

Tapcon+ Screw Anchor - Technical Data

Available Sizes – Tapcon+ and Accessories

Anchor Diameter	Length (Under Head)	Drill Diameter	Base Plate Hole Dia.	Quantity (Ctn/Box)	Part No.
1/4"	2-1/4"	1/4"* Tapcon+ or ANSI Bit	3/8"	800 / 100	3511407
	3"			800 / 100	3507407
3/8"	3"	3/8" ANSI	1/2"	400 / 50	3508407
	4"			400 / 50	3509407
1/2"	6"	1/2" ANSI	5/8"	160 / 20	3510407

*Note - 1/4" diameter anchors require tight tolerance drill bit to ensure Category 1 performance.

Use 1/4-7" Tapcon+ SDS drill bit, Part No. 3512909

Installation information for Tapcon+ Screw Anchors¹

Characteristics	Symbols	Units	Nominal Anchor Diameter (inch)						
			1/4		3/8		1/2		
Head Style	-	-	Hex Head		Hex Head		Hex Head		
Nominal Outside diameter (Shank)	d_{a3}	in.	0.25		0.38		0.50		
Nominal Outside diameter (threads)	-	in.	0.33		0.46		0.59		
Drill Bit Specification	d_{bit}	in.	1/4 Tapcon+ Bit	1/4 Tapcon+ Bit	3/8 ANSI Bit	1/2 ANSI Bit			
Minimum base plate clearance hole diameter	d_h	in.	3/8		1/2		5/8		
Maximum installation torque ³	$T_{inst, max}$	ft-lbf	20		50		70		
Maximum Impact Wrench Torque Rating	$T_{impact, max}$	ft-lbf	115		200		345		
Effective embedment depth	h_{ef}	in.	1.45		1.78		1.32	2.17	3.02
Minimum nominal embedment depth ⁴	h_{nom}	in.	2		2 1/2		2	3	4
Minimum hole depth	h_{hole}	in.	2 1/4		2 3/4		2 1/4	3 1/4	4 1/4
Minimum concrete member thickness	h_{min}	in.	4		4		4	6	
Critical edge distance	c_{ac}	in.	2 1/2		4 1/2		3	4	5
Minimum edge distance	c_{min}	in.	1 1/2		1 1/2		2 1/2	1 3/4	2 1/2
Minimum Spacing	s_{min}	in.	3		3		3	3 1/2	3

Tapcon+ Screw Anchor - Technical Data

Tension Strength Design Information for Tapcon+ Screw Anchors¹

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)					
			1/4	3/8	1/2			
Head Style	-	-	Hex Head		Hex Head	Hex Head		
Drill bit specification	-	in.	1/4 Tapcon+ Bit	1/4 ANSI Bit	3/8 ANSI Bit	1/2 ANSI Bit		
Anchor Category	1, 2, or 3	-	1	2	1	1		
Effective embedment depth	h_{ef}	in.	1.45		1.78	1.32	2.17	3.02
Minimum concrete member thickness	h_{min}	in.	4		4	6		
Critical edge distance	c_{ac}	in.	2 1/2		4 1/2	3	4	5
Data for Steel Strength in Tension								
Minimum specified yield strength	f_y	psi	100,000		100,000	100,000		
Minimum specified ultimate strength	$f_{uta}(f_{ut})^5$	psi	125,000		125,000	125,000		
Effective tensile stress area	A_{se}	in ²	0.0470		0.098	0.1850		
Steel strength in tension	V_{sa}	lbf	5,900		12,250	23,125		
Strength reduction factor Φ for tension, steel failure modes ²	Φ_{sa}	-	0.65		0.65	0.65		
Data for Concrete Breakout Strength in Tension								
Effectiveness factor - uncracked concrete	k_{uncr}	-	24		27	30		
Effectiveness factor - cracked concrete	k_{cr}	-	17		17	17		
Modification factor for cracked and uncracked concrete ³	$\Psi_{c,N}(\Psi_3)^5$	-	1.0		1.0	1.0		
Strength reduction factor Φ for tension, concrete failure modes, Condition B ³	Φ_{cb}	-	0.65	0.55	0.65	0.65		
Data for Pullout Strength in Tension								
Pullout strength, uncracked concrete	$N_{p,uncr}$	lbf	2,107		See footnote 4	See footnote 4		
Pullout strength, cracked concrete	$N_{p,cr}$	lbf	857		1,837	See footnote 4		
Pullout strength for seismic loads	$N_{p,eq}$	lbf	857		1,677	See footnote 4		
Strength reduction factor Φ for tension, pullout failure modes, Condition B ³	Φ_p	-	0.65	0.55	0.65	See footnote 4		
Additional Anchor Data								
Axial stiffness in service load range in uncracked concrete	β_{uncr}	lbf/in	385,000		800,000	800,000		

For SI: 1 inch = 25.4 mm, 1 ft-lbf = 1.356 N-m

¹The data presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D

²The tabulated value of Φ_{sa} applies when the load combinations of Section 1605.2.1 of the IBC or ACI 318 section 9.2 are used. If load combinations of ACI 318 Appendix C are used, the appropriate value of Φ must be determined in accordance with ACI 318-11 D.4.4(b).

