TECHNICAL ENGINEERING BULLETIN

Strong-Bolt® 2 Design Information — Concrete

- Strong-Bolt 2 (STB2) has been tested per ACI 355.2 and AC193.
- These tables provide tension and shear capacities for design using strength level or allowable load capacities. 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.

Table of Contents

Strong-Bolt® 2 Design Information — Concrete

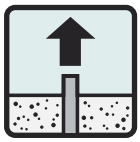
Strong-Bolt® 2 Design Information — Concrete

Icons and Nomenclature

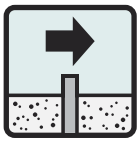
In order to facilitate easier identification of performance data, the following icon system has been incorporated into the sections of the technical bulletin with multiple load tables. These icons will appear in the heading of the table to promote easier visual identification of the type of load, insert 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.

Normal-Weight Concrete

Normal-Weight/ Lightweight Concrete over Metal Deck



Tension Load



Shear Load

Valid for International Building Code

c_{ac}	Critical Edge Distance
c_{min}	Minimum Edge Distance
f'_c	Concrete Compressive Strength
h_{nom}	Nominal Embedment Depth
h_{min}	Minimum Concrete Thickness

Strong-Bolt® 2 Design Information — Concrete

SIMPSON Strong-Tie

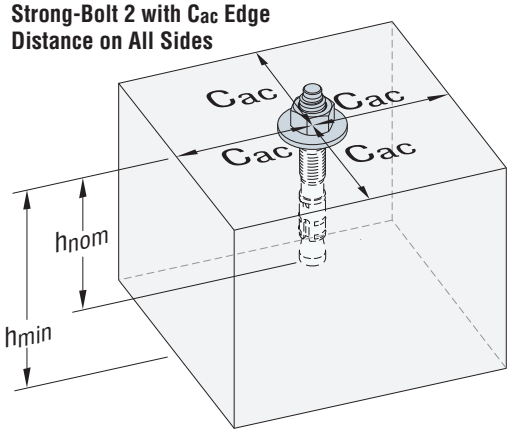
Carbon Steel Strong-Bolt® 2 Tension Design Strength in Normal-Weight Concrete (f'_c = 2,500 psi)

IBC *

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		SDC C-F		SDC A-B		SDC C-F	
					Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
¼	1¾	3¼	2½	1¾	1,435	—	—	—	1,070	—	—	—
⅜	1⅞	3¼	6½	6	1,435	845	1,075	635	1,325	845	990	635
	2⅞	4½	6	6	2,170	1,805	1,630	1,355	2,170	1,805	1,630	1,355
½	2¼[8]	4	6	6	1,805	—	—	—	1,805	—	—	—
	2¾	4	6	6	2,350	1,865	1,760	1,400	2,350	1,865	1,760	1,400
	3⅞	6	7½	4	3,415	3,240	2,560	2,430	2,740	2,875	2,055	2,155
⅝	2¾[8]	5½	7½	6½	2,720	—	—	—	2,355	—	—	—
	3⅜	5½	7½	6½	3,555	2,520	2,665	1,890	3,085	2,520	2,310	1,890
	5⅛	7⅞	9	6½	5,865	4,480	4,400	3,360	5,420	4,480	4,065	3,360
¾	3⅜[8]	6	6	4¼	3,730	—	—	—	2,640	—	—	—
	4⅛	6	6	4¼	4,625	3,425	3,470	2,570	3,570	3,000	2,680	2,250
	5¾	8¾	8	4¼	5,765	5,525	4,325	4,145	5,570	4,210	4,180	3,155
1	5¼	9	18	8	4,600	4,235	3,450	3,175	2,800	4,235	2,100	3,175
	9¾	13½	13½	8	5,330	6,150	3,995	4,615	5,330	6,150	3,995	4,615

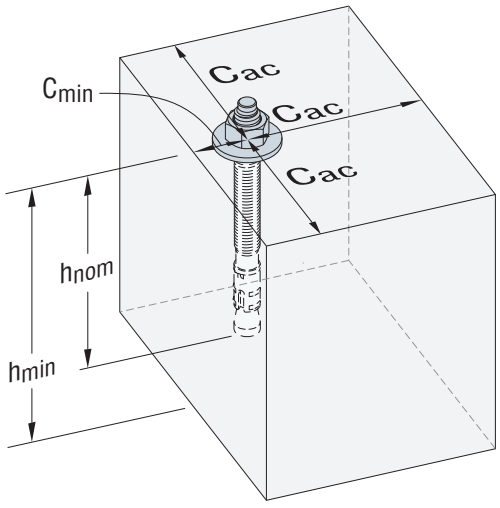
1. Tension design strengths (SD level) are based on the strength design provisions of ACI 318-14 Chapter 17.
2. Tabulated values are for a single anchor with no influence of another anchor.
3. Interpolation between embedment depths is not permitted.
4. Strength reduction factor, ϕ, is based on using a load combination from 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 318-14 Section 17.2.3.
7. 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.
8. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
9. The Designer of Record is responsible for the foundation design.

Strong-Bolt 2 with C_{ac} Edge Distance on All Sides



Flat Slab

Strong-Bolt 2 with C_{min} Edge Distance on One Side and C_{ac} on Three Sides



Flat Slab

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

Carbon Steel Strong-Bolt® 2 Allowable Tension Loads in Normal-Weight Concrete (f'_c = 2,500 psi) — Static Load

IBC *

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	1¾	3¼	2½	1¾	1,025	—	765	—
⅜	1⅞	3¼	6½	6	1,025	605	945	605
	2⅞	4½	6	6	1,550	1,290	1,550	1,290
½	2¼[4]	4	6	6	1,290	—	1,290	—
	2¾	4	6	6	1,680	1,330	1,680	1,330
	3⅞	6	7½	4	2,440	2,315	1,955	2,055
⅝	2¾[4]	5½	7½	6½	1,945	—	1,680	—
	3⅜	5½	7½	6½	2,540	1,800	2,205	1,800
	5⅛	7⅞	9	6½	4,190	3,200	3,870	3,200
¾	3⅜[4]	6	6	4¼	2,665	—	1,885	—
	4⅛	6	6	4¼	3,305	2,445	2,550	2,140
	5¾	8¾	8	4¼	4,120	3,945	3,980	3,005
1	5¼	9	18	8	3,285	3,025	2,000	3,025
	9¾	13½	13½	8	3,805	4,395	3,805	4,395

1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1.4. The conversion factor α 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.
4. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
5. The Designer of Record is responsible for the foundation design.

Carbon Steel Strong-Bolt® 2 Allowable Tension Loads in Normal-Weight Concrete (f'_c = 2,500 psi) — Wind Load

IBC *

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	1¾	3¼	2½	1¾	860	—	640	—
⅜	1⅞	3¼	6½	6	860	505	795	505
	2⅞	4½	6	6	1,300	1,085	1,300	1,085
½	2¼[4]	4	6	6	1,085	—	1,085	—
	2¾	4	6	6	1,410	1,120	1,410	1,120
	3⅞	6	7½	4	2,050	1,945	1,645	1,725
⅝	2¾[4]	5½	7½	6½	1,630	—	1,415	—
	3⅜	5½	7½	6½	2,135	1,510	1,850	1,510
	5⅛	7⅞	9	6½	3,520	2,690	3,250	2,690
¾	3⅜[4]	6	6	4¼	2,240	—	1,585	—
	4⅛	6	6	4¼	2,775	2,055	2,140	1,800
	5¾	8¾	8	4¼	3,460	3,315	3,340	2,525
1	5¼	9	18	8	2,760	2,540	1,680	2,540
	9¾	13½	13½	8	3,200	3,690	3,200	3,690

1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = $1/0.6$ = 1.67. The conversion factor α 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.
4. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
5. The Designer of Record is responsible for the foundation design.

