

# POWDER-ACTUATED FASTENERS

## PAF Shear Loads in Concrete and Steel

| 0.145" Dia. Pin Spacing | Allowable Shear Load (100)                         |                     |                               |                                       |                                       |                                       |
|-------------------------|--|---------------------|-------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
|                         | Base Material <sup>1</sup>                         |                     |                               | Cold Formed Steel                     |                                       |                                       |
|                         | Concrete (f' <sub>c</sub> ≥ 2500 psi) <sup>2</sup> |                     | Steel <sup>3,4</sup>          |                                       |                                       |                                       |
|                         | 1" emb. (lbs/ft)                                   | 1.25" emb. (lbs/ft) | Min. thickness 3/16" (lbs/ft) | 54 mils (16 GA) <sup>5</sup> (lbs/ft) | 43 mils (18 GA) <sup>5</sup> (lbs/ft) | 33 mils (20 GA) <sup>5</sup> (lbs/ft) |
| 0' - 4"                 | 425  | 795                 | 1185                          | 1440                                  | 795                                   | 610                                   |
| 0' - 6"                 | 285  | 530                 | 790                           | 960                                   | 530                                   | 405                                   |
| 0' - 8"                 | 215  | 400                 | 595                           | 720                                   | 400                                   | 305                                   |
| 1' - 0"                 | 145  | 265                 | 395                           | 480                                   | 265                                   | 205                                   |
| 1' - 6"                 | 95   | 175                 | 265                           | 320                                   | 175                                   | 135                                   |
| 2' - 0"                 | 70   | 130                 | 200                           | 240                                   | 135                                   | 100                                   |
| 2' - 6"                 | 55   | 105                 | 160                           | 192                                   | 105                                   | 80                                    |
| 3' - 0"                 | 50   | 90                  | 130                           | 160                                   | 90                                    | 70                                    |
| 4' - 0"                 | 35   | 65                  | 100                           | 120                                   | 65                                    | 50                                    |

1. Load values based on 0.145" dia. pins in 2500 psi nm. wt. concrete or steel having a minimum F<sub>y</sub> = 36 ksi (see Simpson ER-4546).
2. Edge distance of pins shall be no less than 3". Spacing distance of pins shall be no less than 4"
3. The entire pointed portion of the fastener must penetrate the steel.
4. Edge distance of pins shall be no less than 1/2". Spacing distance of pins shall be no less than 1 1/2".
5. 2001 AISI NAS, Eq. E4.3.1-2, Ω = 3.0, d = 0.145". See page 11 for CFS thickness standards and General Notes (e) on page 9 for CFS properties.
6. Allowable loads must be the lesser of the base material or CFS strength.

## PAF Tension Loads in Concrete and Steel

| Allowable Tension Load (100)                       |                  |                            |                                    |                                    |                                    |
|--|------------------|----------------------------|------------------------------------|------------------------------------|------------------------------------|
| Base Material <sup>1,2</sup>                       |                  |                            | Cold Formed Steel (Pull-Over)      |                                    |                                    |
| Concrete (f' <sub>c</sub> ≥ 2500 psi) <sup>3</sup> |                  | Steel <sup>4,5</sup>       |                                    |                                    |                                    |
| 1" emb. (lbs)                                      | 1.25" emb. (lbs) | Min. thickness 3/16" (lbs) | 54 mils (16 GA) <sup>6</sup> (lbs) | 43 mils (18 GA) <sup>6</sup> (lbs) | 33 mils (20 GA) <sup>6</sup> (lbs) |
| 70   | 195              | 155                        | 275                                | 150                                | 115                                |

1. Load values based on 0.145" dia. pins in 2500 psi nm. wt. concrete or steel having a minimum F<sub>y</sub> = 36 ksi (see Simpson ER-4546).
2. Use interaction formula for combined tension/shear (P<sub>s</sub>/P<sub>t</sub>) + (V<sub>s</sub>/V<sub>t</sub>) ≤ 1.0.
3. Edge distance of pins shall be no less than 3". Spacing distance of pins shall be no less than 4"
4. The entire pointed portion of the fastener must penetrate the steel.
5. Edge distance of pins shall be no less than 1/2". Spacing distance of pins shall be no less than 1 1/2".
6. 2001 AISI NAS, Eq. E4.4.2-1 divided by 2.0 (one-sided loading), Ω = 3.0, d<sub>w</sub> = 0.3". See page 11 for CFS thickness standards and General Notes (e) on page 9 for CFS properties.
7. Allowable loads must be the lesser of the base material or CFS strength.

Anchors

# TITEN<sup>®</sup> Screw Anchor

Titen screws are 3/16" and 1/4" diameter masonry screws for attaching all types of components to concrete and masonry. Available in hex and phillips head designs in blue, white or silver colors. Use with appropriately sized Titen drill bits included with each box.

CODES: FL 2355

## Titen Installation Sequence



**WARNING:** Industry studies show that hardened fasteners can experience performance problems in wet environments. Accordingly, use this product in dry, interior applications only.

