775 | 315 | 580 | 235 | 410 | 315 | 310 | 235 |
| | 3 | 4⅜ | 3 | 1½ | 1,540 | 550 | 1,155 | 415 | 980 | 550 | 735 | 415 |
| ⅜ | 2½ | 4 | 4½ | 1¾ | 1,455 | 1,090 | 1,090 | 815 | 590 | 985 | 440 | 735 |
| | 3¼ | 5 | 5½ | 1¾ | 2,270 | 1,570 | 1,705 | 1,175 | 865 | 1,100 | 650 | 825 |
| ½ | 3¼ | 5 | 6 | 1¾ | 2,225 | 1,295 | 1,670 | 970 | 745 | 1,010 | 560 | 760 |
| | 4 | 6¼ | 5¾ | 1¾ | 3,085 | 2,185 | 2,310 | 1,635 | 1,240 | 1,345 | 930 | 1,010 |
| ⅝ | 4 | 6 | 6 | 1¾ | 2,485 | 1,940 | 1,860 | 1,455 | 1,015 | 1,245 | 760 | 930 |
| | 5½ | 8½ | 6⅜ | 1¾ | 5,300 | 3,760 | 3,975 | 2,820 | 2,370 | 1,985 | 1,775 | 1,490 |
| ¾ | 5½ | 8¾ | 6¾ | 1¾ | 5,720 | 3,600 | 4,290 | 2,700 | 2,370 | 1,925 | 1,775 | 1,440 |
| | 6¼ | 10 | 7⅜ | 1¾ | 7,360 | 5,730 | 5,520 | 4,295 | 3,115 | 2,885 | 2,335 | 2,160 |

1. Tension design strengths are based on the strength design provisions of ACI 318-11 Appendix D or ACI 318-14 Chapter 17.
2. Tabulated values are for a single anchor with no influence of another anchor.
3. Interpolation between embedment depths is not permitted.
4. Strength reduction factor, $\phi$, is based on using a load combination from ACI 318-11 Section 9.2, Section 1605.2 of the IBC, or ACI 318-14 Section 5.3.
5. The tension design strength listed for SDC (Seismic Design Category) A-B may also be used in SDC C-F when the tension component of the strength-level seismic design load on the anchor does not exceed 20% of the total factored tension load on the anchor associated with the same load combination.
6. When designing anchorages in SDC C-F, the designer shall consider the ductility requirements of ACI 318-11 Section D.3.3 or ACI 318-14 Section 17.2.3.
7. Tension design strengths in SDC C-F have been adjusted by a 0.75 factor in accordance with ACI 318-11 Section D.3.3.4.4 or ACI 318-14 Section 17.2.3.4.4.

## Stainless-Steel Titen HD Allowable Tension Loads in Normal-Weight Concrete ($f'_C$ = 2,500 psi) — Static Load

| Anchor Dia. (in.) | Nominal Embed. Depth (in.) | Min. Concrete Thickness $h_{min}$ (in.) | Critical Edge Distance $c_{ac}$ (in.) | Minimum Edge Distance $c_{min}$ (in.) | Allowable Tension Load (lb.) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Edge Distances = $c_{ac}$ on all sides | | Edge Distances = $c_{min}$ on one side and $c_{ac}$ on three sides | |
| | | | | | Uncracked | Cracked | Uncracked | Cracked |
| ¼ | 2⅛ | 3½ | 3 | 1½ | 555 | 225 | 295 | 225 |
| | 3 | 4⅜ | 3 | 1½ | 1,100 | 395 | 700 | 395 |
| ⅜ | 2½ | 4 | 4½ | 1¾ | 1,040 | 780 | 420 | 705 |
| | 3¼ | 5 | 5½ | 1¾ | 1,620 | 1,120 | 620 | 785 |
| ½ | 3¼ | 5 | 6 | 1¾ | 1,590 | 925 | 530 | 720 |
| | 4 | 6¼ | 5¾ | 1¾ | 2,205 | 1,560 | 885 | 960 |
| ⅝ | 4 | 6 | 6 | 1¾ | 1,775 | 1,385 | 725 | 890 |
| | 5½ | 8½ | 6⅜ | 1¾ | 3,785 | 2,685 | 1,695 | 1,420 |
| ¾ | 5½ | 8¾ | 6¾ | 1¾ | 4,085 | 2,570 | 1,695 | 1,375 |
| | 6¼ | 10 | 7⅜ | 1¾ | 5,260 | 4,095 | 2,225 | 2,060 |

1. Allowable tension loads are calculated based on the strength design provision of ACI 318-11 Appendix D or ACI 318-14 Chapter 17 using a conversion factor of $\alpha$ = 1.4.The conversion factor $\alpha$ is based on the load combination 1.2D + 1.6L assuming 50% dead load and 50% live load: 1.2(0.5) + 1.6(0.5) = 1.4.
2. Tabulated values are for a single anchor with no influence of another anchor.
3. Interpolation between embedment depths is not permitted.

