



# SET-XP® Design Information — Concrete



- SET-XP has been qualified per ACI 355.4 and AC308. In order to design SET-XP in accordance with ACI 318 Chapter 17, the design information is published in Simpson Strong-Tie's C-A-2023 and ICC-ES ESR-2508. In addition, the design values are included in the Simpson Strong-Tie Anchor Designer Software. Simpson strongly encourages the designer to utilize the software when designing concrete anchorage solutions.
- In an attempt to provide the designer quick reference tables, Simpson Strong-Tie has provided the tables contained within this Technical Engineering Bulletin. These tables provide Tension Capacities only. The tables provide either a Design Strength level capacity or an Allowable Tension Load capacity. The footnotes of each table further explain how the Design Strength capacities were calculated and what factors were used to calculate the Allowable Load capacities. For additional information, please refer to Anchor Designer software and/or contact Simpson Strong-Tie.

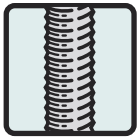
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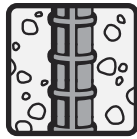
# SET-XP® Design Information — Concrete

## Icons and Nomenclature

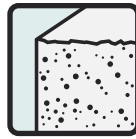
In order to facilitate easier identification of performance data, the following icon system has been incorporated into the sections of the technical bulletin with multiple load tables. These icons will appear in the heading of the table to promote easier visual identification of the type of load, insert type and substrate addressed in the table. Icons are intended for quick identification. All specific information regarding suitability should be read from the table itself.



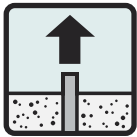
Threaded Rod



Rebar



Normal-Weight  
Concrete



Tension Load

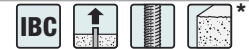


Valid for  
International  
Building Code

- $C_{ac}$  Critical Edge Distance
- $f'_c$  Concrete Compressive Strength
- $h_{ef}$  Effective Embedment Depth
- $h_{min}$  Minimum Concrete Thickness



# SET-XP® Design Information — Concrete



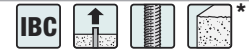
Tension Design Strength for Threaded Rod Anchors in Normal-Weight Concrete ( $f'_c = 2,500$  psi)

Rod Dia. (in.)	Eff. Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Tension Design Strength Based on Concrete or Bond (lb.)							
						Edge Distances = $c_{ac}$ on all sides				Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides			
						SDC A-B		SDC C-F		SDC A-B		SDC C-F	
						Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
3/8	2 3/8	4 1/4	3 3/4	—	—	1,185	—	890	—	675	—	505	—
		5 3/4	3 5/8							800		600	
	3	4 7/8	5	4 7/8	3 1/4	1,500	1,150	1,125	865	635	775	475	585
		7 1/4	4 1/2							880		660	
	4 1/2	6 3/8	8 1/8	6 3/8	3 1/4	2,250	1,725	1,685	1,295	590	1,165	445	875
		10 7/8	6 3/4							880		660	
	6	7 7/8	11 1/8	7 7/8	4 3/8	2,995	2,300	<b>2,250</b>	1,725	570	1,555	430	1,165
		14 1/2	9							880		660	
	7 1/2	9 3/8	14 1/4	9 3/8	5 3/8	3,745	2,875	<b>2,810</b>	2,160	560	1,945	420	1,455
		18	11 1/4							880		660	
1/2	2 3/4	5 1/4	5 1/8	—	—	2,730	—	2,050	—	1,470	—	1,105	—
		6 5/8	5 1/8							1,470		1,105	
	4	6 1/2	7 7/8	6 1/2	5 1/8	3,975	1,755	2,980	1,315	1,400	945	1,050	710
		9 5/8	6							1,935		1,450	
	6	8 1/2	12 5/8	8 1/2	5 1/8	5,960	2,635	<b>4,470</b>	1,975	1,300	1,420	975	1,065
		14 1/2	9							1,935		1,450	
	8	10 1/2	17 1/2	10 1/2	5 1/4	7,950	3,510	<b>5,960</b>	2,635	1,260	1,890	945	1,420
		19 1/4	12							1,935		1,450	
	10	12 1/2	22 1/4	12 1/2	6 3/8	9,935	4,390	<b>7,450</b>	3,290	1,235	2,365	925	1,775
		24	15							1,935		1,450	
5/8	3 1/8	6 1/4	6 1/4	—	—	3,580	—	2,685	—	1,805	—	1,355	—
		7 1/2	6 1/4							1,805		1,355	
	5	8 1/8	9 1/2	8 1/8	6 1/4	5,730	2,335	4,295	1,750	1,875	1,175	1,405	885
		12	7 1/2							2,590		1,945	
	7 1/2	10 5/8	15 3/8	10 5/8	6 1/4	8,595	3,500	6,445	2,625	1,745	1,765	1,310	1,325
		18	11 1/4							2,590		1,945	
12 1/2	15 5/8	26 7/8	15 5/8	7 5/8	14,320	5,830	<b>10,740</b>	4,375	1,655	2,945	1,240	2,210	
	30	18 3/4							2,590		1,945		
3/4	3 1/2	7 1/4	7 1/8	—	—	4,385	—	3,290	—	2,120	—	1,590	—
		8 1/2	7 1/8							2,120		1,590	
	6	9 3/4	11	9 3/4	7 1/8	7,520	3,000	5,640	2,250	2,335	1,450	1,750	1,090
		14 1/2	9							3,230		2,420	
	9	12 3/4	17 3/4	12 3/4	7 1/8	11,280	4,500	8,460	3,375	2,175	2,180	1,630	1,635
		21 5/8	13 1/2							3,230		2,420	
	15	18 3/4	31 1/8	18 3/4	9	18,795	7,505	<b>14,100</b>	5,625	2,060	3,630	1,545	2,720
		36	22 1/2							3,230		2,420	
7/8	3 3/4	8 1/8	7 7/8	—	—	5,020	—	3,010	—	2,355	—	1,410	—
		9	7 7/8							2,355		1,410	
	7	11 3/8	12 3/8	11 3/8	7 7/8	9,365	3,745	5,620	2,250	2,795	1,755	1,680	1,055
		16 7/8	10 1/2							3,865		2,320	
	10 1/2	14 7/8	19 7/8	14 7/8	7 7/8	14,050	5,620	8,430	3,370	2,605	2,635	1,560	1,580
		25 1/4	15 3/4							3,865		2,320	
	17 1/2	21 7/8	35	21 7/8	10	23,415	9,365	<b>14,050</b>	5,620	2,465	4,390	1,480	2,635
		42	26 1/4							3,865		2,320	

\* See page 4 for footnotes.

\* See page 2 for an explanation of the load table icons.

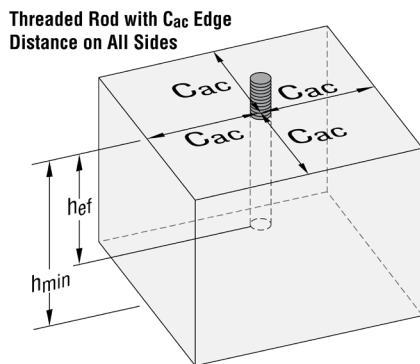
# SET-XP® Design Information — Concrete



Tension Design Strength for Threaded Rod Anchors in Normal-Weight Concrete ( $f'_c = 2,500$  psi)

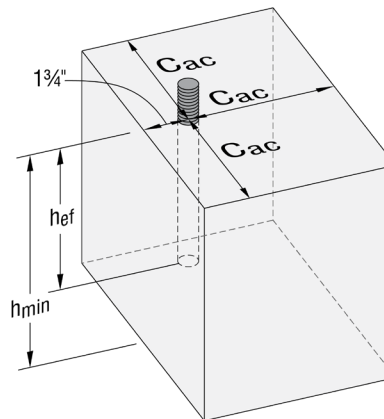
Rod Dia. (in.)	Eff. Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Tension Design Strength Based on Concrete or Bond (lb.)							
						Edge Distances = $c_{ac}$ on all sides				Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides			
		$h_{min}$	$c_{ac}$	$h_{min}$	$c_{ac}$	SDC A-B		SDC C-F		SDC A-B		SDC C-F	
						Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
1	4	9	8½	—	—	5,455	—	3,765	—	2,505	—	1,730	—
		9⅝	8½							2,505		1,730	
	8	13	13½	13	8½	10,905	4,755	7,525	3,280	3,155	2,185	2,175	1,510
		19¼	12							4,360		3,010	
	12	17	21¾	17	8½	16,360	7,135	11,290	4,920	2,935	3,280	2,025	2,265
		28⅞	18							4,360		3,010	
	20	25	38¼	25	12¼	27,265	11,890	<b>18,815</b>	8,205	2,785	5,465	1,920	3,770
		48	30							4,360		3,010	
1¼	5	11¼	9½	—	—	6,705	—	5,030	—	—	—	—	—
		12	9½							—		—	
	10	16¼	15⅝	16¼	9½	13,415	7,430	10,060	5,570	—	—	—	—
		24	15							—		—	
	15	21¼	24¾	21¼	11⅞	20,120	11,145	15,090	8,360	—	—	—	—
		36	22½							—		—	
	25	31¼	43⅝	31¼	15⅝	33,530	18,575	25,150	13,930	—	—	—	—
		60	37½							—		—	