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

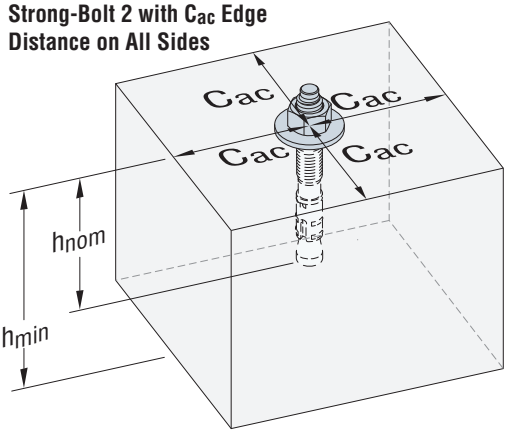
Carbon Steel Strong-Bolt® 2 Allowable Tension Loads in Normal-Weight Concrete (f'_c = 2,500 psi) — Seismic Load

IBC *

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		SDC C-F		SDC A-B		SDC C-F	
					Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
¼	1¾	3¼	2½	1¾	1,005	—	—	—	750	—	—	—
⅜	1⅞	3¼	6½	6	1,005	590	755	445	930	590	695	445
	2⅞	4½	6	6	1,520	1,265	1,140	950	1,520	1,265	1,140	950
½	2¼[7]	4	6	6	1,265	—	—	—	1,265	—	—	—
	2¾	4	6	6	1,645	1,305	1,230	980	1,645	1,305	1,230	980
	3⅞	6	7½	4	2,390	2,270	1,790	1,700	1,920	2,010	1,440	1,510
⅝	2¾[7]	5½	7½	6½	1,905	—	—	—	1,650	—	—	—
	3⅜	5½	7½	6½	2,490	1,765	1,865	1,325	2,160	1,765	1,615	1,325
	5⅛	7⅞	9	6½	4,105	3,135	3,080	2,350	3,795	3,135	2,845	2,350
¾	3⅜[7]	6	6	4¼	2,610	—	—	—	1,850	—	—	—
	4⅛	6	6	4¼	3,240	2,400	2,430	1,800	2,500	2,100	1,875	1,575
	5¾	8¾	8	4¼	4,035	3,870	3,030	2,900	3,900	2,945	2,925	2,210
1	5¼	9	18	8	3,220	2,965	2,415	2,225	1,960	2,965	1,470	2,225
	9¾	13½	13½	8	3,730	4,305	2,795	3,230	3,730	4,305	2,795	3,230

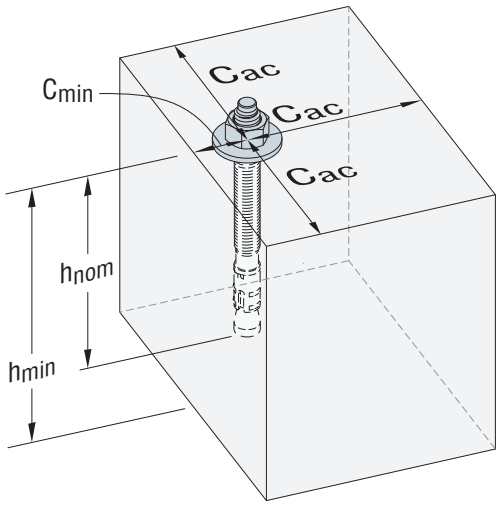
1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of $\alpha = \frac{1}{0.7} = 1.43$. The conversion factor α is based on the load combination assuming 100% seismic load.
2. Tabulated values are for a single anchor with no influence of another anchor.
3. Interpolation between embedment depths is not permitted.
4. The 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.
5. When designing anchorages in SDC C-F, the designer shall consider the ductility requirements of ACI 318-14 Section 17.2.3.
6. 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.
7. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
8. The Designer of Record is responsible for the foundation design.

Strong-Bolt 2 with C_{ac} Edge Distance on All Sides



Flat Slab

Strong-Bolt 2 with C_{min} Edge Distance on One Side and C_{ac} on Three Sides



Flat Slab

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

SIMPSON Strong-Tie

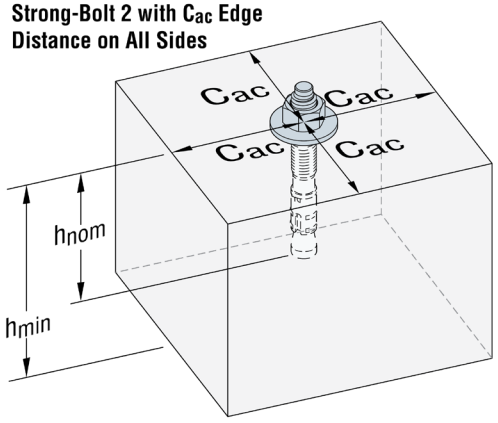
Carbon Steel Strong-Bolt® 2 Shear Design Strengths in Normal-Weight Concrete (f'_c = 2,500 psi)

IBC *

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.)	Shear 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		SDC C-F		SDC A-B				SDC C-F			
									Uncracked		Cracked		Uncracked		Cracked	
					Uncracked	Cracked	Uncracked	Cracked	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge
¼	1¾	3¼	2½	1¾	560	—	—	—	535	440	—	—	—	—	—	—
⅜	1⅞	3¼	6½	6	1,170	1,095	1,170	1,095	1,170	1,170	1,095	1,095	1,170	1,170	1,095	1,095
	2⅞	4½	6	6	1,170	1,170	1,170	1,170	1,170	1,170	1,170	1,170	1,170	1,170	1,170	1,170
½	2¼[8]	4	6	6	1,935	—	—	—	1,935	1,935	—	—	—	—	—	—
	2¾	4	6	6	2,140	1,530	2,140	1,530	2,140	2,140	1,530	1,530	2,140	2,140	1,530	1,530
	3⅞	6	7½	4	3,555	2,540	3,555	2,540	2,845	2,345	2,030	1,675	2,845	2,345	2,030	1,675
⅝	2¾[8]	5½	7½	6½	1,935	—	—	—	1,935	1,935	—	—	—	—	—	—
	3⅜	5½	7½	6½	3,490	2,495	3,490	2,495	3,490	3,130	2,495	2,235	3,490	3,130	2,495	2,235
	5⅛	7⅞	9	6½	5,535	3,955	5,535	3,955	5,535	4,370	3,955	3,120	5,535	4,370	3,955	3,120
¾	3⅜[8]	6	6	4¼	3,055	—	—	—	3,055	2,380	—	—	—	—	—	—
	4⅛	6	6	4¼	3,210	2,295	3,210	2,295	3,210	2,500	2,295	1,785	3,210	2,500	2,295	1,785
	5¾	8¾	8	4¼	5,450	3,890	5,450	3,890	3,805	3,620	2,715	2,585	3,805	3,620	2,715	2,585
1	5¼	9	18	8	9,010	9,010	9,010	9,010	7,130	7,130	6,175	5,575	7,130	7,130	6,175	5,575
	9¾	13½	13½	8	9,010	8,505	9,010	8,505	9,010	8,325	7,130	5,945	9,010	8,325	7,130	5,945

