Post-Installed Anchorage Solutions for Holdowns and Bases for use with Cold-Formed Steel

Simpson Strong-Tie Anchor Systems® products offer several post-installed anchorage solutions for holdowns and bases. Often times these products are used when cast-in-place anchors are omitted or mislocated, or in retrofit applications. The following design values provide solutions to common applications encountered in the light frame construction market.

For complete information on product performance, installation requirements and appropriate code listings for Anchor Systems products please refer to the specific web pages for Simpson Strong-Tie Anchor Systems **Adhesives**, **Mechanical Anchors**, and **Powder-Actuated Fastening Systems** . Also refer to **Important Instructions to the Designer**.

See **Corrosion Information** for general corrosion information.

SEISMIC VALUES: IBC Section 1908.1.16 requires that concrete anchors in Seismic Design Categories C through F be governed by the strength of a ductile steel anchor. Anchors noted as limited by the steel capacity satisfy this requirement (footnote 9). Alternately, for anchor solutions limited by the concrete capacity, the IBC requires that either the attachment to the structure shall undergo ductile yielding at a load level less than the anchor design capacity, or the anchor strength shall be at least 2.5 times the demand force.

Anchoring Adhesive Solutions

Also see **product information for SET-XP® for use with Cold Formed Steel**.

Shear Loads for Threaded Rod in Normal-Weight Concrete

Anchor Size	Drill Bit	Edge Distance	End Distance	Emb. Depth	Concrete Thick.	Spacing	Shear Loads [6] (lbs /ft)						
							Concrete[4]				Cold-Formed Steel (ASD)[5]		
							LRFD[1] (seismic)	LRFD[11] (wind)	ASD[1,2] (seismic)	ASD[2,11] (wind)	33 mil (20 ga)	43 mil (18 ga)	54 mil (16 ga)
½	⅝	1¾	5	4	6½	0' - 8"	1,360	1,815	970	1,130	895	1,320	2,485
						1'- 0"	905	1,205	645	755	595	880	1,655
						1'- 4"	680	905	485	565	445	660	1,240
						2' - 0"	455	605	325	375	300	440	830
						2' - 8"	340	450	240	285	225	330	620
						4' - 0"	225	300	160	190	150	220	415
						6' - 0"	150	200	110	125	100	145	275
⅝	¾	1¾	5	5	8½	0' - 8"	1,525	2,035	1,090	1,270	960	1,490	2,995
						1'- 0"	1,015	1,355	725	845	640	995	2,000
						1'- 4"	760	1,015	545	635	480	745	1,500
						2' - 0"	510	680	365	425	320	495	1,000
						2' - 8"	380	510	270	315	240	375	750
						4' - 0"	255	340	180	210	160	250	500
						6' - 0"	170	225	120	140	105	165	335
¾	⅞	1¾	5	6	10	0' - 8"	1,675	2,235	1,195	1,395	965	1,600	3,320
						1'- 0"	1,115	1,485	795	930	640	1,065	2,215
						1'- 4"	835	1,115	595	700	480	800	1,660
						2' - 0"	560	745	400	465	320	535	1,110
						2' - 8"	420	555	300	350	240	400	830
						4' - 0"	280	375	200	230	160	265	555
						6' - 0"	185	245	135	155	105	180	370

Tension Loads for Threaded Rod in Normal-Weight Concrete

Anchor Dia.	Drill Bit	Emb. Depth	Tension Loads[6] (lbs)										Tension Loads[10] Fu = 58 ksi Steel (lbs)	
			Edge and End Distance (C_C)					Minimum Edge (C_{min}) + Critical End (C_C)						
			C_C	LRFD[1] (seismic)	LRFD[11] (wind)	ASD[1,2] (seismic)	ASD[2,11] (wind)	C_{min}	LRFD[1] (seismic)	LRFD[11] (wind)	ASD[1,2] (seismic)	ASD[2,11] (wind)	LRFD	ASD
½	⅝	4	6	3,175	4,235	2,270	2,645	1¾	1,620	2,160	1,155	1,350	6,175	4,265
		7	8	5,525	6,175[9]	3,945	3,860	1¾	2,750	3,665	1,965	2,290		
		10	8	6,175[9]	6,175[9]	4,410	3,860	1¾	3,925	5,235	2,805	3,270		
⅝	¾	5	8	3,415	4,555	2,440	2,845	1¾	1,630	2,175	1,165	1,360	9,830	6,675
		8½	8	5,820	7,760	4,155	4,850	1¾	2,735	3,645	1,950	2,280		
		12	9	8,230	9,830[9]	5,880	6,145	1¾	3,870	5,160	2,765	3,225		
¾	⅞	6	9	6,085	8,115	4,345	5,070	1¾	2,750	3,665	1,965	2,290	14,530	9,615
		10½	12	10,150	13,535	7,250	8,460	1¾	5,050	6,735	3,605	4,210		
		15	15	14,530[9]	14,530[9]	10,380	9,080	1¾	7,800	10,400	5,575	6,500		
⅞	1	8	10	5,305	8,845	3,790	5,530	1¾	2,380	3,965	1,700	2,480	20,095	13,070
		12	12	7,960	13,265	4,975	8,290	1¾	3,570	5,950	2,550	3,720		
		18	14	11,610	19,355	8,295	12,095	1¾	5,205	8,675	3,720	5,420		
1	1⅛	8	12	9,375	12,500	6,695	7,815	1¾	3,990	5,320	2,850	3,325	26,360	17,075
		14	18	17,890	23,855	12,780	14,910	1¾	7,910	10,545	5,650	6,590		
		20	23	26,360[9]	26,360[9]	18,830	16,475	1¾	11,645	16,570	8,320	10,355		

1. Anchorage designs conform to ACI 318 Appendix D and assume cracked concrete with no supplementary reinforcement.
2. Allowable Stress Design (ASD) values are obtained by dividing Load Resistance Factor Design (LRFD) capacities by 1.4 for seismic and 1.6 for wind.

for further information.

4. Shear load is applied parallel to the edge of concrete. Anchor is considered as an individual anchor without influence from other anchors.
5. Cold-Formed Steel (CFS) shear values are based on 2001 AISI NAS, Eq. E3.3.1-1, m_f = 0.75, Ω=2.5. Reference General Notes for CFS properties. To convert from ASD to LRFD multiply value by 1.5.
6. Governing shear load is the lesser of concrete and CFS. Governing tension load is the lesser of concrete and steel.
7. For conditons not covered by these tables use Simpson Strong-Tie Anchor Selector™ Software for ACI 318.
8. Third and fourth edge distances must be ≥ 1.5 x Embedment Depth.
9. Failure mode governed by ductile steel rod (A307 Grade C).
10. LRFD steel strength based on ACI 318 Appendix D. ASD steel strength based on AISC Steel Construction Manual, 13th Edition, Fu=58 ksi.
11. Wind design includes SDC A & B.