1. Tension design strength (SD level) must be the lesser of the concrete, bond or threaded rod steel design strength.
2. Tension design strengths are based on the strength design provisions of ACI 318-14 Chapter 17 assuming dry concrete, periodic inspection, short-term temperature of 150°F and long-term temperature of 110°F.
3. Tabulated values are for a single anchor with no influence of another anchor.
4. Interpolation between embedment depths is not permitted.
5. Strength reduction factor,  $\phi$ , is based on using a load combination from ACI 318-14 Section 5.3.
6. 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.
7. When designing anchorages in SDC C-F, the Designer shall consider the ductility requirements of ACI 318-14 Section 17.2.3. Design strengths in **Bold** indicate that the anchor ductility requirements of 17.2.3.4.3 (a) (i) to (iii) are satisfied when using ASTM F1554 Grade 36 threaded rod. Any other ductility requirements must be satisfied.
8. Tension design strengths in SDC C-F have been adjusted by 0.75 factor in accordance with ACI 318-14 Section 17.2.3.4.4.
9. The Designer of Record is responsible for the foundation design.



Flat Slab

Threaded Rod with 1¼" Edge Distance on One Side and  $c_{ac}$  on Three Sides

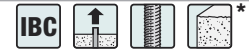


Flat Slab

\* See page 2 for an explanation of the load table icons.



# SET-XP® Design Information — Concrete



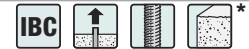
Allowable Tension Loads for Threaded Rod Anchors in Normal-Weight Concrete ( $f'_c = 2,500$  psi)  
 — Static Load

Rod Dia. (in.)	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Allowable Tension Load Based on Concrete or Bond (lb.)			
		$h_{min}$	$c_{ac}$	$h_{min}$	$c_{ac}$	Edge distances = $c_{ac}$ on all sides		Edge Distances = $1\frac{1}{4}$ " on one side and $c_{ac}$ on three sides	
						Uncracked	Cracked	Uncracked	Cracked
3/8	2 3/8	4 1/4	3 3/4	—	—	845	—	480	—
		5 3/4	3 5/8					570	
	3	4 7/8	5	4 7/8	3 1/4	1,070	820	455	555
		7 1/4	4 1/2					630	
	4 1/2	6 3/8	8 1/8	6 3/8	3 1/4	1,605	1,230	420	830
		10 7/8	6 3/4					630	
	6	7 7/8	11 1/8	7 7/8	4 3/8	2,140	1,645	405	1,110
		14 1/2	9					630	
	7 1/2	9 3/8	14 1/4	9 3/8	5 3/8	2,675	2,055	400	1,390
		18	11 1/4					630	
1/2	2 3/4	5 1/4	5 1/8	—	—	1,950	—	1,050	—
		6 3/8	5 1/8					1,050	
	4	6 1/2	7 7/8	6 1/2	5 1/8	2,840	1,255	1,000	675
		9 5/8	6					1,380	
	6	8 1/2	12 5/8	8 1/2	5 1/8	4,255	1,880	930	1,015
		14 1/2	9					1,380	
	8	10 1/2	17 1/2	10 1/2	5 1/4	5,680	2,505	900	1,350
		19 1/4	12					1,380	
	10	12 1/2	22 1/4	12 1/2	6 3/8	7,095	3,135	880	1,690
		24	15					1,380	
5/8	3 3/8	6 1/4	6 1/4	—	—	2,555	—	1,290	—
		7 1/2	6 1/4					1,290	
	5	8 3/8	9 1/2	8 3/8	6 1/4	4,095	1,670	1,340	840
		12	7 1/2					1,850	
	7 1/2	10 5/8	15 3/8	10 5/8	6 1/4	6,140	2,500	1,245	1,260
		18	11 1/4					1,850	
	12 1/2	15 5/8	26 7/8	15 5/8	7 3/8	10,230	4,165	1,180	2,105
		30	18 3/4					1,850	
3/4	3 1/2	7 1/4	7 1/8	—	—	3,130	—	1,515	—
		8 1/2	7 1/8					1,515	
	6	9 3/4	11	9 3/4	7 1/8	5,370	2,145	1,670	1,035
		14 1/2	9					2,305	
	9	12 3/4	17 3/4	12 3/4	7 1/8	8,055	3,215	1,555	1,555
		21 3/8	13 1/2					2,305	
	15	18 3/4	31 1/8	18 3/4	9	13,425	5,360	1,470	2,595
		36	22 1/2					2,305	
7/8	3 3/4	8 3/8	7 7/8	—	—	3,585	—	1,680	—
		9	7 7/8					1,680	
	7	11 3/8	12 3/8	11 3/8	7 7/8	6,690	2,675	1,995	1,255
		16 7/8	10 1/2					2,760	
	10 1/2	14 7/8	19 7/8	14 7/8	7 7/8	10,035	4,015	1,860	1,880
		25 1/4	15 3/4					2,760	
	17 1/2	21 7/8	35	21 7/8	10	16,725	6,690	1,760	3,135
		42	26 1/4					2,760	

\* See page 6 for footnotes.

\* See page 2 for an explanation of the load table icons.

# SET-XP® Design Information — Concrete

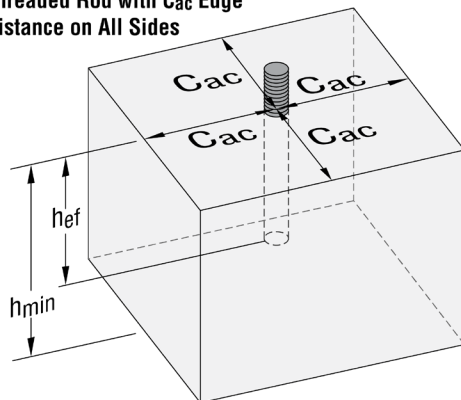


Allowable Tension Loads for Threaded Rod Anchors in Normal-Weight Concrete ( $f'_c = 2,500$  psi)  
— Static Load

Rod Dia. (in.)	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Allowable Tension Load Based on Concrete or Bond (lb.)			
		$h_{min}$	$c_{ac}$	$h_{min}$	$c_{ac}$	Edge distances = $c_{ac}$ on all sides		Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides	
						Uncracked	Cracked	Uncracked	Cracked
1	4	9	$8\frac{1}{2}$	—	—	3,895	—	1,790	—
		$9\frac{5}{8}$	$8\frac{1}{2}$					1,790	
	8	13	$13\frac{1}{2}$	13	$8\frac{1}{2}$	7,790	3,395	2,255	1,560
		$19\frac{1}{4}$	12					3,115	
	12	17	$21\frac{3}{4}$	17	$8\frac{1}{2}$	11,685	5,095	2,095	2,345
		$28\frac{7}{8}$	18					3,115	
	20	25	$38\frac{1}{4}$	25	$12\frac{1}{4}$	19,475	8,495	1,990	3,905
		48	30					3,115	
$1\frac{1}{4}$	5	$11\frac{1}{4}$	$9\frac{1}{2}$	—	—	4,790	—	—	—
		12	$9\frac{1}{2}$					—	
	10	$16\frac{1}{4}$	$15\frac{3}{8}$	$16\frac{1}{4}$	$9\frac{1}{2}$	9,580	5,305	—	—
		24	15					—	
	15	$21\frac{1}{4}$	$24\frac{3}{4}$	$21\frac{1}{4}$	$11\frac{1}{8}$	14,370	7,960	—	—
		36	$22\frac{1}{2}$					—	
	25	$31\frac{1}{4}$	$43\frac{3}{8}$	$31\frac{1}{4}$	$15\frac{5}{8}$	23,950	13,270	—	—
		60	$37\frac{1}{2}$					—	

