SET-XP® High-Strength Epoxy Adhesive

SET-XP is an epoxy-based high-strength anchoring adhesive. SET-XP is a 1:1 ratio, two-component anchoring adhesive for anchoring and doweling into concrete (cracked and uncracked) and masonry (uncracked) applications.

Features

- Design flexibility — permitted for sustained load performance at elevated temperature
- Jobsite versatility — can be specified for dry and damp conditions when in-service temperatures range from –40°F (–40°C) to 150°F (65°C)
- Recognized per AC308 to be used for rebar development and splice length design provisions of ACI 318
- Code listed for installation with the Speed Clean™ DXS system without any further cleaning

Product Information

Mix Ratio/Type	1:1 epoxy
Mixed Color	Teal
Base Materials	Concrete — Cracked and uncracked Masonry — Uncracked
Base Material Conditions	Dry, water-saturated
Anchor Type	Threaded rod or rebar
Substrate Installation Temperature	50°F (4°C) to 110°F (38°C)
In-Service Temperature Range	-40°F (-40°C) to 150°F (65°C)
Storage Temperature	45°F (7°C) and 90°F (32°C)
Shelf Life	24 months
Volatile Organic Compound (VOC)	3 g/L
Chemical Resistance	See pp. 268–269
Manufactured in the USA using global materials	

Test Criteria

SET-XP has been tested in accordance with ICC-ES AC308, AC58, ACI 355.4 and applicable ASTM test methods.

Code Reports, Standards and Compliance

Concrete — ICC-ES ESR-2508 (including post-installed rebar and City of LA Report); FL15730.
Masonry — IAPMO UES ER-265 (including City of LA Report); FL16230.
ASTM C881 and AASHTO M235 — Types I/IV and II/V, Grade 3, Class C.
UL Certification — CDPH Standard Method v1.2.
NSF/ANSI/CAN 61 (216 in.^{2} / 1,000 gal.)

Installation Instructions

Installation instructions are located at the following locations: pp. 64–67; product packaging; or **strongtie.com/setxp**.

- Hole cleaning brushes are located on p. 68.

SET-XP Adhesive

SET-XP Cartridge System

Model No.	Capacity (ounces)	Cartridge Type	Carton Quantity	Dispensing Tool(s)	Mixing Nozzle[3]
SET-XP10[4]	8.5	Single	12	CDT10S	
SET-XP22-N[4]	22	Side-by-Side	10	EDT22S, EDTA22P, EDTA22CKT	EMN22I
SET-XP56	56	Side-by-Side	6	EDTA56P	

1. Cartridge estimation guidelines are available at **strongtie.com/softwareandwebapplications/category**.
2. Detailed information on dispensing tools, mixing nozzles and other adhesive accessories is available at **strongtie.com**.
3. Use only Simpson Strong-Tie mixing nozzles in accordance with Simpson Strong-Tie instructions. Modification or improper use of mixing nozzle may impair SET-XP adhesive performance.
4. One EMN22I mixing nozzle and one nozzle extension are supplied with each cartridge.
5. Use of rodless pneumatic tools to dispense single-tube, coaxial adhesive cartridges is prohibited.

SET-XP® High-Strength Epoxy Adhesive

SET-XP Cure Schedule

Base Material Temperature		Gel Time (minutes)	Cure Time (hrs.)
°F	°C		
50	10	75	72
60	16	60	48
70	21	45	24
90	32	35	24
110	43	20	24

For water-saturated concrete, the cure times must be doubled.

SET-XP Typical Properties

Property		Class C (>60°F)	Test Method
Consistency		non-sag	ASTM C881
Bond Strength, Slant Shear	Hardened to Hardened Concrete, 2-Day Cure[1]	2,900 psi	ASTM C882
	Hardened to Hardened Concrete, 14-Day Cure[1]	3,200 psi	
	Fresh to Hardened Concrete, 14-Day Cure[2]	2,000 psi	
Compressive Yield Strength, 7-Day Cure[2]		14,100 psi	ASTM D695
Compressive Modulus, 7-Day Cure[2]		612,000 psi	ASTM D695
Heat Deflection Temperature, 7-Day Cure[2]		136°F (58°C)	ASTM D648
Glass Transition Temperature, 7-Day Cure[2]		126°F (52°C)	ASTM E1356
Decomposition Temperature, 24-Hour Cure[2]		500°F (260°C)	ASTM E2550
Water Absorption, 24-Hours, 7-Day Cure[2]		0.10%	ASTM D570
Shore D Hardness, 24-Hour Cure[2]		84	ASTM D2240
Linear Coefficient of Shrinkage, 7-Day Cure[2]		0.002 in./in.	ASTM D2566
Coefficient of Thermal Expansion[2]		2.4×10^{-5} in./in.°F	ASTM C531

1. Material and curing conditions: 60° ± 2°F.
2. Material and curing conditions: 73° ± 2°F.

SET-XP Installation Information and Additional Data for Threaded Rod and Rebar[1]