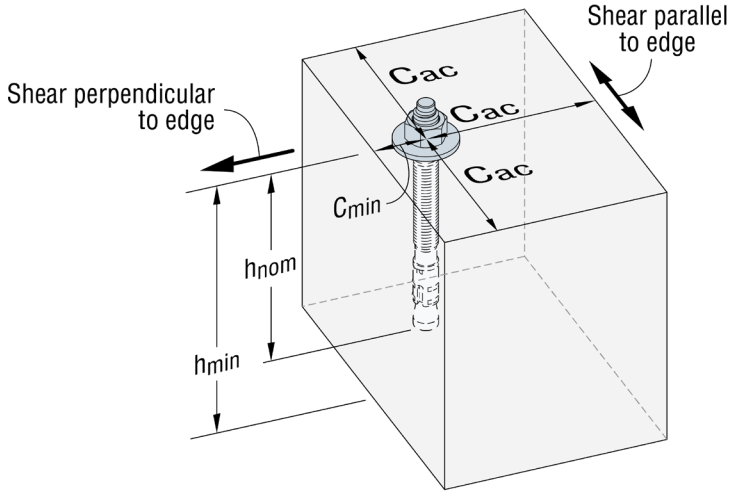
1. Shear design strengths (SD level) are based on the strength design provisions of ACI 318-14 Chapter 17.
2. Tabulated values are for a single anchor with no influence of another anchor.
3. Interpolation between embedment depths is not permitted.
4. Strength reduction factor, ϕ, is based on using a load combination from ACI 318-14 Section 5.3.
5. The shear design strength listed for SDC (Seismic Design Category) A-B may also be used in SDC C-F when the shear component of the strength-level seismic design load on the anchor does not exceed 20% of the total factored shear 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. Shear 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.
8. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
9. The Designer of Record is responsible for the foundation design.

Strong-Bolt 2 with C_{ac} Edge Distance on All Sides



Flat Slab

Strong-Bolt 2 with C_{min} Edge Distance on One Side and C_{ac} on Three Sides



Flat Slab

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

SIMPSON Strong-Tie

Carbon Steel Strong-Bolt® 2 Allowable Shear Loads in Normal-Weight Concrete (f'_c = 2,500 psi) — Static Load

IBC *

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 Shear 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	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge
¼	1¾	3¼	2½	1¾	400	—	380	315	—	—
⅜	1⅞	3¼	6½	6	835	780	835	835	780	780
	2⅞	4½	6	6	835	835	835	835	835	835
½	2¼[4]	4	6	6	1,380	—	1,380	1,380	—	—
	2¾	4	6	6	1,530	1,095	1,530	1,530	1,095	1,095
	3⅞	6	7½	4	2,540	1,815	2,030	1,675	1,450	1,195
⅝	2¾[4]	5½	7½	6½	1,380	—	1,380	1,380	—	—
	3⅜	5½	7½	6½	2,495	1,780	2,495	2,235	1,780	1,595
	5⅛	7⅞	9	6½	3,955	2,825	3,955	3,120	2,825	2,230
¾	3⅜[4]	6	6	4¼	2,180	—	2,180	1,700	—	—
	4⅛	6	6	4¼	2,295	1,640	2,295	1,785	1,640	1,275
	5¾	8¾	8	4¼	3,895	2,780	2,720	2,585	1,940	1,845
1	5¼	9	18	8	6,435	6,435	5,095	5,095	4,410	3,980
	9¾	13½	13½	8	6,435	6,075	6,435	5,945	5,095	4,245

1. Allowable shear loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1.4. The conversion factor α 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.
4. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
5. The Designer of Record is responsible for the foundation design.

Carbon Steel Strong-Bolt® 2 Allowable Shear Loads in Normal-Weight Concrete (f'_c = 2,500 psi) — Wind Load

IBC *

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 Shear 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	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge
¼	1¾	3¼	2½	1¾	335	—	320	265	—	—
⅜	1⅞	3¼	6½	6	700	655	700	700	655	655
	2⅞	4½	6	6	700	700	700	700	700	700
½	2¼[4]	4	6	6	1,160	—	1,160	1,160	—	—
	2¾	4	6	6	1,285	920	1,285	1,285	920	920
	3⅞	6	7½	4	2,135	1,525	1,705	1,405	1,220	1,005
⅝	2¾[4]	5½	7½	6½	1,160	—	1,160	1,160	—	—
	3⅜	5½	7½	6½	2,095	1,495	2,095	1,880	1,495	1,340
	5⅛	7⅞	9	6½	3,320	2,375	3,320	2,620	2,375	1,870
¾	3⅜[4]	6	6	4¼	1,835	—	1,835	1,430	—	—
	4⅛	6	6	4¼	1,925	1,375	1,925	1,500	1,375	1,070
	5¾	8¾	8	4¼	3,270	2,335	2,285	2,170	1,630	1,550
1	5¼	9	18	8	5,405	5,405	4,280	4,280	3,705	3,345
	9¾	13½	13½	8	5,405	5,105	5,405	4,995	4,280	3,565

1. Allowable shear loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1/0.6 = 1.67. The conversion factor α 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.
4. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
5. The Designer of Record is responsible for the foundation design.

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

SIMPSON Strong-Tie

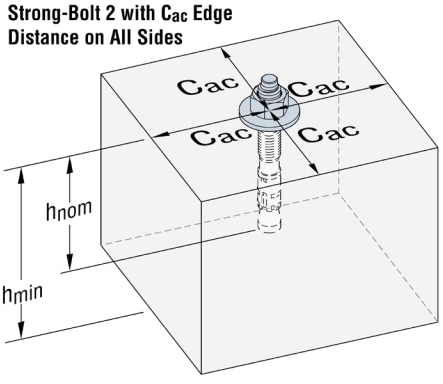
Carbon Steel Strong-Bolt® 2 Allowable Shear Loads in Normal-Weight Concrete (f'_c = 2,500 psi) — Seismic Load

IBC *

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 Shear 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		SDC C-F		SDC A-B				SDC C-F			
									Uncracked		Cracked		Uncracked		Cracked	
					Uncracked	Cracked	Uncracked	Cracked	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge
¼	1¾	3¼	2½	1¾	390	—	—	—	375	310	—	—	—	—	—	—
⅜	1⅞	3¼	6½	6	820	765	820	765	820	820	765	765	820	820	765	765
	2⅞	4½	6	6	820	820	820	820	820	820	820	820	820	820	820	820
½	2¼[7]	4	6	6	1,355	—	—	—	1,355	1,355	—	—	—	—	—	—
	2¾	4	6	6	1,500	1,070	1,500	1,070	1,500	1,500	1,070	1,070	1,500	1,500	1,070	1,070
	3⅞	6	7½	4	2,490	1,780	2,490	1,780	1,990	1,640	1,420	1,175	1,990	1,640	1,420	1,175
⅝	2¾[7]	5½	7½	6½	1,355	—	—	—	1,355	1,355	—	—	—	—	—	—
	3⅜	5½	7½	6½	2,445	1,745	2,445	1,745	2,445	2,190	1,745	1,565	2,445	2,190	1,745	1,565
	5⅛	7⅞	9	6½	3,875	2,770	3,875	2,770	3,875	3,060	2,770	2,185	3,875	3,060	2,770	2,185
¾	3⅜[7]	6	6	4¼	2,140	—	—	—	2,140	1,665	—	—	—	—	—	—
	4⅛	6	6	4¼	2,245	1,605	2,245	1,605	2,245	1,750	1,605	1,250	2,245	1,750	1,605	1,250
	5¾	8¾	8	4¼	3,815	2,725	3,815	2,725	2,665	2,535	1,900	1,810	2,665	2,535	1,900	1,810
1	5¼	9	18	8	6,305	6,305	6,305	6,305	4,990	4,990	4,325	3,900	4,990	4,990	4,325	3,900
	9¾	13½	13½	8	6,305	5,955	6,305	5,955	6,305	5,830	4,990	4,160	6,305	5,830	4,990	4,160