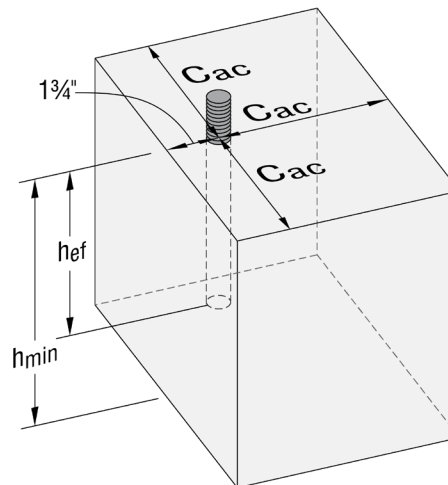
1. Allowable tension load must be the lesser of the concrete, bond or threaded rod steel load.  
Designer to select the lower value from the table above and the allowable tension load based on steel strength (page 10).
2. Allowable tension loads are calculated based on the strength design provisions of ACI 318-14 Chapter 17 assuming dry concrete, periodic inspection, short-term temperature of 150°F and long-term temperature of 110°F. Tension design strengths are converted to allowable tension loads using a conversion factor of  $a = 1.4$ . The conversion factor  $a$  is based on the load combination  $1.2D + 1.6L$  assuming 50% dead load and 50% live load:  $1.2(0.5) + 1.6(0.5) = 1.4$ .
3. Tabulated values are for a single anchor with no influence of another anchor.
4. Interpolation between embedment depths is not permitted.
5. The Designer of Record is responsible for the foundation design.

**Threaded Rod with  $c_{ac}$  Edge Distance on All Sides**



**Flat Slab**

**Threaded Rod with  $1\frac{3}{4}$ " Edge Distance on One Side and  $c_{ac}$  on Three Sides**

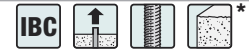


**Flat Slab**

\* See page 2 for an explanation of the load table icons.



# SET-XP® Design Information — Concrete



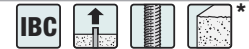
Allowable Tension Loads for Threaded Rod Anchors in Normal-Weight Concrete ( $f'_c = 2,500$  psi)  
 — Wind Load

Rod Dia. (in.)	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Allowable Tension Load Based on Concrete or Bond (lb.)			
		$h_{min}$	$c_{ac}$	$h_{min}$	$c_{ac}$	Edge distances = $c_{ac}$ on all sides		Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides	
						Uncracked	Cracked	Uncracked	Cracked
3/8	2 3/8	4 1/4	3 3/4	—	—	710	—	405	—
		5 3/4	3 5/8	—	—			480	—
	3	4 7/8	5	4 7/8	3 1/4	900	690	380	465
		7 1/4	4 1/2	—	—			530	
	4 1/2	6 3/8	8 1/8	6 3/8	3 1/4	1,350	1,035	355	700
		10 7/8	6 3/4					530	
	6	7 7/8	11 1/8	7 7/8	4 3/8	1,795	1,380	340	935
		14 1/2	9					530	
	7 1/2	9 3/8	14 1/4	9 3/8	5 3/8	2,245	1,725	335	1,165
		18	11 1/4					530	
1/2	2 3/4	5 1/4	5 1/8	—	—	1,640	—	880	—
		6 3/8	5 1/8	—	—			880	—
	4	6 1/2	7 7/8	6 1/2	5 1/8	2,385	1,055	840	565
		9 5/8	6					1,160	
	6	8 1/2	12 5/8	8 1/2	5 1/8	3,575	1,580	780	850
		14 1/2	9					1,160	
	8	10 1/2	17 1/2	10 1/2	5 1/4	4,770	2,105	755	1,135
		19 1/4	12					1,160	
	10	12 1/2	22 1/4	12 1/2	6 3/8	5,960	2,635	740	1,420
		24	15					1,160	
5/8	3 1/8	6 1/4	6 1/4	—	—	2,150	—	1,085	—
		7 1/2	6 1/4	—	—			1,085	—
	5	8 1/8	9 1/2	8 1/8	6 1/4	3,440	1,400	1,125	705
		12	7 1/2					1,555	
	7 1/2	10 5/8	15 3/8	10 5/8	6 1/4	5,155	2,100	1,045	1,060
		18	11 1/4					1,555	
12 1/2	15 5/8	26 7/8	15 5/8	7 3/8	8,590	3,500	995	1,765	
	30	18 3/4					1,555		—
3/4	3 1/2	7 1/4	7 1/8	—	—	2,630	—	1,270	—
		8 1/2	7 1/8	—	—			1,270	—
	6	9 3/4	11	9 3/4	7 1/8	4,510	1,800	1,400	870
		14 1/2	9					1,940	
	9	12 3/4	17 3/4	12 3/4	7 1/8	6,770	2,700	1,305	1,310
		21 5/8	13 1/2					1,940	
	15	18 3/4	31 1/8	18 3/4	9	11,275	4,505	1,235	2,180
		36	22 1/2					1,940	
7/8	3 3/4	8 1/8	7 7/8	—	—	3,010	—	1,415	—
		9	7 7/8	—	—			1,415	—
	7	11 3/8	12 3/8	11 3/8	7 7/8	5,620	2,245	1,675	1,055
		16 7/8	10 1/2					2,320	
	10 1/2	14 7/8	19 7/8	14 7/8	7 7/8	8,430	3,370	1,565	1,580
		25 1/4	15 3/4					2,320	
	17 1/2	21 7/8	35	21 7/8	10	14,050	5,620	1,480	2,635
		42	26 1/4					2,320	

\* See page 8 for footnotes.

\* See page 2 for an explanation of the load table icons.

# SET-XP® Design Information — Concrete

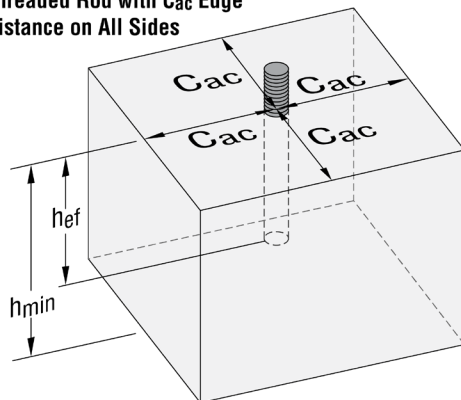


Allowable Tension Loads for Threaded Rod Anchors in Normal-Weight Concrete ( $f'_c=2,500$  psi)  
 — Wind Load

Rod Dia. (in)	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Allowable Tension Load Based on Concrete or Bond (lb.)			
		$h_{min}$	$c_{ac}$	$h_{min}$	$c_{ac}$	Edge distances = $c_{ac}$ on all sides		Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides	
						Uncracked	Cracked	Uncracked	Cracked
1	4	9	$8\frac{1}{2}$	—	—	3,275	—	1,505	—
		$9\frac{5}{8}$	$8\frac{1}{2}$	—	—			1,505	
	8	13	$13\frac{1}{2}$	13	$8\frac{1}{2}$	6,545	2,855	1,895	1,310
		$19\frac{1}{4}$	12					2,615	
	12	17	$21\frac{3}{4}$	17	$8\frac{1}{2}$	9,815	4,280	1,760	1,970
		$28\frac{7}{8}$	18					2,615	
20	25	$38\frac{1}{4}$	25	$12\frac{1}{4}$	16,360	7,135	1,670	3,280	
	48	30					2,615		
$1\frac{1}{4}$	5	$11\frac{1}{4}$	$9\frac{1}{2}$	—	—	4,025	—	—	—
		12	$9\frac{1}{2}$	—	—			—	
	10	$16\frac{1}{4}$	$15\frac{3}{8}$	$16\frac{1}{4}$	$9\frac{1}{2}$	8,050	4,460	—	—
		24	15					—	
	15	$21\frac{1}{4}$	$24\frac{3}{4}$	$21\frac{1}{4}$	$11\frac{1}{8}$	12,070	6,685	—	—
		36	$22\frac{1}{2}$					—	
	25	$31\frac{1}{4}$	$43\frac{3}{8}$	$31\frac{1}{4}$	$15\frac{3}{8}$	20,120	11,145	—	—
		60	$37\frac{1}{2}$					—	

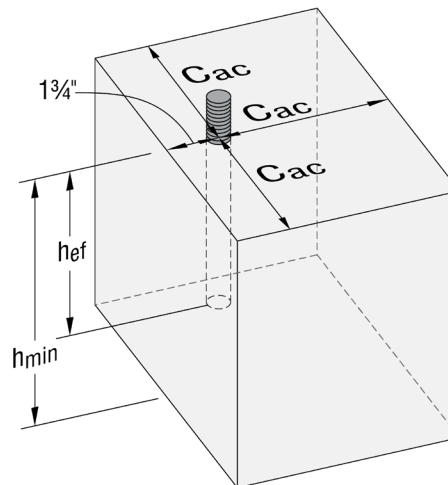
1. Allowable tension load must be the lesser of the concrete, bond or threaded rod steel load.  
 Designer to select the lower value from the table above and the allowable tension load based on steel strength (page 10).
2. Allowable tension loads are calculated based on the strength design provisions of ACI 318-14 Chapter 17 assuming dry concrete, periodic inspection, short-term temperature of 150°F and long-term temperature of 110°F. Tension design strengths are converted to allowable tension loads using a conversion factor of  $\alpha = \frac{1}{1.67} = 0.6$ . The conversion factor  $\alpha$  is based on the load combination assuming 100% wind load.
3. Tabulated values are for a single anchor with no influence of another anchor.
4. Interpolation between embedment depths is not permitted.
5. The Designer of Record is responsible for the foundation design.