## Stainless-Steel Titen HD Allowable Tension Loads in Normal-Weight Concrete ($f'_C$ = 2,500 psi) — Wind Load

| Anchor Dia. (in.) | Nominal Embed. Depth (in.) | Min. Concrete Thickness $h_{min}$ (in.) | Critical Edge Distance $c_{ac}$ (in.) | Minimum Edge Distance $c_{min}$ (in.) | Allowable Tension Load (lb.) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Edge Distances = $c_{ac}$ on all sides | | Edge Distances = $c_{min}$ on one side and $c_{ac}$ on three sides | |
| | | | | | Uncracked | Cracked | Uncracked | Cracked |
| ¼ | 2⅛ | 3½ | 3 | 1½ | 465 | 190 | 245 | 190 |
| | 3 | 4⅜ | 3 | 1½ | 925 | 330 | 590 | 330 |
| ⅜ | 2½ | 4 | 4½ | 1¾ | 875 | 655 | 355 | 590 |
| | 3¼ | 5 | 5½ | 1¾ | 1,360 | 935 | 520 | 660 |
| ½ | 3¼ | 5 | 6 | 1¾ | 1,335 | 775 | 445 | 605 |
| | 4 | 6¼ | 5¾ | 1¾ | 1,850 | 1,310 | 745 | 805 |
| ⅝ | 4 | 6 | 6 | 1¾ | 1,490 | 1,165 | 610 | 745 |
| | 5½ | 8½ | 6⅜ | 1¾ | 3,180 | 2,255 | 1,420 | 1,190 |
| ¾ | 5½ | 8¾ | 6¾ | 1¾ | 3,430 | 2,160 | 1,420 | 1,155 |
| | 6¼ | 10 | 7⅜ | 1¾ | 4,415 | 3,440 | 1,870 | 1,730 |

1. Allowable tension loads are calculated based on the strength design provision of ACI 318-11 Appendix D or ACI 318-14 Chapter 17 using a conversion factor of $\alpha$ = 1/0.6 = 1.67. The conversion factor $\alpha$ is based on the load combination assuming 100% wind load.
2. Tabulated values are for a single anchor with no influence of another anchor.
3. Interpolation between embedment depths is not permitted.

## Stainless-Steel Titen HD Allowable Tension Loads in Normal-Weight Concrete ($f'_C$ = 2,500 psi) — Seismic Load

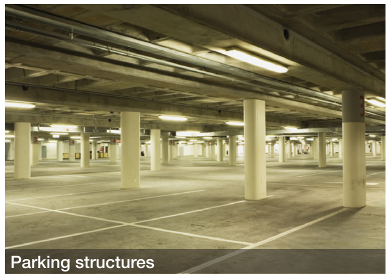
| Anchor Dia. (in.) | Nominal Embed. Depth (in.) | Min. Concrete Thickness $h_{min}$ (in.) | Critical Edge Distance $c_{ac}$ (in.) | Minimum Edge Distance $c_{min}$ (in.) | Allowable Tension Load (lb.) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Edge Distances = $c_{ac}$ on all sides | | | | Edge Distances = $c_{min}$ on one side and $c_{ac}$ on three sides | | | |
| | | | | | SDC A-B[4] | | SDC C-F[5,6] | | SDC A-B[4] | | SDC C-F[5,6] | |
| | | | | | Uncracked | Cracked | Uncracked | Cracked | Uncracked | Cracked | Uncracked | Cracked |
| ¼ | 2⅛ | 3½ | 3 | 1½ | 545 | 220 | 405 | 165 | 285 | 220 | 215 | 165 |
| | 3 | 4⅜ | 3 | 1½ | 1,080 | 385 | 810 | 290 | 685 | 385 | 515 | 290 |
| ⅜ | 2½ | 4 | 4½ | 1¾ | 1,020 | 765 | 765 | 570 | 415 | 690 | 310 | 515 |
| | 3¼ | 5 | 5½ | 1¾ | 1,590 | 1,090 | 1,195 | 820 | 605 | 770 | 455 | 580 |
| ½ | 3¼ | 5 | 6 | 1¾ | 1,560 | 905 | 1,170 | 680 | 520 | 705 | 390 | 530 |
| | 4 | 6¼ | 5¾ | 1¾ | 2,160 | 1,530 | 1,615 | 1,145 | 870 | 940 | 650 | 705 |
| ⅝ | 4 | 6 | 6 | 1¾ | 1,740 | 1,360 | 1,300 | 1,020 | 710 | 870 | 530 | 650 |
| | 5½ | 8½ | 6⅜ | 1¾ | 3,710 | 2,630 | 2,785 | 1,975 | 1,660 | 1,390 | 1,245 | 1,045 |
| ¾ | 5½ | 8¾ | 6¾ | 1¾ | 4,005 | 2,520 | 3,005 | 1,890 | 1,660 | 1,350 | 1,245 | 1,010 |
| | 6¼ | 10 | 7⅜ | 1¾ | 5,150 | 4,010 | 3,865 | 3,005 | 2,180 | 2,020 | 1,635 | 1,510 |