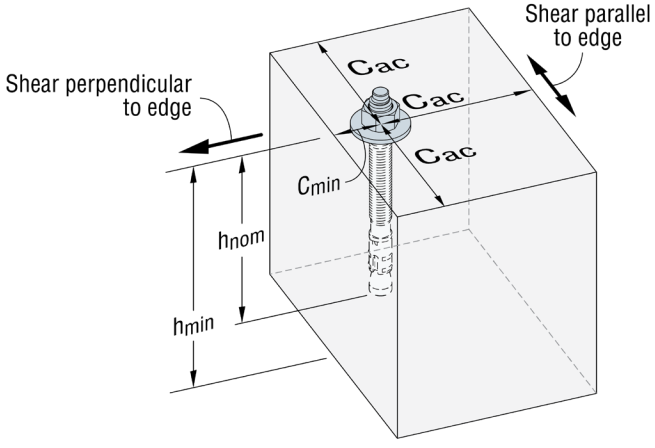
1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of $\alpha = 1/0.7 = 1.43$. The conversion factor α is based on the load combination assuming 100% seismic load.
2. Tabulated values are for a single anchor with no influence of another anchor.
3. Interpolation between embedment depths is not permitted.
4. The 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.
5. When designing anchorages in SDC C-F, the designer shall consider the ductility requirements of ACI 318-14 Section 17.2.3.
6. 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.
7. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
8. The Designer of Record is responsible for the foundation design.

Strong-Bolt 2 with C_{ac} Edge Distance on All Sides



Flat Slab

Strong-Bolt 2 with C_{min} Edge Distance on One Side and C_{ac} on Three Sides



Flat Slab

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

SIMPSON Strong-Tie

Carbon Steel Strong-Bolt® 2 Tension Design Strength in Soffit of Normal-Weight or Sand-Lightweight Concrete-Filled Profile Steel Deck Assemblies (f'_c = 3,000 psi)

IBC *

Anchor Dia. (in.)	Nominal Embed. Depth (in.)	Mimimum End Distance c_{min} (in.)	Tension Design Strength (lb.)							
			Lower Flute				Upper Flute			
			SDC A-B		SDC C-F		SDC A-B		SDC C-F	
			Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
⅜	2	3¼	1,145	675	860	505	1,480	870	1,110	655
	3⅜	6	2,050	1,700	1,535	1,275	—	—	—	—
½	2¾	4½	1,675	1,325	1,260	995	3,115	2,460	2,340	1,845
	4½	8	2,495	1,775	1,870	1,330	—	—	—	—
⅝	3⅜	5½	2,395	1,700	1,795	1,275	—	—	—	—
	5⅝	10	4,265	3,245	3,200	2,435	—	—	—	—
¾	4⅛	6¾	2,470	1,830	1,855	1,370	—	—	—	—

1. Tension design strengths (SD level) are based on the strength design provisions of 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, ϕ, is based on using a load combination from 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 318-14 Section 17.2.3.
7. 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.
8. Installation must comply with Figure 1.

Carbon Steel Strong-Bolt® 2 Allowable Tension Loads in Soffit of Normal-Weight or Sand-Lightweight Concrete-Filled Profile Steel Deck Assemblies (f'_c = 3,000 psi) — Static Load

IBC *

Anchor Dia. (in.)	Nominal Embed. Depth (in.)	Minimum End Distance c_{min} (in.)	Allowable Tension Load (lb.)			
			Lower Flute		Upper Flute	
			Uncracked	Cracked	Uncracked	Cracked
⅜	2	3¼	820	480	1,055	620
	3⅜	6	1,465	1,215	—	—
½	2¾	4½	1,195	945	2,225	1,755
	4½	8	1,780	1,270	—	—
⅝	3⅜	5½	1,710	1,215	—	—
	5⅝	10	3,045	2,320	—	—
¾	4⅛	6¾	1,765	1,305	—	—

1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1.4. The conversion factor α 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.
4. Installation must comply with Figure 1.

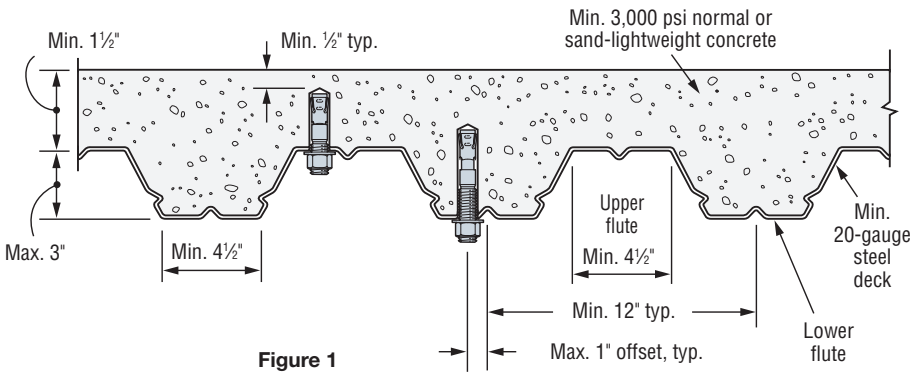


Figure 1

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

SIMPSON Strong-Tie

Carbon Steel Strong-Bolt® 2 Allowable Tension Loads in Soffit of Normal-Weight or Sand-Lightweight Concrete-Filled Profile Steel Deck Assemblies (f'c = 3,000 psi) — Wind Load

IBC *

Anchor Dia. (in.)	Nominal Embed. Depth (in.)	Minimum End Distance c_{min} (in.)	Allowable Tension Load (lb.)			
			Lower Flute		Upper Flute	
			Uncracked	Cracked	Uncracked	Cracked
⅜	2	3¼	685	405	890	520
	3⅜	6	1,230	1,020	—	—
½	2¾	4½	1,005	795	1,870	1,475
	4½	8	1,495	1,065	—	—
⅝	3⅜	5½	1,435	1,020	—	—
	5⅝	10	2,560	1,945	—	—
¾	4⅛	6¾	1,480	1,100	—	—

1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1/0.6 = 1.67. The conversion factor α 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.
4. Installation must comply with Figure 1.