Threaded Rod with  $c_{ac}$  Edge Distance on All Sides



Flat Slab

Threaded Rod with  $1\frac{3}{4}$ " Edge Distance on One Side and  $c_{ac}$  on Three Sides



Flat Slab

\* See page 2 for an explanation of the load table icons.





# SET-XP® Design Information — Concrete



Allowable Tension Loads for Threaded Rod Anchors in Normal-Weight Concrete ( $f'_c = 2,500$  psi)  
 — Seismic Load

Rod Dia. (in.)	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Allowable Tension Load Based on Concrete or Bond (lb.)							
						Edge Distances = $c_{ac}$ on all sides				Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides			
						SDC A-B		SDC C-F		SDC A-B		SDC C-F	
						Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
3/8	2 3/8	4 1/4	3 3/4	—	—	830	—	625	—	475	—	355	—
		5 3/4	3 5/8							560		420	
	3	4 7/8	5	4 7/8	3 1/4	1,050	805	790	605	445	545	335	410
		7 1/4	4 1/2							615		460	
	4 1/2	6 3/8	8 1/8	6 3/8	3 1/4	1,575	1,210	1,180	905	415	815	310	615
		10 7/8	6 3/4							615		460	
	6	7 7/8	11 1/8	7 7/8	4 3/4	2,095	1,610	<b>1,575</b>	1,210	400	1,090	300	815
		14 1/2	9							615		460	
	7 1/2	9 3/8	14 1/4	9 3/8	5 3/8	2,620	2,015	<b>1,965</b>	1,510	390	1,360	295	1,020
		18	11 1/4							615		460	
1/2	2 3/4	5 1/4	5 1/8	—	—	1,910	—	1,435	—	1,030	—	775	—
		6 5/8	5 1/8							1,030		775	
	4	6 1/2	7 7/8	6 1/2	5 1/8	2,785	1,230	2,085	920	980	660	735	495
		9 3/8	6							1,355		1,015	
	6	8 1/2	12 3/8	8 1/2	5 1/8	4,170	1,845	<b>3,130</b>	1,385	910	995	685	745
		14 1/2	9							1,355		1,015	
	8	10 1/2	17 1/2	10 1/2	5 1/4	5,565	2,455	<b>4,170</b>	1,845	880	1,325	660	995
		19 1/4	12							1,355		1,015	
	10	12 1/2	22 1/4	12 1/2	6 3/8	6,955	3,075	<b>5,215</b>	2,305	865	1,655	650	1,245
		24	15							1,355		1,015	
5/8	3 1/8	6 1/4	6 1/4	—	—	2,505	—	1,880	—	1,265	—	950	—
		7 1/2	6 1/4							1,265		950	
	5	8 3/8	9 1/2	8 3/8	6 1/4	4,010	1,635	3,005	1,225	1,315	825	985	620
		12	7 1/2							1,815		1,360	
	7 1/2	10 5/8	15 3/8	10 5/8	6 1/4	6,015	2,450	4,510	1,840	1,220	1,235	915	930
		18	11 1/4							1,815		1,360	
12 1/2	15 3/8	26 7/8	15 3/8	7 3/8	10,025	4,080	<b>7,520</b>	3,065	1,160	2,060	870	1,545	
	30	18 3/4							1,815		1,360		
3/4	3 1/2	7 1/4	7 1/8	—	—	3,070	—	2,305	—	1,485	—	1,115	—
		8 1/2	7 1/8							1,485		1,115	
	6	9 3/4	11	9 3/4	7 1/8	5,265	2,100	3,950	1,575	1,635	1,015	1,225	765
		14 1/2	9							2,260		1,695	
	9	12 3/4	17 3/4	12 3/4	7 1/8	7,895	3,150	5,920	2,365	1,525	1,525	1,140	1,145
		21 3/8	13 1/2							2,260		1,695	
15	18 3/4	31 1/8	18 3/4	9	13,155	5,255	<b>9,870</b>	3,940	1,440	2,540	1,080	1,905	
	36	22 1/2							2,260		1,695		
7/8	3 3/4	8 1/8	7 7/8	—	—	3,515	—	2,105	—	1,650	—	985	—
		9	7 7/8							1,650		985	
	7	11 3/8	12 3/8	11 3/8	7 7/8	6,555	2,620	3,935	1,575	1,955	1,230	1,175	740
		16 7/8	10 1/2							2,705		1,625	
	10 1/2	14 7/8	19 7/8	14 7/8	7 7/8	9,835	3,935	5,900	2,360	1,825	1,845	1,090	1,105
		25 1/4	15 3/4							2,705		1,625	
17 1/2	21 7/8	35	21 7/8	10	16,390	6,555	<b>9,835</b>	3,935	1,725	3,075	1,035	1,845	
	42	26 1/4							2,705		1,625		

\* See page 10 for footnotes.

\* See page 2 for an explanation of the load table icons.



# SET-XP® Design Information — Concrete



Allowable Tension Loads for Threaded Rod Anchors in Normal-Weight Concrete ( $f'_c = 2,500$  psi)  
— Seismic Load

Rod Dia. (in.)	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Allowable Tension Load Based on Concrete or Bond (lb.)							
						Edge Distances = $c_{ac}$ on all sides				Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides			
						SDC A-B		SDC C-F		SDC A-B		SDC C-F	
						Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
1	4	9	8½	—	—	3,820	—	2,635	—	1,755	—	1,210	—
		9⅝	8½	—	—	—	—	—	—	1,755	—	1,210	—
	8	13	13½	13	8½	7,635	3,330	5,270	2,295	2,210	1,530	1,525	1,055
		19¼	12							3,050		2,105	
	12	17	21¾	17	8½	11,450	4,995	7,905	3,445	2,055	2,295	1,420	1,585
		28⅞	18							3,050		2,105	
20	25	38¼	25	12¼	19,085	8,325	<b>13,170</b>	5,745	1,950	3,825	1,345	2,640	
	48	30							3,050		2,105		
1¼	5	11¼	9½	—	—	4,695	—	3,520	—	—	—	—	—
		12	9½	—	—	—	—	—	—	—	—	—	—
	10	16¼	15⅜	16¼	9½	9,390	5,200	7,040	3,900	—	—	—	—
		24	15							—		—	
	15	21¼	24¾	21¼	11⅞	14,085	7,800	10,565	5,850	—	—	—	—
		36	22½							—		—	
	25	31¼	43⅜	31¼	15%	23,470	13,005	17,605	9,750	—	—	—	—
		60	37½							—		—	

- Allowable tension load must be the lesser of the concrete, bond or threaded rod steel load.  
Designer to select the lower value from the table above and the allowable tension load based on steel strength (page 10).
- Allowable tension loads are calculated based on the strength design provisions of ACI 318-14 Chapter 17 assuming dry concrete, periodic inspection, short-term temperature of 150°F and long-term temperature of 110°F. Tension design strengths are converted to allowable tension loads using a conversion factor of  $\alpha = 1/1.43 = 0.7$ . The conversion factor  $\alpha$  is based on the load combination assuming 100% seismic load.
- Tabulated values are for a single anchor with no influence of another anchor.
- Interpolation between embedment depths is not permitted.
- The allowable tension load 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.
- When designing anchorages in SDC C-F, the Designer shall consider the ductility requirements of ACI 318-14 Section 17.2.3. Design strengths in **Bold** indicate that the anchor ductility requirements of 17.2.3.4.3 (a) (i) to (iii) are satisfied when using ASTM F1554 Grade 36 threaded rod. Any other ductility requirements must be satisfied.
- Allowable tension loads in SDC C-F have been adjusted by 0.75 factor in accordance with ACI 318-14 Section 17.2.3.4.4.
- The Designer of Record is responsible for the foundation design.