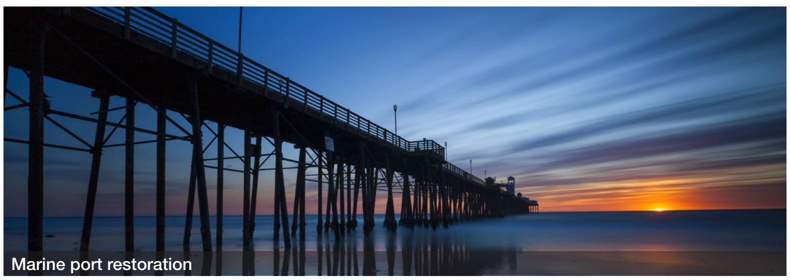
1. Allowable tension loads are calculated based on the strength design provision of ACI 318-11 Appendix D or ACI 318-14 Chapter 17 using a conversion factor of $\alpha$ = 1/0.7 = 1.43. The conversion factor $\alpha$ is based on the load combination assuming 100% seismic load.
2. Tabulated values are for a single anchor with no influence of another anchor.
3. Interpolation between embedment depths is not permitted.
4. The tension design strength listed for SDC (Seismic Design Category) A-B may also be used in SDC C-F when the tension component of the strength-level seismic design load on the anchor does not exceed 20% of the total factored tension load on the anchor associated with the same load combination.
5. When designing anchorages in SDC C-F, the designer shall consider the ductility requirements of ACI 318-11 Section D.3.3 or ACI 318-14 Section 17.2.3.
6. Tension design strengths in SDC C-F have been adjusted by a 0.75 factor in accordance with ACI 318-11 Section D.3.3.4.4 or ACI 318-14 Sectoin 17.2.3.4.4.

Type 300 Series stainless-steel screw anchors have different corrosion-resistant properties for different environments. When matched to the appropriate environment and application, anchors made from Type 300 Series stainless steel will resist the effects of corrosion and maintain their strength and integrity. Type 316 is the optimal choice for applications in corrosive or extreme environments such as salt water, or when chemical or corrosive solutions are present. Type 304 is a cost-effective solution for less extreme applications where the environment may be wet, moist or damp.

## For Use in Seating, Catwalks, Machinery, Piping, Railings and More

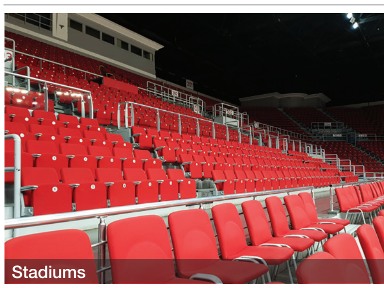

Water treatment plants


Parking structures


Marine port restoration

### Type 316 stainless steel

- Wastewater treatment
- Fertilizer storage buildings
- Sill plates in coastal environments
- Marine/port restoration
- Light rail (transportation)
- Parking structures
- Tunnels
- Balconies in coastal environments
- Outdoor railings in coastal environments


Stadiums


Clean rooms


Food processing


Central utility plants


Deck ledgers


General exterior applications

### Type 304 stainless steel

- Stadium seating
- Curtain walls
- Clean rooms
- Central utility plant facilities
- Food-processing facilities
- Ledger bolts for decks
- DOT signs and fixtures
- Agricultural facilities
- Cooling towers
- Pulp and paper mills
- Scaffolding
- Parking structures
- Tunnels
- Balconies
- Refineries
- Breweries and wineries
- Fencing
- Outdoor railings

This flier is effective until December 31, 2021, and reflects information available as of June 1, 2019.
This information is updated periodically and should not be relied upon after December 31, 2021.
Contact Simpson Strong-Tie for current information and limited warranty or see strongtie.com.



F-A-THDSS19 6/19 exp. 12/21

(800) 999-5099
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