Carbon Steel Strong-Bolt® 2 Allowable Tension Loads in Soffit of Normal-Weight or Sand-Lightweight Concrete-Filled Profile Steel Deck Assemblies (f'c = 3,000 psi) — Seismic Load

IBC *

Anchor Dia. (in.)	Nominal Embed. Depth (in.)	Minimum End Distance c_{min} (in.)	Allowable Tension Load (lb.)							
			Lower Flute				Upper Flute			
			SDC A-B		SDC C-F		SDC A-B		SDC C-F	
			Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
⅜	2	3¼	800	475	600	355	1,035	610	775	460
	3⅜	6	1,435	1,190	1,075	895	—	—	—	—
½	2¾	4½	1,175	930	880	695	2,180	1,720	1,640	1,290
	4½	8	1,745	1,245	1,310	930	—	—	—	—
⅝	3⅜	5½	1,675	1,190	1,255	895	—	—	—	—
	5⅝	10	2,985	2,270	2,240	1,705	—	—	—	—
¾	4⅛	6¾	1,730	1,280	1,300	960	—	—	—	—

1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1/0.7 = 1.43. The conversion factor α 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 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.
5. When designing anchorages in SDC C-F, the designer shall consider the ductility requirements of ACI 318-14 Section 17.2.3.
6. 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.
7. Installation must comply with Figure 1.

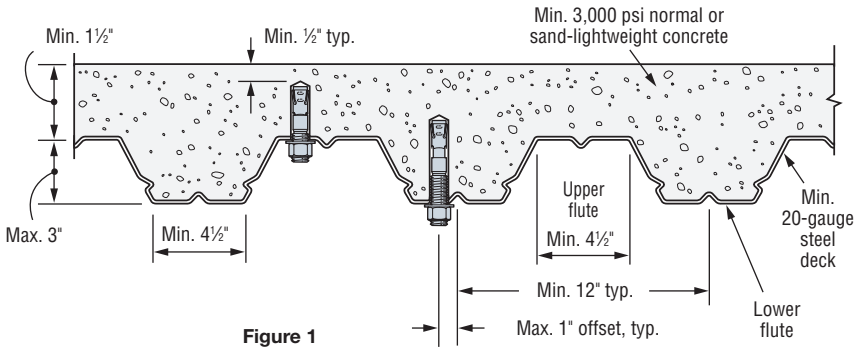


Figure 1

* See page 3 for an explanation of the load table icons.

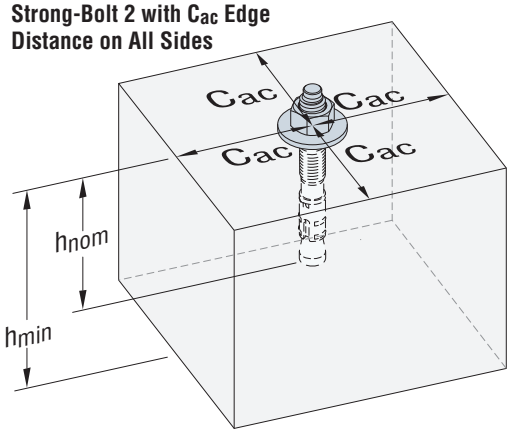
Strong-Bolt® 2 Design Information — Concrete

Stainless Steel Strong-Bolt® 2 Tension Design Strength 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		SDC C-F		SDC A-B		SDC C-F	
					Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
¼	1¾	3¼	2½	1¾	1,250	—	—	—	1,070	—	—	—
⅜	1⅞	3¼	6½	6	1,435	1,015	1,075	760	1,325	1,015	990	760
	2⅞	4½	8½	6	3,085	2,045	2,090	1,380	2,175	2,045	1,630	1,380
½	2¼[8]	4½	6½	6½	1,415	—	—	—	1,415	—	—	—
	2¾	4½	6½	6½	2,100	1,665	1,575	1,250	2,100	1,665	1,575	1,250
	3⅞	6	7	5	2,920	2,800	2,190	2,100	2,920	2,800	2,190	2,100
⅝	2¾[8]	5½	7½	4	1,545	—	—	—	1,290	—	—	—
	3⅜	5½	7½	4	3,555	2,520	2,665	1,890	1,910	2,640	1,430	1,845
	5⅛	7⅞	9	4	4,950	4,255	3,710	3,190	3,905	3,685	2,925	2,765
¾	3⅜[8]	6¾	8	6	3,315	—	—	—	2,485	—	—	—
	4⅛	6¾	8	6	4,835	3,425	3,625	2,570	3,625	3,425	2,720	2,570
	5¾	8¾	8	6	6,255	5,350	4,690	4,010	6,255	5,225	4,690	3,920

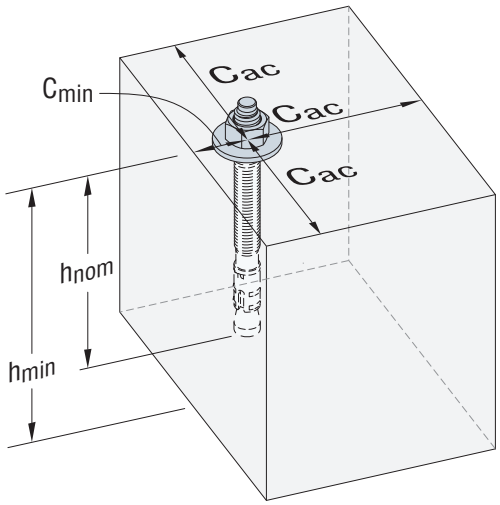
1. Tension design strengths (SD level) are based on the strength design provisions of ACI 318-14 Chapter 17.
2. Tabulated values are for a single anchor with no influence of another anchor.
3. Interpolation between embedment depths is not permitted.
4. Strength reduction factor, ϕ, is based on using a load combination from 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 318-14 Section 17.2.3.
7. 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.
8. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
9. The Designer of Record is responsible for the foundation design.

Strong-Bolt 2 with C_{ac} Edge Distance on All Sides



Flat Slab

Strong-Bolt 2 with C_{min} Edge Distance on One Side and C_{ac} on Three Sides



Flat Slab

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

Stainless Steel Strong-Bolt® 2 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	1¾	3¼	2½	1¾	895	—	765	—
⅜	1⅞	3¼	6½	6	1,025	725	945	725
	2⅞	4½	8½	6	2,205	1,460	1,555	1,460
½	2¼[4]	4½	6½	6½	1,010	—	1,010	—
	2¾	4½	6½	6½	1,500	1,190	1,500	1,190
	3⅞	6	7	5	2,085	2,000	2,085	2,000
⅝	2¾[4]	5½	7½	4	1,105	—	920	—
	3⅜	5½	7½	4	2,540	1,800	1,365	1,755
	5⅛	7⅞	9	4	3,535	3,040	2,790	2,630
¾	3⅜[4]	6¾	8	6	2,370	—	1,775	—
	4⅛	6¾	8	6	3,455	2,445	2,590	2,445
	5¾	8¾	8	6	4,470	3,820	4,470	3,730

1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1.4. The conversion factor α 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.
4. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
5. The Designer of Record is responsible for the foundation design.