## Allowable Tension Loads Based on Threaded Rod Steel Strength

Rod Dia. (in.)	ASTM F1554 Gr. 36	ASTM A449 Gr. 92 or ASTM A193 Gr. B7
¾	1,495	3,090
½	2,720	5,625
⅝	4,325	8,950
¾	6,395	13,225
⅞	8,845	18,295
1	11,600	24,000
1¼	18,545	39,970

- Allowable steel tension loads are based on the following equation:  
 $F_v = 0.33 \times F_u \times \text{Tensile Stress Area}$ 
  - ASTM F1554 Gr. 36 - minimum  $F_u=58$ ksi
  - ASTM A449 Gr. 92 - minimum  $F_u=120$ ksi
  - ASTM A193 Gr. B7 - minimum  $F_u=125$ ksi
  - For ½" to 1" diameter, the steel strength is based on ASTM A449 Gr. 92.  
For 1¼" diameter, the steel strength is based on ASTM A193 Gr. B7.

\* See page 2 for an explanation of the load table icons.



# SET-XP® Design Information — Concrete



Tension Design Strength for Rebar in Normal-Weight Concrete ( $f'_c = 2,500$  psi)

Rebar Size	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Tension Design Strength Based on Concrete or Bond (lb.)							
						Edge Distances = $c_{ac}$ on all sides				Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides			
						SDC A-B		SDC C-F		SDC A-B		SDC C-F	
						Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
#3	2½	4¼	4	—	—	1,380	—	1,035	—	765	—	575	—
		5¾	3⅝							895		670	
	3	4⅞	5⅝	4⅞	3½	1,740	700	1,305	525	720	455	540	340
		7¼	4½							995		745	
	4½	6⅝	8⅝	6⅝	3½	2,615	1,055	1,960	790	670	685	505	510
		10⅞	6¾							995		745	
	6	7⅞	11⅞	7⅞	3½	3,485	1,405	2,615	1,055	650	910	485	685
		14½	9							995		745	
	7½	9⅝	15⅝	9⅝	3½	4,355	1,755	3,265	1,315	635	1,140	475	855
		18	11¼							995		745	
#4	2¾	5¼	4½	—	—	2,065	—	1,550	—	1,180	—	885	—
		6⅝	4½							1,180		885	
	4	6½	7	6½	4½	3,005	2,525	2,255	1,895	1,090	1,440	815	1,080
		9⅝	6							1,505		1,130	
	6	8½	11⅝	8½	5½	4,510	3,790	3,380	2,840	1,015	2,035	760	1,525
		14½	9							1,505		1,130	
	8	10½	15⅝	10½	6⅝	6,015	5,050	4,510	3,790	980	2,525	735	1,895
		19¼	12							1,505		1,130	
	10	12½	19⅞	12½	7⅝	7,515	6,315	5,635	4,735	960	2,995	720	2,245
		24	15							1,505		1,130	
#5	3⅝	6¼	5½	—	—	2,860	—	2,145	—	1,500	—	1,125	—
		7½	5½							1,500		1,125	
	5	8⅝	8¾	8⅝	5½	4,575	3,560	3,430	2,670	1,520	1,865	1,140	1,400
		12	7½							2,105		1,575	
	7½	10⅝	14	10⅝	6⅞	6,860	5,340	5,145	4,005	1,415	2,640	1,060	1,980
		18	11¼							2,105		1,575	
12½	15⅝	24⅝	15⅝	9⅝	11,435	8,895	8,575	6,670	1,340	4,005	1,005	3,005	
	30	18¾							2,105		1,575		
#6	3½	7¼	6½	—	—	3,725	—	2,795	—	1,845	—	1,385	—
		8½	6½							1,845		1,385	
	6	9¾	10⅝	9¾	6½	6,385	4,555	4,790	3,415	2,000	2,260	1,500	1,695
		14½	9							2,765		2,075	
	9	12¾	16⅝	12¾	8⅝	9,575	6,835	7,180	5,125	1,860	3,235	1,395	2,425
		21⅝	13½							2,765		2,075	
	15	18¾	29⅝	18¾	11⅝	15,960	11,390	11,970	8,545	1,765	4,965	1,325	3,725
		36	22½							2,765		2,075	
#7	3¾	8⅝	7½	—	—	4,505	—	3,380	—	2,145	—	1,610	—
		9	7½							2,145		1,610	
	7	11⅝	11⅞	11⅝	7½	8,415	5,430	6,310	4,070	2,525	2,585	1,890	1,940
		16⅞	10½							3,485		2,615	
	10½	14⅞	19⅝	14⅞	9⅝	12,620	8,145	9,465	6,110	2,350	3,740	1,760	2,805
		25¼	15¾							3,485		2,615	
17½	21⅞	33½	21⅞	12¾	21,035	13,575	15,775	10,180	2,225	5,770	1,670	4,330	
	42	26¼							3,485		2,615		

\* See page 12 for footnotes.

\* See page 2 for an explanation of the load table icons.

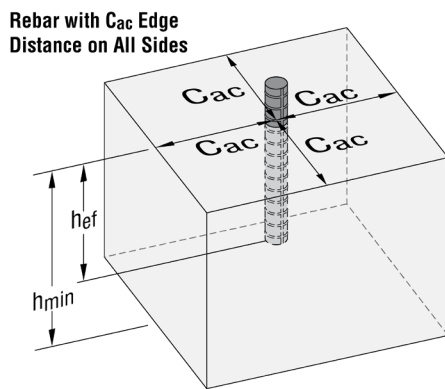
# SET-XP® Design Information — Concrete



Tension Design Strength for Rebar in Normal-Weight Concrete ( $f'_c = 2,500$  psi)

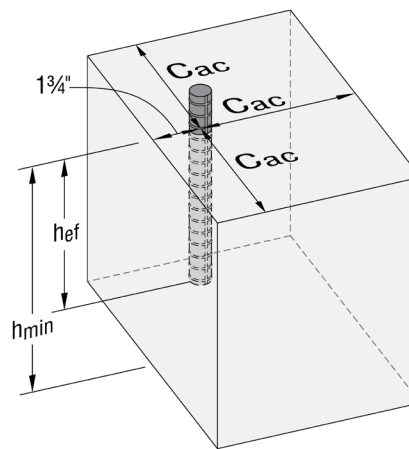
Rebar Size	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Tension Design Strength Based on Concrete or Bond (lb.)							
						Edge Distances = $c_{ac}$ on all sides				Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides			
		SDC A-B		SDC C-F		SDC A-B		SDC C-F					
		Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked				
#8	4	9	8 $\frac{3}{8}$	—	—	5,330	—	3,995	—	2,455	—	1,845	—
		9 $\frac{5}{8}$	8 $\frac{3}{8}$							2,455		1,845	
	8	13	13 $\frac{3}{8}$	13	8 $\frac{3}{8}$	10,660	6,095	7,995	4,570	3,085	2,810	2,315	2,110
		19 $\frac{1}{4}$	12							4,265		3,200	
	12	17	21 $\frac{1}{2}$	17	9 $\frac{3}{4}$	15,985	9,145	11,990	6,860	2,870	4,070	2,155	3,055
		28 $\frac{7}{8}$	18							4,265		3,200	
	20	25	37 $\frac{7}{8}$	25	13 $\frac{3}{4}$	26,645	15,240	19,985	11,430	2,720	6,380	2,040	4,785
		48	30							4,265		3,200	
#10	5	11 $\frac{1}{4}$	10 $\frac{1}{8}$	—	—	7,765	—	5,825	—	—	—	—	—
		12	10 $\frac{1}{8}$							—		—	
	10	16 $\frac{1}{4}$	16 $\frac{1}{4}$	16 $\frac{1}{4}$	10 $\frac{1}{8}$	15,530	5,940	11,645	4,455	—	—	—	—
		24	15							—		—	
	15	21 $\frac{1}{4}$	26 $\frac{1}{8}$	21 $\frac{1}{4}$	10 $\frac{1}{8}$	23,295	8,910	17,470	6,680	—	—	—	—
		36	22 $\frac{1}{2}$							—		—	
	25	31 $\frac{1}{4}$	46	31 $\frac{1}{4}$	13 $\frac{1}{2}$	38,825	14,850	29,115	11,135	—	—	—	—
		60	37 $\frac{1}{2}$							—		—	

1. Tension design strength (SD level) must be the lesser of the concrete, bond or rebar steel design strength.
2. Tension design strengths are based on the strength design provisions of ACI 318-14 Chapter 17 assuming dry concrete, periodic inspection, short-term temperature of 150°F and long-term temperature of 110°F.
3. Tabulated values are for a single anchor with no influence of another anchor.
4. Interpolation between embedment depths is not permitted.
5. Strength reduction factor,  $\phi_s$ , is based on using a load combination from ACI 318-14 Section 5.3.
6. 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.
7. When designing anchorages in SDC C-F, the Designer shall consider the ductility requirements of ACI 318-14 Section 17.2.3.
8. Tension design strengths in SDC C-F have been adjusted by 0.75 factor in accordance with ACI 318-14 Section 17.2.3.4.4..
9. The Designer of Record is responsible for the foundation design.