## Shear Loads for Titen Screw Anchors

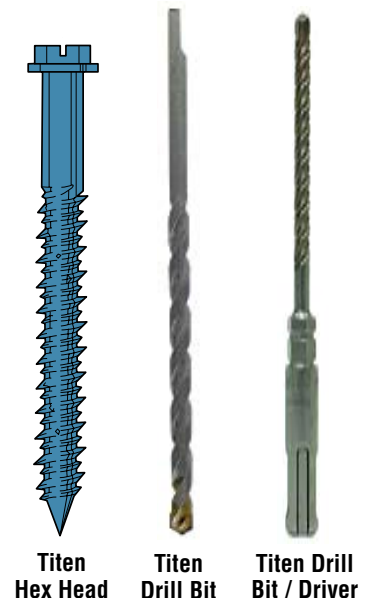
| Anchor Callout (Dia. x L) | Min. Embed. Depth | Min. Edge | Anchor Spacing | Allowable Shear Load (100)                     |                                       |                                       |                                       |
|---------------------------|-------------------|-----------|----------------|--|---------------------------------------|---------------------------------------|---------------------------------------|
|                           |                   |           |                | Concrete (f' <sub>c</sub> ≥ 2000 psi) (lbs/ft) | CMU (hollow or grout-filled) (lbs/ft) | Cold Formed Steel                     |                                       |
|                           |                   |           |                |  |                                       | 43 mils (18 GA) <sup>1</sup> (lbs/ft) | 33 mils (20 GA) <sup>1</sup> (lbs/ft) |
| 3/16" x 1 1/4" Titen      | 1"                | 1 1/8"    | 0' - 2.25"     | 1360   | 1200                                  | 1815                                  | 1410                                  |
|                           |                   |           | 0' - 6"        | 510  | 450                                   | 680                                   | 530                                   |
|                           |                   |           | 1' - 0"        | 255  | 225                                   | 340                                   | 265                                   |
|                           |                   |           | 1' - 6"        | 170  | 150                                   | 225                                   | 175                                   |
|                           |                   |           | 2' - 0"        | 125  | 110                                   | 170                                   | 135                                   |
|                           |                   |           | 3' - 0"        | 85   | 75                                    | 115                                   | 90                                    |
| 1/4" x 1 3/4" Titen       | 1 1/2"            | 1 1/2"    | 0' - 3"        | 1600   | 1240                                  | 1820                                  | 1400                                  |
|                           |                   |           | 0' - 6"        | 800  | 620                                   | 910                                   | 700                                   |
|                           |                   |           | 1' - 0"        | 400  | 310                                   | 455                                   | 350                                   |
|                           |                   |           | 1' - 6"        | 265  | 205                                   | 305                                   | 235                                   |
|                           |                   |           | 2' - 0"        | 200  | 155                                   | 230                                   | 175                                   |
|                           |                   |           | 3' - 0"        | 135  | 105                                   | 150                                   | 115                                   |
| 4' - 0"                   | 100               | 80        | 115            | 90   |                                       |                                       |                                       |

1. 2001 AISI NAS, Eq. E4.3.1-2, Ω = 3.0. See page 11 for CFS thickness standards and General Notes (e) on page 9 for CFS properties.
2. Allowable loads must be the lesser of the concrete, CMU or CFS strength.

## Tension Loads for Titen Screw Anchors

| Dia. (in)         | Embed. Depth (in) | Allowable Tension Load (100)                             |   |                                    |                                    |                                    |                                    |
|-------------------|-------------------|--|---|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
|                   |                   | Concrete <sup>1</sup> (f' <sub>c</sub> ≥ 2500 psi) (lbs) | CMU <sup>1</sup> Hollow or Grout-filled (lbs) | Cold Formed Steel (Pull-Over)      |                                    |                                    |                                    |
|                   |                   |  |   | 68 mils (14 GA) <sup>4</sup> (lbs) | 54 mils (16 GA) <sup>4</sup> (lbs) | 43 mils (18 GA) <sup>4</sup> (lbs) | 33 mils (20 GA) <sup>4</sup> (lbs) |
| 3/16 <sup>2</sup> | 1                 | 135  | 135   | 360                                | 290                                | 160                                | 120                                |
| 1/4 <sup>3</sup>  | 1 1/2             | 400  | 185   | 435                                | 345                                | 190                                | 145                                |

1. Use interaction formula for combined tension and shear (P<sub>s</sub>/P<sub>t</sub>) + (V<sub>s</sub>/V<sub>t</sub>) ≤ 1.0.
2. Critical spacing = 2 1/4" and critical edge distance = 1 1/8".
3. Critical spacing = 3" and critical edge distance = 1 1/2".
4. 2001 AISI NAS, Eq. E4.4.2-1 divided by 2.0 (one-sided loading), Ω = 3.0, d<sub>w</sub> = 3/16" (3/16" Titen) and d<sub>w</sub> = 3/8" (1/4" Titen). See page 11 for CFS thickness standards and General Notes (e) on page 9 for CFS properties.
5. Allowable loads must be the lesser of the concrete, CMU or CFS strength.



Titen Hex Head Titen Drill Bit Titen Drill Bit / Driver



Special hex adapter on the bit allows the Titen Installation Tool to slide over the bit and lock in, ready to drive screws.