Stainless Steel Strong-Bolt® 2 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}	Allowable Tension Load (lb.)			
					Edge Distances = c_{ac} on all sides		Edge Distances = c_{min} on one side and c_{ac} on three sides	
				(in.)	Uncracked	Cracked	Uncracked	Cracked
¼	1¾	3¼	2½	1¾	750	—	640	—
⅜	1⅞	3¼	6½	6	860	610	795	610
	2⅞	4½	8½	6	1,850	1,225	1,305	1,225
½	2¼[4]	4½	6½	6½	850	—	850	—
	2¾	4½	6½	6½	1,260	1,000	1,260	1,000
	3⅞	6	7	5	1,750	1,680	1,750	1,680
⅝	2¾[4]	5½	7½	4	925	—	775	—
	3⅜	5½	7½	4	2,135	1,510	1,145	1,475
	5⅛	7⅞	9	4	2,970	2,555	2,345	2,210
¾	3⅜[4]	6¾	8	6	1,990	—	1,490	—
	4⅛	6¾	8	6	2,900	2,055	2,175	2,055
	5¾	8¾	8	6	3,755	3,210	3,755	3,135

1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1/0.6 = 1.67. The conversion factor α 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.
4. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
5. The Designer of Record is responsible for the foundation design.

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

SIMPSON Strong-Tie

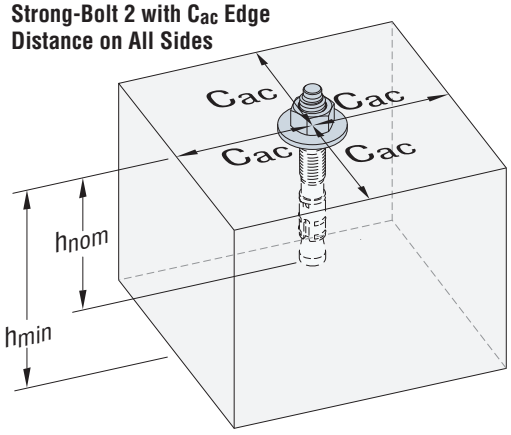
Stainless Steel Strong-Bolt® 2 Allowable Tension Loads in Normal-Weight Concrete (f'_c = 2,500 psi) — Seismic Load

IBC *

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		SDC C-F		SDC A-B		SDC C-F	
					Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
¼	1¾	3¼	2½	1¾	875	—	—	—	750	—	—	—
⅜	1⅞	3¼	6½	6	1,005	710	755	530	930	710	695	530
	2⅞	4½	8½	6	2,160	1,430	1,465	965	1,525	1,430	1,140	965
½	2¼[7]	4½	6½	6½	990	—	—	—	990	—	—	—
	2¾	4½	6½	6½	1,470	1,165	1,105	875	1,470	1,165	1,105	875
	3⅞	6	7	5	2,045	1,960	1,535	1,470	2,045	1,960	1,535	1,470
⅝	2¾[7]	5½	7½	4	1,080	—	—	—	905	—	—	—
	3⅜	5½	7½	4	2,490	1,765	1,865	1,325	1,335	1,720	1,000	1,290
	5⅛	7⅞	9	4	3,465	2,980	2,595	2,235	2,735	2,580	2,050	1,935
¾	3⅜[7]	6¾	8	6	2,320	—	—	—	1,740	—	—	—
	4⅛	6¾	8	6	3,385	2,400	2,540	1,800	2,540	2,400	1,905	1,800
	5¾	8¾	8	6	4,380	3,745	3,285	2,805	4,380	3,660	3,285	2,745

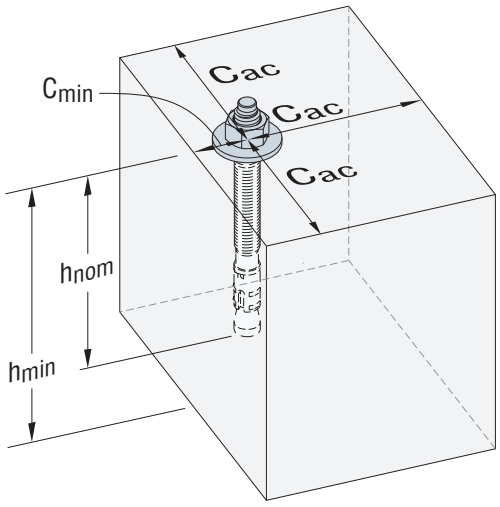
1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of $\alpha = 1/0.7 = 1.43$. The conversion factor α is based on the load combination assuming 100% seismic load.
2. Tabulated values are for a single anchor with no influence of another anchor.
3. Interpolation between embedment depths is not permitted.
4. The 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.
5. When designing anchorages in SDC C-F, the designer shall consider the ductility requirements of ACI 318-14 Section 17.2.3.
6. 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.
7. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
8. The Designer of Record is responsible for the foundation design.

Strong-Bolt 2 with C_{ac} Edge Distance on All Sides



Flat Slab

Strong-Bolt 2 with C_{min} Edge Distance on One Side and C_{ac} on Three Sides



Flat Slab

* See page 3 for an explanation of the load table icons.

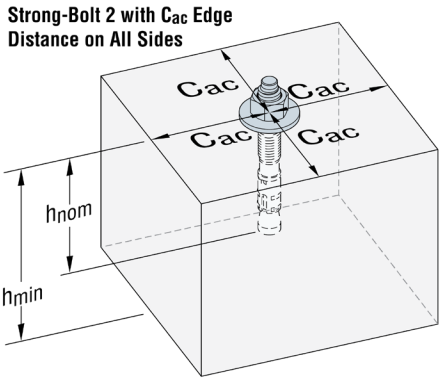
Strong-Bolt® 2 Design Information — Concrete

SIMPSON Strong-Tie

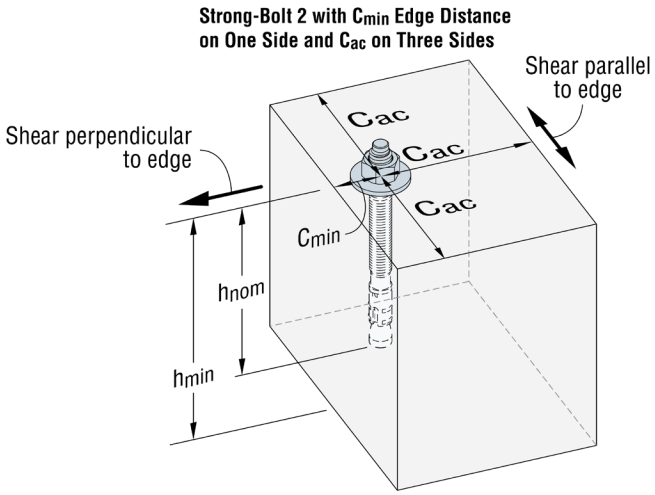
Stainless Steel Strong-Bolt® 2 Shear Design Strengths in Normal-Weight Concrete (f'_c = 2,500 psi) IBC *

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.)	Shear 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		SDC C-F		SDC A-B				SDC C-F			
									Uncracked		Cracked		Uncracked		Cracked	
					Uncracked	Cracked	Uncracked	Cracked	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge
¼	1¾	3¼	2½	1¾	560	—	—	—	535	440	—	—	—	—	—	—
⅜	1⅞	3¼	6½	6	1,545	1,095	1,545	1,095	1,425	1,425	1,095	1,095	1,425	1,425	1,095	1,095
	2⅞	4½	8½	6	2,005	2,005	2,005	2,005	2,005	2,005	2,005	1,675	2,005	2,005	2,005	1,675
½	2¼[8]	4½	6½	6½	1,945	—	—	—	1,945	1,945	—	—	—	—	—	—
	2¾	4½	6½	6½	2,460	1,755	2,460	1,755	2,460	2,460	1,755	1,755	2,460	2,460	1,755	1,755
	3⅞	6	7	5	3,315	2,370	3,315	2,370	3,315	2,600	2,370	1,855	3,315	2,600	2,370	1,855
⅝	2¾[8]	5½	7½	4	2,600	—	—	—	1,390	1,390	—	—	—	—	—	—
	3⅜	5½	7½	4	3,490	2,495	3,490	2,495	2,795	2,300	1,995	1,645	2,795	2,300	1,995	1,645
	5⅛	7⅞	9	4	5,535	3,955	5,535	3,955	3,220	3,330	2,300	2,380	3,220	3,330	2,300	2,380
¾	3⅜[8]	6¾	8	6	4,320	—	—	—	4,320	3,495	—	—	—	—	—	—
	4⅛	6¾	8	6	4,540	3,245	4,540	3,245	4,540	3,675	3,245	2,625	4,540	3,675	3,245	2,625
	5¾	8¾	8	6	5,450	3,890	5,450	3,890	5,450	4,430	3,890	3,165	5,450	4,430	3,890	3,165

