

## Titen® 2 Concrete and Masonry Screw

Titen 2 Installation Information and Additional Data<sup>1</sup>

Characteristic	Symbol	Units	Nominal Anchor Diameter (in.)	
			3/16	1/4
<b>Installation Information</b>				
Drill Bit Diameter	$d$	in.	5/32	3/16
Minimum Baseplate Clearance Hole Diameter	$d_c$	in.	1/4	5/16
Minimum Hole Depth	$h_{hole}$	in.	2 1/4	2 1/4
Embedment Depth	$h_{nom}$	in.	1 3/4	1 3/4
Effective Embedment Depth	$h_{ef}$	in.	1.30	1.30
Critical Edge Distance	$c_{ac}$	in.	3	3
Minimum Edge Distance	$c_{min}$	in.	1 3/4	1 3/4
Minimum Spacing	$s_{min}$	in.	1	2
Minimum Concrete Thickness	$h_{min}$	in.	3 1/4	3 1/4
<b>Additional Data</b>				
Yield Strength	$f_{ya}$	psi	100,000	
Tensile Strength	$f_{uta}$	psi	125,000	
Minimum Tensile and Shear Stress Area	$A_{se}$	in. <sup>2</sup>	0.017	0.025

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.

Titen 2 Tension Strength Design Data<sup>1</sup>

Characteristic	Symbol	Units	Nominal Anchor Diameter (in.)	
			3/16	1/4
Anchor Category	1, 2 or 3	—	1	
Embedment Depth	$h_{nom}$	in.	1 3/4	1 3/4
<b>Steel Strength in Tension</b>				
Tension Resistance of Steel	$N_{sa}$	lb.	2,175	3,175
Strength Reduction Factor — Steel Failure	$\phi_{sa}$	—	0.65 <sup>2</sup>	
<b>Concrete Breakout Strength in Tension<sup>6</sup></b>				
Effective Embedment Depth	$h_{ef}$	in.	1.30	1.30
Critical Edge Distance	$c_{ac}$	in.	3	3
Effectiveness Factor — Uncracked Concrete	$k_{uncr}$	—	24	
Modification Factor	$\Psi_{c,N}$	—	1.0	
Strength Reduction Factor — Concrete Breakout Failure	$\phi_{cb}$	—	0.65 <sup>3</sup>	
<b>Pullout Strength in Tension<sup>6</sup></b>				
Pullout Resistance Uncracked Concrete ( $f'_c = 2,500$ psi) <sup>4</sup>	$N_{p,uncr}$	lb.	1,900	1,900
Strength Reduction Factor — Pullout Failure	$\phi_p$	—	0.65 <sup>5</sup>	

- 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.
- 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 and the requirements of ACI 318-11 Appendix C are used, the appropriate value of  $\phi$  must be determined in accordance with ACI 318-11 Section D.4.4.
- The tabulated value 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 are used and the requirements of ACI 318-14 Section 17.3.3 (c) or ACI 318-11 Section D.4.3, as applicable, for Condition B are met. Condition B applies where supplementary reinforcement is not provided. For installations where complying supplementary reinforcement can be verified, the  $\phi_{cb}$  factor described in ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3, as applicable, for Condition A are allowed. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of  $\phi$  must be determined in accordance with ACI 318-11 Section D.4.4.
- The characteristic pullout resistance for greater compressive strengths may be increased by multiplying the tabular value by  $(f'_c/2,500)^{0.5}$ .
- The tabulated value of  $\phi_p$  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 318-14 Section 17.3.3 (c) or ACI 318-11 Section D.4.3(c) for Condition B are met. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of  $\phi$  must be determined in accordance with ACI 318-11 Section D.4.4 for Condition B.

\* See p. 13 for an explanation of the load table icons.

# Titen® 2 Concrete and Masonry Screw



## Titen 2 Shear Strength Design Data<sup>1</sup>

Characteristic	Symbol	Units	Nominal Anchor Diameter (in.)	
			3/16	1/4
Anchor Category	1, 2 or 3	—	1	
Embedment Depth	$h_{nom}$	in.	1 3/4	1 3/4
<b>Steel Strength in Shear</b>				
Shear Resistance of Steel	$V_{sa}$	lb.	990	1,510
Strength Reduction Factor — Steel Failure	$\phi_{sa}$	—	0.60 <sup>2</sup>	
<b>Concrete Breakout Strength in Shear<sup>4</sup></b>				
Outside Diameter	$d_a$	in.	0.149	0.180
Load Bearing Length of Anchor in Shear	$l_e$	in.	1.30	1.30
Strength Reduction Factor — Concrete Breakout Failure	$\phi_{cb}$	—	0.70 <sup>3</sup>	
<b>Concrete Pryout Strength in Shear</b>				
Coefficient for Pryout Strength	$k_{cp}$	—	1.0	
Strength Reduction Factor — Concrete Pryout Failure	$\phi_{cp}$	—	0.70 <sup>4</sup>	