Flat Slab

Rebar with 1 3/4" Edge Distance on One Side and  $C_{ac}$  on Three Sides



Flat Slab

\* See page 2 for an explanation of the load table icons.



# SET-XP® Design Information — Concrete



Allowable Tension Loads for Rebar in Normal-Weight Concrete ( $f'_c = 2,500$  psi) — Static Load

Rebar Size	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Allowable Tension Load Based on Concrete or Bond (lb.)				
		$h_{min}$	$c_{ac}$	$h_{min}$	$c_{ac}$	Edge distances = $c_{ac}$ on all sides		Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides		
						Uncracked	Cracked	Uncracked	Cracked	
#3	2½	4¼	4	—	—	985	—	545	—	
		5¾	3⅝					640		
	3	4⅞	5⅝	4⅞	3½	1,245	500	515	325	
		7¼	4½					710		
	4½	6⅝	8⅝	6⅝	3½	1,870	755	480	490	
		10⅞	6¾					710		
	6	7⅞	11⅞	7⅞	3½	2,490	1,005	465	650	
		14½	9					710		
	7½	9⅞	15⅞	9⅞	3½	3,110	1,255	455	815	
		18	11¼					710		
#4	2¾	5¼	4½	—	—	1,475	—	845	—	
		6⅝	4½					845		
	4	6½	7	6½	4½	2,145	1,805	780	1,030	
		9⅞	6					1,075		
	6	8½	11⅞	8½	5½	3,220	2,705	725	1,455	
		14½	9					1,075		
	8	10½	15⅞	10½	6⅝	4,295	3,605	700	1,805	
		19¼	12					1,075		
	10	12½	19⅞	12½	7⅝	5,370	4,510	685	2,140	
		24	15					1,075		
#5	3⅝	6¼	5½	—	—	2,045	—	1,070	—	
		7½	5½					1,070		
	5	8⅞	8¾	8⅞	5½	3,270	2,545	1,085	1,330	
		12	7½					1,505		
	7½	10⅞	14	10⅞	6⅞	4,900	3,815	1,010	1,885	
		18	11¼					1,505		
	12½	15⅞	24⅝	15⅞	9⅞	8,170	6,355	955	2,860	
		30	18¾					1,505		
	#6	3½	7¼	6½	—	—	2,660	—	1,320	—
			8½	6½					1,320	
6		9¾	10⅞	9¾	6½	4,560	3,255	1,430	1,615	
		14½	9					1,975		
9		12¾	16⅞	12¾	8⅞	6,840	4,880	1,330	2,310	
		21⅝	13½					1,975		
15		18¾	29⅞	18¾	11⅞	11,400	8,135	1,260	3,545	
		36	22½					1,975		
#7		3¾	8⅞	7½	—	—	3,220	—	1,530	—
			9	7½					1,530	
	7	11⅞	11⅞	11⅞	7½	6,010	3,880	1,805	1,845	
		16⅞	10½					2,490		
	10½	14⅞	19⅞	14⅞	9⅞	9,015	5,820	1,680	2,670	
		25¼	15¾					2,490		
	17½	21⅞	33½	21⅞	12¾	15,025	9,695	1,590	4,120	
		42	26¼					2,490		

\* See page 14 for footnotes.

\* See page 2 for an explanation of the load table icons.

# SET-XP® Design Information — Concrete

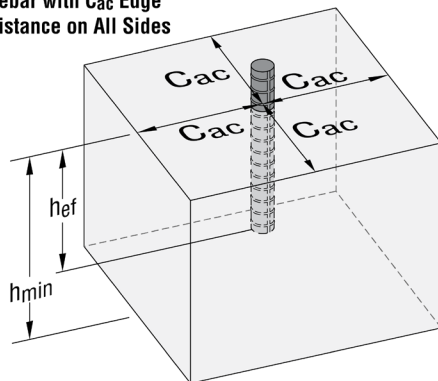


## Allowable Tension Loads for Rebar in Normal-Weight Concrete ( $f'_c = 2,500$ psi) — Static Load

Rebar Size	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Allowable Tension Load Based on Concrete or Bond (lb.)			
		$h_{min}$	$c_{ac}$	$h_{min}$	$c_{ac}$	Edge distances = $c_{ac}$ on all sides		Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides	
						Uncracked	Cracked	Uncracked	Cracked
#8	4	9	$8\frac{3}{8}$	—	—	3,805	—	1,755	—
		$9\frac{5}{8}$	$8\frac{3}{8}$	—	—			1,755	—
	8	13	$13\frac{3}{8}$	13	$8\frac{3}{8}$	7,615	4,355	2,205	2,005
		$19\frac{1}{4}$	12					3,045	
	12	17	$21\frac{1}{2}$	17	$9\frac{3}{4}$	11,420	6,530	2,050	2,905
		$28\frac{7}{8}$	18					3,045	
	20	25	$37\frac{7}{8}$	25	$13\frac{3}{4}$	19,030	10,885	1,945	4,555
		48	30					3,045	
#10	5	$11\frac{1}{4}$	$10\frac{1}{8}$	—	—	5,545	—	—	—
		12	$10\frac{1}{8}$	—	—			—	—
	10	$16\frac{1}{4}$	$16\frac{1}{4}$	$16\frac{1}{4}$	$10\frac{1}{8}$	11,095	4,245	—	—
		24	15					—	—
	15	$21\frac{1}{4}$	$26\frac{1}{8}$	$21\frac{1}{4}$	$10\frac{1}{8}$	16,640	6,365	—	—
		36	$22\frac{1}{2}$					—	—
	25	$31\frac{1}{4}$	46	$31\frac{1}{4}$	$13\frac{1}{2}$	27,730	10,605	—	—
		60	$37\frac{1}{2}$					—	—

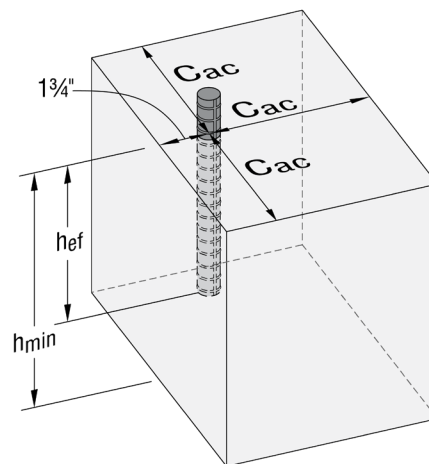
- Allowable tension load must be the lesser of the concrete, bond or rebar steel load.  
Designer to select the lower value from the table above and the allowable tension load based on rebar steel strength (page 18).
- Allowable tension loads are calculated based on the strength design provisions of ACI 318-14 Chapter 17 assuming dry concrete, periodic inspection, short-term temperature of 150°F and long-term temperature of 110°F. Tension design strengths are converted to allowable tension loads 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:  $1.2(0.5) + 1.6(0.5) = 1.4$ .
- Tabulated values are for a single anchor with no influence of another anchor.
- Interpolation between embedment depths is not permitted.
- The Designer of Record is responsible for the foundation design.

Rebar with  $c_{ac}$  Edge Distance on All Sides



Flat Slab

Rebar with  $1\frac{3}{4}$ " Edge Distance on One Side and  $c_{ac}$  on Three Sides



Flat Slab

\* See page 2 for an explanation of the load table icons.