1. Shear design strengths (SD level) are based on the strength design provisions of 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, ϕ, is based on using a load combination from ACI 318-14 Section 5.3.
5. The shear design strength listed for SDC (Seismic Design Category) A-B may also be used in SDC C-F when the shear component of the strength-level seismic design load on the anchor does not exceed 20% of the total factored shear 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. Shear 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.
8. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
9. The Designer of Record is responsible for the foundation design.



Flat Slab



Flat Slab

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

Stainless Steel Strong-Bolt® 2 Allowable Shear 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 Shear 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	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge
¼	1¾	3¼	2½	1¾	400	—	380	315	—	—
⅜	1⅞	3¼	6½	6	1,105	780	1,020	1,020	780	780
	2⅞	4½	8½	6	1,430	1,430	1,430	1,430	1,430	1,195
½	2¼[4]	4½	6½	6½	1,390	—	1,390	1,390	—	—
	2¾	4½	6½	6½	1,755	1,255	1,755	1,755	1,255	1,255
	3⅞	6	7	5	2,370	1,695	2,370	1,855	1,695	1,325
⅝	2¾[4]	5½	7½	4	1,855	—	995	995	—	—
	3⅜	5½	7½	4	2,495	1,780	1,995	1,645	1,425	1,175
	5⅛	7⅞	9	4	3,955	2,825	2,300	2,380	1,645	1,700
¾	3⅜[4]	6¾	8	6	3,085	—	3,085	2,495	—	—
	4⅛	6¾	8	6	3,245	2,320	3,245	2,625	2,320	1,875
	5¾	8¾	8	6	3,895	2,780	3,895	3,165	2,780	2,260

1. Allowable shear loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1.4. The conversion factor α 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 infuence of another anchor.
3. Interpolation between embedment depths is not permitted.
4. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
5. The Designer of Record is responsible for the foundation design.

Stainless Steel Strong-Bolt® 2 Allowable Shear 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 Shear 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	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge
¼	1¾	3¼	2½	1¾	335	—	320	265	—	—
⅜	1⅞	3¼	6½	6	925	655	855	855	655	655
	2⅞	4½	8½	6	1,205	1,205	1,205	1,205	1,205	1,005
½	2¼[4]	4½	6½	6½	1,165	—	1,165	1,165	—	—
	2¾	4½	6½	6½	1,475	1,055	1,475	1,475	1,055	1,055
	3⅞	6	7	5	1,990	1,420	1,990	1,560	1,420	1,115
⅝	2¾[4]	5½	7½	4	1,560	—	835	835	—	—
	3⅜	5½	7½	4	2,095	1,495	1,675	1,380	1,195	985
	5⅛	7⅞	9	4	3,320	2,375	1,930	2,000	1,380	1,430
¾	3⅜[4]	6¾	8	6	2,590	—	2,590	2,095	—	—
	4⅛	6¾	8	6	2,725	1,945	2,725	2,205	1,945	1,575
	5¾	8¾	8	6	3,270	2,335	3,270	2,660	2,335	1,900

1. Allowable shear loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1/0.6 = 1.67. The conversion factor α is based on the load combination assuming 100% wind load.
2. Tabulated values are for a single anchor with no infuence of another anchor.
3. Interpolation between embedment depths is not permitted.
4. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
5. The Designer of Record is responsible for the foundation design.

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

SIMPSON Strong-Tie

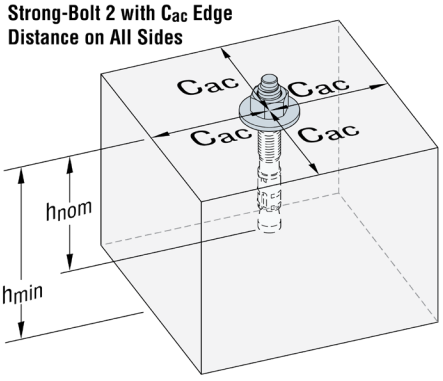
Stainless Steel Strong-Bolt® 2 Allowable Shear Loads in Normal-Weight Concrete (f'_c = 2,500 psi) — Seismic Load

IBC *

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 Shear 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		SDC C-F		SDC A-B				SDC C-F			
									Uncracked		Cracked		Uncracked		Cracked	
					Uncracked	Cracked	Uncracked	Cracked	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge	⊥ to edge	∥ to edge
¼	1¾	3¼	2½	1¾	390	—	—	—	375	310	—	—	—	—	—	—
⅜	1⅞	3¼	6½	6	1,080	765	1,080	765	995	995	765	765	995	995	765	765
	2⅞	4½	8½	6	1,405	1,405	1,405	1,405	1,405	1,405	1,405	1,175	1,405	1,405	1,405	1,175
½	2¼[7]	4½	6½	6½	1,360	—	—	—	1,360	1,360	—	—	—	—	—	—
	2¾	4½	6½	6½	1,720	1,230	1,720	1,230	1,720	1,720	1,230	1,230	1,720	1,720	1,230	1,230
	3⅞	6	7	5	2,320	1,660	2,320	1,660	2,320	1,820	1,660	1,300	2,320	1,820	1,660	1,300
⅝	2¾[7]	5½	7½	4	1,820	—	—	—	975	975	—	—	—	—	—	—
	3⅜	5½	7½	4	2,445	1,745	2,445	1,745	1,955	1,610	1,395	1,150	1,955	1,610	1,395	1,150
	5⅛	7⅞	9	4	3,875	2,770	3,875	2,770	2,255	2,330	1,610	1,665	2,255	2,330	1,610	1,665
¾	3⅜[7]	6¾	8	6	3,025	—	—	—	3,025	2,445	—	—	—	—	—	—
	4⅛	6¾	8	6	3,180	2,270	3,180	2,270	3,180	2,575	2,270	1,835	3,180	2,575	2,270	1,835
	5¾	8¾	8	6	3,815	2,725	3,815	2,725	3,815	3,100	2,725	2,215	3,815	3,100	2,725	2,215