- 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.
- 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. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of  $\phi$  must be determined in accordance with ACI 318-11 Section D.4.4.
- The tabulated value of  $\phi_{cb}$  applies when both the load combinations of Section 1605.2.1 of the IBC, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c) for Condition B are met. Condition B applies where supplementary reinforcement is not provided. For installations where complying supplementary 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) for Condition A are allowed. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of  $\phi_{cb}$  must be determined in accordance with ACI 318-11 D.4.4(c).
- The tabulated value of  $\phi_{cp}$  applies when both the load combinations of IBC Section 1605.2, ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c) for Condition B are met. If the load combinations of ACI 318-11 Appendix C are used, appropriate value of  $\phi_{cp}$  must be determined in accordance with ACI 318-11 Section D.4.4(c).

## Allowable Tension Load for Titen 2 Screw Anchor Installed in Grouted CMU Wall Faces<sup>1,2,3</sup>



Anchor Diameter (in.)	Embedment Depth (in.)	Minimum Dimensions			Allowable Load (lb.)
		Spacing (in.)	Edge (in.)	End (in.)	
3/16	2	3	3 7/8	3 7/8	346
3/16	2	3	1 1/2	3 7/8	315
1/4	2	4	3 7/8	3 7/8	277
1/4	2	4	1 1/2	3 7/8	272

- The tabulated values are for screw anchors installed in minimum 8"-wide grouted concrete masonry walls having reached a minimum of  $f'_m$  of 1,500 psi at time of installation.
- Embedment is measured from the masonry surface to the embedded end of the screw anchor.
- Screw anchors must be installed in grouted cell. The minimum edge and end distances must be maintained.
- Allowable loads are based on a safety factor of 5.0 for installations under the IBC and IRC.

## Allowable Shear Load for Titen 2 Screw Anchor Installed in Grouted CMU Wall Faces<sup>1,2,3</sup>



Anchor Diameter (in.)	Embedment Depth (in.)	Minimum Dimensions			Direction of Loading	Allowable Load (lb.)
		Spacing (in.)	Edge (in.)	End (in.)		
3/16	2	3	3 7/8	3 7/8	Toward edge, parallel to wall end	224
3/16	2	3	1 1/2	3 7/8	Toward wall end, parallel to wall edge	238
1/4	2	4	3 7/8	3 7/8	Toward edge, parallel to wall end	309
1/4	2	4	1 1/2	3 7/8	Toward wall end, parallel to wall edge	277

- The tabulated values are for screw anchors installed in minimum 8"-wide grouted concrete masonry walls having reached a minimum of  $f'_m$  of 1,500 psi at time of installation.
- Embedment is measured from the masonry surface to the embedded end of the screw anchor.
- Screw anchors must be installed in grouted cell. The minimum edge and end distances must be maintained.
- Allowable loads are based on a safety factor of 5.0 for installations under the IBC and IRC.

\* See p. 13 for an explanation of the load table icons.

# Titen® 2 Concrete and Masonry Screw

Allowable Tension Load for Titen 2 Screw Anchor  
Installed in Hollow CMU Wall Faces<sup>1,2,3</sup>



Anchor Diameter (in.)	Embedment Depth (in.)	Minimum Dimensions			Allowable Load (lb.)
		Spacing (in.)	Edge (in.)	End (in.)	
3/16	1 1/4	3	3 7/8	3 7/8	151
1/4	1 1/4	4	3 7/8	3 7/8	153

1. The tabulated values are for screw anchors installed in minimum 8"-wide ungrouted concrete masonry walls having reached a minimum of  $f'_m$  of 1,500 psi at time of installation.
2. Embedment is measured from the masonry surface to the embedded end of the screw anchor.
3. Screw anchors may be installed at any location in the wall face provided the minimum edge and end distances are maintained.
4. Allowable loads are based on a safety factor of 5.0 for installations under the IBC and IRC.

Allowable Shear Load for Titen 2 Screw Anchor  
Installed in Hollow CMU Wall Faces<sup>1,2,3</sup>



Anchor Diameter (in.)	Embedment Depth (in.)	Minimum Dimensions			Direction of Loading	Allowable Load (lb.)
		Spacing (in.)	Edge (in.)	End (in.)		
3/16	1 1/4	3	3 7/8	3 7/8	Toward edge, parallel to wall end	168
1/4	1 1/4	4	3 7/8	3 7/8	Toward edge, parallel to wall end	163

1. The tabulated values are for screw anchors installed in minimum 8"-wide ungrouted concrete masonry walls having reached a minimum of  $f'_m$  of 1,500 psi at time of installation.
2. Embedment is measured from the masonry surface to the embedded end of the screw anchor.
3. Screw anchors may be installed at any location in the wall face provided the minimum edge and end distances are maintained.
4. Allowable loads are based on a safety factor of 5.0 for installations under the IBC and IRC.

\* See p. 13 for an explanation of the load table icons.