# SET-XP® Design Information — Concrete



Allowable Tension Loads for Rebar in Normal-Weight Concrete ( $f'_c = 2,500$  psi) — Wind Load

Rebar Size	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Allowable Tension Load Based on Concrete or Bond (lb.)			
		$h_{min}$	$c_{ac}$	$h_{min}$	$c_{ac}$	Edge distances = $c_{ac}$ on all sides		Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides	
						Uncracked	Cracked	Uncracked	Cracked
#3	2½	4¼	4	—	—	830	—	460	—
		5¾	3⅝					535	
	3	4⅞	5⅜	4⅞	3½	1,045	420	430	275
		7¼	4½					595	
	4½	6⅜	8⅞	6⅜	3½	1,570	635	400	410
		10⅞	6¾					595	
	6	7⅞	11⅞	7⅞	3½	2,090	845	390	545
		14½	9					595	
	7½	9⅞	15⅞	9⅞	3½	2,615	1,055	380	685
		18	11¼					595	
#4	2¾	5¼	4½	—	—	1,240	—	710	—
		6⅝	4½					710	
	4	6½	7	6½	4½	1,805	1,515	655	865
		9⅞	6					905	
	6	8½	11⅜	8½	5½	2,705	2,275	610	1,220
		14½	9					905	
	8	10½	15⅝	10½	6⅝	3,610	3,030	590	1,515
		19¼	12					905	
	10	12½	19⅞	12½	7⅝	4,510	3,790	575	1,795
		24	15					905	
#5	3⅝	6¼	5½	—	—	1,715	—	900	—
		7½	5½					900	
	5	8⅞	8¾	8⅞	5½	2,745	2,135	910	1,120
		12	7½					1,265	
	7½	10⅝	14	10⅝	6⅞	4,115	3,205	850	1,585
		18	11¼					1,265	
	12½	15⅝	24⅝	15⅝	9⅝	6,860	5,335	805	2,405
		30	18¾					1,265	
#6	3½	7¼	6½	—	—	2,235	—	1,105	—
		8½	6½					1,105	
	6	9¾	10⅝	9¾	6½	3,830	2,735	1,200	1,355
		14½	9					1,660	
	9	12¾	16⅝	12¾	8⅞	5,745	4,100	1,115	1,940
		21⅝	13½					1,660	
	15	18¾	29⅞	18¾	11⅞	9,575	6,835	1,060	2,980
		36	22½					1,660	
#7	3¾	8⅞	7½	—	—	2,705	—	1,285	—
		9	7½					1,285	
	7	11⅞	11⅞	11⅞	7½	5,050	3,260	1,515	1,550
		16⅞	10½					2,090	
	10½	14⅞	19⅞	14⅞	9⅞	7,570	4,885	1,410	2,245
		25¼	15¾					2,090	
	17½	21⅞	33½	21⅞	12¾	12,620	8,145	1,335	3,460
		42	26¼					2,090	

\* See page 16 for footnotes.

\* See page 2 for an explanation of the load table icons.

# SET-XP® Design Information — Concrete

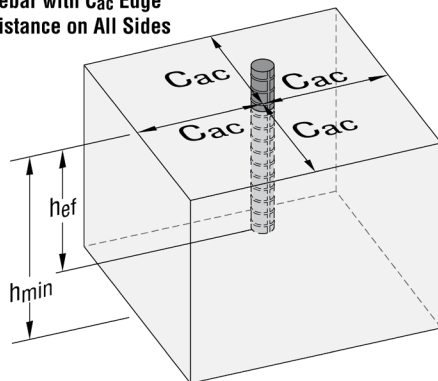


Allowable Tension Loads for Rebar in Normal-Weight Concrete ( $f'_c = 2,500$  psi) — Wind Load

Rebar Size	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Allowable Tension Load Based on Concrete or Bond (lb.)			
		$h_{min}$	$c_{ac}$	$h_{min}$	$c_{ac}$	Edge distances = $c_{ac}$ on all sides		Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides	
						Uncracked	Cracked	Uncracked	Cracked
#8	4	9	$8\frac{3}{8}$	—	—	3,200	—	1,475	—
		$9\frac{5}{8}$	$8\frac{3}{8}$					1,475	
	8	13	$13\frac{3}{8}$	13	$8\frac{3}{8}$	6,395	3,655	1,850	1,685
		$19\frac{1}{4}$	12					2,560	
	12	17	$21\frac{1}{2}$	17	$9\frac{3}{4}$	9,590	5,485	1,720	2,440
		$28\frac{7}{8}$	18					2,560	
20	25	$37\frac{7}{8}$	25	$13\frac{3}{4}$	15,985	9,145	1,630	3,830	
	48	30					2,560		
#10	5	$11\frac{1}{4}$	$10\frac{1}{8}$	—	—	4,660	—	—	—
		12	$10\frac{1}{8}$					—	
	10	$16\frac{1}{4}$	$16\frac{1}{4}$	$16\frac{1}{4}$	$10\frac{1}{8}$	9,320	3,565	—	—
		24	15					—	
	15	$21\frac{1}{4}$	$26\frac{1}{8}$	$21\frac{1}{4}$	$10\frac{1}{8}$	13,975	5,345	—	—
		36	$22\frac{1}{2}$					—	
	25	$31\frac{1}{4}$	46	$31\frac{1}{4}$	$13\frac{1}{2}$	23,295	8,910	—	—
		60	$37\frac{1}{2}$					—	

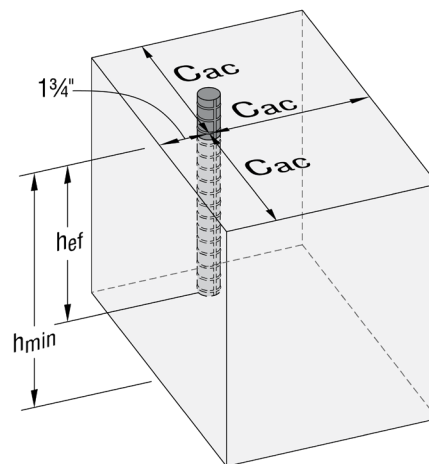
1. Allowable tension load must be the lesser of the concrete, bond or rebar steel load.  
Designer to select the lower value from the table above and the allowable tension load based on rebar steel strength (page 18).
2. Allowable tension loads are calculated based on the strength design provisions of ACI 318-14 Chapter 17 assuming dry concrete, periodic inspection, short-term temperature of 150°F and long-term temperature of 110°F. Tension design strengths are converted to allowable tension loads using  $\alpha$  conversion factor of  $\alpha = \frac{1}{1.67} = 0.60$ . The conversion factor  $\alpha$  is based on the load combination assuming 100% wind load.
3. Tabulated values are for a single anchor with no influence of another anchor.
4. Interpolation between embedment depths is not permitted.
5. The Designer of Record is responsible for the foundation design.

Rebar with  $c_{ac}$  Edge Distance on All Sides



Flat Slab

Rebar with  $1\frac{3}{4}$ " Edge Distance on One Side and  $c_{ac}$  on Three Sides



Flat Slab

\* See page 2 for an explanation of the load table icons.





# SET-XP® Design Information — Concrete



Allowable Tension Loads for Rebar in Normal-Weight Concrete ( $f'_c = 2,500$  psi) — Seismic Load