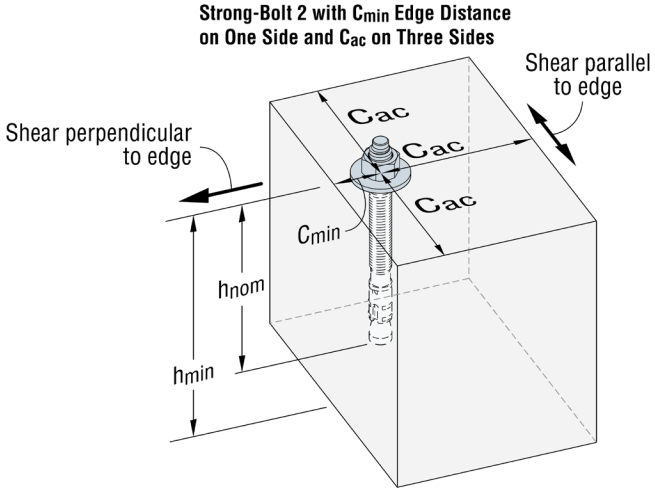
1. Allowable shear loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of $\alpha = 1/0.7 = 1.43$. The conversion factor α is based on the load combination assuming 100% seismic load.
2. Tabulated values are for a single anchor with no influence of another anchor.
3. Interpolation between embedment depths is not permitted.
4. The allowable shear load listed for SDC (Seismic Design Category) A-B may also be used in SDC C-F when the shear component of the strength-level seismic design load on the anchor does not exceed 20% of the total factored shear 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 318-14 Section 17.2.3.
6. Shear 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.
7. Tabulated values for this embedment depth are based on internal testing and they are not listed in ICC-ES ESR-3037.
8. The Designer of Record is responsible for the foundation design.

Strong-Bolt 2 with C_{ac} Edge Distance on All Sides



Flat Slab

Strong-Bolt 2 with C_{min} Edge Distance on One Side and C_{ac} on Three Sides



Flat Slab

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

Stainless Steel Strong-Bolt® 2 Tension Design Strength in Soffit of Normal-Weight or Sand-Lightweight Concrete-Filled Profile Steel Deck Assemblies (f'_c = 3,000 psi)

Anchor Dia. (in.)	Nominal Embed. Depth (in.)	Minimum End Distance c_{min} (in.)	Tension Design Strength (lb.)							
			Lower Flute				Upper Flute			
			SDC A-B		SDC C-F		SDC A-B		SDC C-F	
			Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
⅜	2	3¼	1,025	800	770	600	1,295	1,010	970	755
	3⅜	6	2,570	1,695	1,735	1,145	—	—	—	—
½	2¾	4½	1,610	1,295	1,205	970	1,665	1,335	1,250	1,000
	4½	8	1,730	1,660	1,295	1,245	—	—	—	—
⅝	3⅜	5½	1,605	1,135	1,205	855	—	—	—	—
	5⅝	10	3,250	2,615	2,440	1,960	—	—	—	—
¾	4⅛	6¾	2,780	1,970	2,085	1,475	—	—	—	—

1. Tension design strengths (SD level) are based on the strength design provisions of 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, ϕ, is based on using a load combination from 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 318-14 Section 17.2.3.
7. 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.
8. Installation must comply with Figure 1.

Stainless Steel Strong-Bolt® 2 Allowable Tension Loads in Soffit of Normal-Weight or Sand-Lightweight Concrete-Filled Profile Steel Deck Assemblies (f'_c = 3000 psi) — Static Load

Anchor Dia. (in.)	Nominal Embed. Depth (in.)	Minimum End Distance c_{min} (in.)	Allowable Tension Load (lb.)			
			Lower Flute		Upper Flute	
			Uncracked	Cracked	Uncracked	Cracked
⅜	2	3¼	730	570	925	720
	3⅜	6	1,835	1,210	—	—
½	2¾	4½	1,150	925	1,190	955
	4½	8	1,235	1,185	—	—
⅝	3⅜	5½	1,145	810	—	—
	5⅝	10	2,320	1,870	—	—
¾	4⅛	6¾	1,985	1,405	—	—

1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1.4. The conversion factor α 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.
4. Installation must comply with Figure 1.

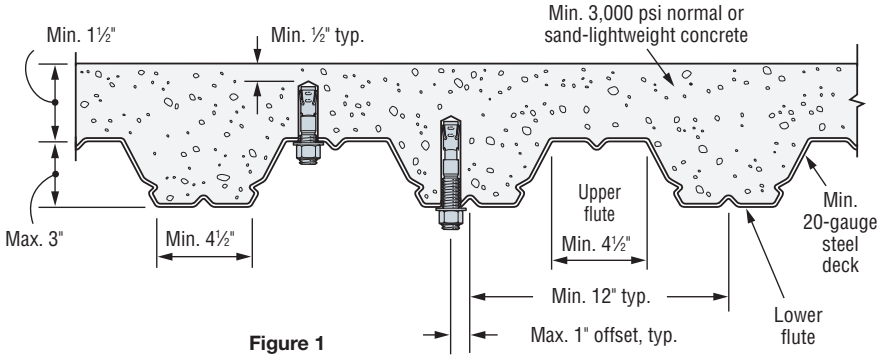


Figure 1

* See page 3 for an explanation of the load table icons.

Strong-Bolt® 2 Design Information — Concrete

SIMPSON Strong-Tie

Stainless Steel Strong-Bolt® 2 Allowable Tension Loads in Soffit of Normal-Weight or Sand-Lightweight Concrete-Filled Profile Steel Deck Assemblies (f'_c = 3,000 psi) — Wind Load

IBC *

Anchor Dia. (in.)	Nominal Embed. Depth (in.)	Minimum End Distance c_{min} (in.)	Allowable Tension Load (lb.)			
			Lower Flute		Upper Flute	
			Uncracked	Cracked	Uncracked	Cracked
⅜	2	3¼	615	480	775	605
	3⅜	6	1,540	1,015	—	—
½	2¾	4½	965	775	1,000	800
	4½	8	1,040	995	—	—
⅝	3⅜	5½	965	680	—	—
	5⅝	10	1,950	1,570	—	—
¾	4⅛	6¾	1,670	1,180	—	—

1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1/0.6 = 1.67. The conversion factor α 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.
4. Installation must comply with Figure 1 on page 18.

Stainless Steel Strong-Bolt® 2 Allowable Tension Loads in Soffit of Normal-Weight or Sand-Lightweight Concrete-Filled Profile Steel Deck Assemblies (f'_c = 3,000 psi) — Seismic Load

IBC *

Anchor Dia. (in.)	Nominal Embed. Depth (in.)	Minimum End Distance c_{min} (in.)	Allowable Tension Load (lb.)							
			Lower Flute				Upper Flute			
			SDC A-B		SDC C-F		SDC A-B		SDC C-F	
			Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked	Uncracked	Cracked
⅜	2	3¼	720	560	540	420	905	705	680	530
	3⅜	6	1,800	1,185	1,215	800	—	—	—	—
½	2¾	4½	1,125	905	845	680	1,165	935	875	700
	4½	8	1,210	1,160	905	870	—	—	—	—
⅝	3⅜	5½	1,125	795	845	600	—	—	—	—
	5⅝	10	2,275	1,830	1,710	1,370	—	—	—	—
¾	4⅛	6¾	1,945	1,380	1,460	1,035	—	—	—	—

1. Allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1/0.7 = 1.43. The conversion factor α 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 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.
5. When designing anchorages in SDC C-F, the designer shall consider the ductility requirements of ACI 318-14 Section 17.2.3.
6. 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.
7. Installation must comply with Figure 1 on page 18.

* See page 3 for an explanation of the load table icons.

TEB-A-STB2-23 1/23 exp. 12/23

(800) 999-5099
strongtie.com