³The tabulated value of Φ_{cb} and Φ_{cp} applies when the load combinations of Section 1605.2.1 of the IBC or ACI 318 Section 9.2 are used and the requirements of ACI 318-11 D.4.3(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, the appropriate value of Φ must be determined in accordance with ACI 318-11 D.4.4(c) for Condition B

⁴Pullout resistance does not govern design and does not need to be considered

⁵The notation in parentheses is for the 2006 IBC

⁶For calculation only. For actual h_{ef} see Table 1

⁷For the strength between the threaded cap and anchor head

Trubolt Wedge Anchor - Technical Data

Shear Strength Design Information for Tapcon+ Screw Anchors¹

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)					
			1/4		3/8	1/2		
Head Style	-	-	Hex Head		Hex Head	Hex Head		
Drill bit specification	-	in.	1/4 Tapcon+ Bit	1/4 ANSI Bit	3/8 ANSI Bit	1/2 ANSI Bit		
Anchor Category	1, 2, or 3	-	1	2	1	1		
Minimum effective embedment depth	h_{ef}	in.	1.45		1.78	1.32	2.17	3.02
Minimum concrete member thickness	h_{min}	in.	4		4	6		
Critical edge distance	c_{ac}	in.	2 1/2		4 1/2	3	4	5
Data for Steel Strengths in Shear								
Minimum specified yield strength	f_y	psi	100,000		100,000	100,000		
Minimum specified ultimate strength	$f_{uta}(f_{ut})^5$	psi	125,000		125,000	125,000		
Effective shear stress area	A_{se}	in ²	0.0470		0.098	0.1850		
Steel strength in shear - static	V_{sa}	lbf	2,045		3,621	12,610		
Steel strength in shear - seismic	$V_{sa, eq}$	-	1,350		2,920	9,300		
Strength reduction factor Φ for shear, steel failure modes ²	Φ_{sa}	-	0.60		0.60	0.60		
Data for Concrete Breakout and Concrete Pryout Strengths in Shear								
Nominal Outside Diameter (shank)	$d_a(d_o)^4$	in.	0.25		0.38	0.50		
Load bearing length of anchor	ℓ_e	-	1.45		1.78	1.32	2.17	3.02
Coefficient for pryout strength	κ_{cp}	-	1.0		1.0	1.0		2.0
Strength reduction factor for shear, concrete breakout ³	Φ_{cb}	-	0.70		0.70	0.70		

For SI: 1 inch = 25.4 mm, 1 ft-lbf = 1.356 N-m

¹The data presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D

²The tabulated value of Φ_{sa} applies when the load combinations of Section 1605.2.1 of the IBC or ACI 318 section 9.2 are used. If load combinations of ACI 318 Appendix C are used, the appropriate value of Φ must be determined in accordance with ACI 318-11 D.4.4(b).

³The tabulated value of Φ_{cb} and Φ_{cp} applies when the load combinations of Section 1605.2.1 of the IBC or ACI 318 Section 9.2 are used and the requirements of ACI 318-11 D.4.3(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, the appropriate value of Φ must be determined in accordance with ACI 318-11 D.4.4(c) for Condition B

⁴Pullout resistance does not govern design and does not need to be considered

⁵The notation in parentheses is for the 2006 IBC

⁶For calculation only. For actual h_{ef} see Table 1

⁷For the strength between the threaded cap and anchor head

Tapcon+ Screw Anchor - Technical Data

Tapcon+ Screw Anchors Design Information for Anchors Located in the Soffit of Concrete Over Steel Deck Floor and Roof Assemblies^{1,2,3,4,5}

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)		
			1/2		
Location of installation	-	-	Lower Flute		Upper Flute
Minimum hole depth	h_{hole}	in.	2 1/2	4 1/2	2 1/2
Nominal embedment depth	h_{nom}	in.	2	4	2
Minimum effective embedment depth	h_{ef}	in.	1.32	3.02	1.32
Characteristic pullout strength, uncracked concrete over metal deck	$N_{p, deck, uncr}$	lbf	1,720	4,950	2,405
Characteristic pullout strength, cracked concrete over metal deck	$N_{p, deck, cr}$	lbf	975	2,805	1,360
Characteristic shear strength, concrete over metal deck	$V_{sa, deck}$	lbf	3,825	6,130	3,825
Characteristic shear strength - seismic, concrete over metal deck	$V_{sa, deck, eq}$	lbf	2,820	4,520	2,820
Reduction factor for pullout strength in tension, Condition B	Φ	-	0.65		
Reduction factor for pullout strength in shear, Condition B	Φ	-	0.65		

For SI: 1 inch = 25.4 mm, 1 ft-lbf = 1.356 N-m

¹Values for $N_{p, deck, uncr}$, $N_{p, deck, cr}$, $V_{sa, deck}$, $V_{sa, deck, eq}$ apply to sand-lightweight concrete having a minimum concrete compressive strength, f'_c of 3,000 psi.

²The characteristic pull-out strength for greater concrete compressive strengths shall be increased by multiplying the tabular value by $(f'_c / 3000\text{psi})^{0.5}$

³All values of Φ apply to the load combinations of IBC Section 1605.2.1, or ACI 318 Section 9.2. If the load combinations of Appendix C are used, then appropriate value of Φ must be determined in accordance with ACI 318-11 D.4.4. For installations where reinforcement that complies with ACI 318 Appendix D requirements for Condition A is present, the appropriate Φ factor must be determined in accordance with ACI 318-11 D.4.3.

⁴The minimum anchor spacing along the flute must be greater of $3 h_{ef}$ or 1.5 times the flute width in accordance with Section 4.1.11 of this report

⁵Installation must comply with Figure 6 of this report