Rebar Size	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Allowable Tension Load Based on Concrete or Bond (lb.)							
						Edge Distances = $c_{ac}$ on all sides				Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides			
						SDC A-B		SDC C-F		SDC A-B		SDC C-F	
						Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
#3	2%	4 $\frac{1}{4}$	4	—	—	965	—	725	—	535	—	405	—
		5 $\frac{3}{4}$	3 $\frac{5}{8}$							625		470	
	3	4 $\frac{7}{8}$	5 $\frac{3}{8}$	4 $\frac{7}{8}$	3 $\frac{1}{2}$	1,220	490	915	370	505	320	380	240
		7 $\frac{1}{4}$	4 $\frac{1}{2}$							695		520	
	4 $\frac{1}{2}$	6 $\frac{3}{8}$	8 $\frac{3}{8}$	6 $\frac{3}{8}$	3 $\frac{1}{2}$	1,830	740	1,370	555	470	480	355	355
		10 $\frac{7}{8}$	6 $\frac{3}{4}$							695		520	
	6	7 $\frac{7}{8}$	11 $\frac{7}{8}$	7 $\frac{7}{8}$	3 $\frac{1}{2}$	2,440	985	1,830	740	455	635	340	480
		14 $\frac{1}{2}$	9							695		520	
	7 $\frac{1}{2}$	9 $\frac{3}{8}$	15 $\frac{1}{8}$	9 $\frac{3}{8}$	3 $\frac{1}{2}$	3,050	1,230	2,285	920	445	800	335	600
		18	11 $\frac{1}{4}$							695		520	
#4	2 $\frac{3}{4}$	5 $\frac{1}{4}$	4 $\frac{1}{2}$	—	—	1,445	—	1,085	—	825	—	620	—
		6 $\frac{3}{8}$	4 $\frac{1}{2}$							825		620	
	4	6 $\frac{1}{2}$	7	6 $\frac{1}{2}$	4 $\frac{1}{2}$	2,105	1,770	1,580	1,325	765	1,010	570	755
		9 $\frac{3}{8}$	6							1,055		790	
	6	8 $\frac{1}{2}$	11 $\frac{3}{8}$	8 $\frac{1}{2}$	5 $\frac{1}{2}$	3,155	2,655	2,365	1,990	710	1,425	530	1,070
		14 $\frac{1}{2}$	9							1,055		790	
	8	10 $\frac{1}{2}$	15 $\frac{5}{8}$	10 $\frac{1}{2}$	6 $\frac{3}{8}$	4,210	3,535	3,155	2,655	685	1,770	515	1,325
		19 $\frac{1}{4}$	12							1,055		790	
	10	12 $\frac{1}{2}$	19 $\frac{7}{8}$	12 $\frac{1}{2}$	7 $\frac{3}{8}$	5,260	4,420	3,945	3,315	670	2,095	505	1,570
		24	15							1,055		790	
#5	3 $\frac{3}{8}$	6 $\frac{1}{4}$	5 $\frac{1}{2}$	—	—	2,000	—	1,500	—	1,050	—	790	—
		7 $\frac{1}{2}$	5 $\frac{1}{2}$							1,050		790	
	5	8 $\frac{1}{8}$	8 $\frac{3}{4}$	8 $\frac{1}{8}$	5 $\frac{1}{2}$	3,205	2,490	2,400	1,870	1,065	1,305	800	980
		12	7 $\frac{1}{2}$							1,475		1,105	
	7 $\frac{1}{2}$	10 $\frac{5}{8}$	14	10 $\frac{5}{8}$	6 $\frac{7}{8}$	4,800	3,740	3,600	2,805	990	1,850	740	1,385
		18	11 $\frac{1}{4}$							1,475		1,105	
12 $\frac{1}{2}$	15 $\frac{5}{8}$	24 $\frac{5}{8}$	15 $\frac{5}{8}$	9 $\frac{3}{8}$	8,005	6,225	6,005	4,670	940	2,805	705	2,105	
	30	18 $\frac{3}{4}$							1,475		1,105		
#6	3 $\frac{1}{2}$	7 $\frac{1}{4}$	6 $\frac{1}{2}$	—	—	2,610	—	1,955	—	1,290	—	970	—
		8 $\frac{1}{2}$	6 $\frac{1}{2}$							1,290		970	
	6	9 $\frac{3}{4}$	10 $\frac{3}{8}$	9 $\frac{3}{4}$	6 $\frac{1}{2}$	4,470	3,190	3,355	2,390	1,400	1,580	1,050	1,185
		14 $\frac{1}{2}$	9							1,935		1,455	
	9	12 $\frac{3}{4}$	16 $\frac{5}{8}$	12 $\frac{3}{4}$	8 $\frac{1}{8}$	6,705	4,785	5,025	3,590	1,300	2,265	975	1,700
		21 $\frac{5}{8}$	13 $\frac{1}{2}$							1,935		1,455	
	15	18 $\frac{3}{4}$	29 $\frac{1}{8}$	18 $\frac{3}{4}$	11 $\frac{3}{8}$	11,170	7,975	8,380	5,980	1,235	3,475	930	2,610
		36	22 $\frac{1}{2}$							1,935		1,455	
#7	3 $\frac{3}{4}$	8 $\frac{1}{8}$	7 $\frac{1}{2}$	—	—	3,155	—	2,365	—	1,500	—	1,125	—
		9	7 $\frac{1}{2}$							1,500		1,125	
	7	11 $\frac{3}{8}$	11 $\frac{7}{8}$	11 $\frac{3}{8}$	7 $\frac{1}{2}$	5,890	3,800	4,415	2,850	1,770	1,810	1,325	1,360
		16 $\frac{7}{8}$	10 $\frac{1}{2}$							2,440		1,830	
	10 $\frac{1}{2}$	14 $\frac{7}{8}$	19 $\frac{1}{8}$	14 $\frac{7}{8}$	9 $\frac{3}{8}$	8,835	5,700	6,625	4,275	1,645	2,620	1,230	1,965
		25 $\frac{1}{4}$	15 $\frac{3}{4}$							2,440		1,830	
	17 $\frac{1}{2}$	21 $\frac{7}{8}$	33 $\frac{1}{2}$	21 $\frac{7}{8}$	12 $\frac{3}{4}$	14,725	9,505	11,045	7,125	1,560	4,040	1,170	3,030
		42	26 $\frac{1}{4}$							2,440		1,830	

\* See page 18 for footnotes.

\* See page 2 for an explanation of the load table icons.



# SET-XP® Design Information — Concrete



## Allowable Tension Loads for Rebar in Normal-Weight Concrete ( $f'_c = 2,500$ psi) — Seismic Load

Rebar Size	Effective Embed. Depth $h_{ef}$ (in.)	Minimum Dimensions for Uncracked (in.)		Minimum Dimensions for Cracked (in.)		Allowable Tension Load Based on Concrete or Bond (lb.)							
						Edge Distances = $c_{ac}$ on all sides				Edge Distances = $1\frac{3}{4}$ " on one side and $c_{ac}$ on three sides			
						SDC A-B		SDC C-F		SDC A-B		SDC C-F	
						Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
#8	4	9	8%	—	—	3,730	—	2,795	—	1,720	—	1,290	—
		9%	8%							1,720		1,290	
	8	13	13%	13	8%	7,460	4,265	5,595	3,200	2,160	1,965	1,620	1,475
		19 1/4	12							2,985		2,240	
	12	17	21 1/2	17	9 3/4	11,190	6,400	8,395	4,800	2,010	2,850	1,510	2,140
		28 7/8	18							2,985		2,240	
	20	25	37 7/8	25	13 3/4	18,650	10,670	13,990	8,000	1,905	4,465	1,430	3,350
		48	30							2,985		2,240	
#10	5	11 1/4	10 1/8	—	—	5,435	—	4,080	—	—	—	—	—
		12	10 1/8							—		—	
	10	16 1/4	16 1/4	16 1/4	10 1/8	10,870	4,160	8,150	3,120	—	—	—	—
		24	15							—		—	
	15	21 1/4	26 1/8	21 1/4	10 1/8	16,305	6,235	12,230	4,675	—	—	—	—
		36	22 1/2							—		—	
	25	31 1/4	46	31 1/4	13 1/2	27,180	10,395	20,380	7,795	—	—	—	—
		60	37 1/2							—		—	

1. Allowable tension load must be the lesser of the concrete, bond or rebar steel load.  
Designer to select the lower value from the table above and the allowable tension load based on rebar steel strength (page 18).
2. Allowable tension loads are calculated based on the strength design provisions of ACI 318-14 Chapter 17 assuming dry concrete, periodic inspection, short-term temperature of 150°F and long-term temperature of 110°F. Tension design strengths are converted to allowable tension loads using  $\alpha$  conversion factor of  $\alpha = \frac{1}{1.43} = 0.7$ . The conversion factor  $\alpha$  is based on the load combination assuming 100% seismic load.
3. Tabulated values are for a single anchor with no influence of another anchor.
4. Interpolation between embedment depths is not permitted.
5. The allowable tension load 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 318-14 Section 17.2.3.
7. Allowable tension loads in SDC C-F have been adjusted by 0.75 factor in accordance with ACI 318-14 Section 17.2.3.4.4..
8. The Designer of Record is responsible for the foundation design.

## Allowable Tension Loads Based on Rebar Steel Strength

Rebar Size	ASTM A615 Gr. 40 <sup>1</sup>	ASTM A615 Gr. 60 <sup>2</sup>
#3	2,200	2,640
#4	4,000	4,800
#5	6,200	7,440
#6	8,800	10,560
#7	12,000	14,400
#8	15,800	18,960
#10	25,400	30,480

1. Allowable steel tension load is based on AC58 Section 3.3.3 (20,000 psi x Tensile Stress Area)
2. Allowable steel tension load is based on AC58 Section 3.3.3 (24,000 psi x Tensile Stress Area)

\* See page 2 for an explanation of the load table icons.

This technical bulletin is effective until December 31, 2025, and reflects information available as of January 1, 2024. This information is updated periodically and should not be relied upon after December 31, 2025; contact Simpson Strong-Tie for current information and limited warranty or see [strongtie.com](http://strongtie.com).