IBC *

Characteristic		Symbol	Units	Nominal Anchor Diameter (in.) / Rebar Size						
				⅜ / #3	½ / #4	⅝ / #5	¾ / #6	⅞ / #7	1 / #8	1¼ / #10
Installation Information										
Drill Bit Diameter		d_{hole}	in.	½	⅝	¾	⅞	1	1⅛	1⅜
Maximum Tightening Torque		T_{inst}	ft.-lb.	10	20	30	45	60	80	125
Permitted Embedment Depth Range	Minimum	h_{ef}	in.	2⅜	2¾	3⅛	3½	3¾	4	5
	Maximum	h_{ef}	in.	7½	10	12½	15	17½	20	25
Minimum Concrete Thickness		h_{min}	in.	$h_{ef} + 5d_{hole}$						
Critical Edge Distance[2]		c_{ac}	in.	See footnote 2						
Minimum Edge Distance		c_{min}	in.	1¾						2¾
Minimum Anchor Spacing		s_{min}	in.	3						6

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 and ACI 318-11.
2. $c_{ac} = h_{ef} (\tau_{k,uncr}/1{,}160)^{0.4} \times [3.1 - 0.7(h/h_{ef})]$, where:
   $[h/h_{ef}] \leq 2.4$
   $\tau_{k,uncr}$ = the characteristic bond strength in uncracked concrete, given in the tables that follow $\leq k_{uncr} ((h_{ef} \times f'_c)^{0.5}/(\pi \times d_{hole}))$
   h = the member thickness (inches)
   h_{ef} = the embedment depth (inches)

* See p. 12 for an explanation of the load table icons.

SET-XP® Design Information — Concrete

SET-XP Tension Strength Design Data for Threaded Rod[1]

Characteristic			Symbol	Units	⅜	½	⅝	¾	⅞	1	1¼
					Nominal Anchor Diameter (in.)						
Steel Strength in Tension											
Threaded Rod	Minimum Tensile Stress Area		A_{se}	in²	0.078	0.142	0.226	0.334	0.462	0.606	0.969
Threaded Rod	Tension Resistance of Steel — ASTM F1554, Grade 36		N_{sa}	lb.	4,525	8,235	13,110	19,370	26,795	35,150	56,200
Threaded Rod	Tension Resistance of Steel — ASTM A193, Grade B7		N_{sa}	lb.	9,750	17,750	28,250	41,750	57,750	75,750	121,125
Threaded Rod	Tension Resistance of Steel — Type 410 Stainless (ASTM A193, Grade B6)		N_{sa}	lb.	8,580	15,620	24,860	36,740	50,820	66,660	106,590
Threaded Rod	Tension Resistance of Steel — Type 304 and 316 Stainless (ASTM A193, Grade B8 and B8M)		N_{sa}	lb.	4,445	8,095	12,880	19,040	26,335	34,540	55,235
Threaded Rod	Strength Reduction Factor — Steel Failure		ϕ	—	0.75[7]						
Concrete Breakout Strength in Tension (2,500 psi ≤ f'_c ≤ 8,000 psi)[12]											
Effectiveness Factor — Uncracked Concrete			k_{uncr}	—	24						
Effectiveness Factor — Cracked Concrete			k_{cr}	—	17						
Strength Reduction Factor — Breakout Failure			ϕ	—	0.65[9]						
Bond Strength in Tension (2,500 psi ≤ f'_c ≤ 8,000 psi)[12]											
Uncracked Concrete[2,3,4]	Characteristic Bond Strength[5,13]		$\tau_{k,uncr}$	psi	770	1,150	1,060	970	885	790	620
Uncracked Concrete[2,3,4]	Permitted Embedment Depth Range	Minimum	h_{ef}	in.	2⅜	2¾	3⅛	3½	3¾	4	5
Uncracked Concrete[2,3,4]	Permitted Embedment Depth Range	Maximum	h_{ef}	in.	7½	10	12½	15	17½	20	25
Cracked Concrete[2,3,4]	Characteristic Bond Strength[5,10,11,13]		$\tau_{k,cr}$	psi	595	510	435	385	355	345	345
Cracked Concrete[2,3,4]	Permitted Embedment Depth Range	Minimum	h_{ef}	in.	3	4	5	6	7	8	10
Cracked Concrete[2,3,4]	Permitted Embedment Depth Range	Maximum	h_{ef}	in.	7½	10	12½	15	17½	20	25
Bond Strength in Tension — Bond Strength Reduction Factors for Continuous Special Inspection											
Strength Reduction Factor — Dry Concrete			$\phi_{dry,ci}$	—	0.65[8]						
Strength Reduction Factor — Water-Saturated Concrete — $h_{ef} \le 12d_a$			$\phi_{sat,ci}$	—	0.55[8]		0.45[8]				
Additional Factor for Water-Saturated Concrete — $h_{ef} \le 12d_a$			$K_{sat,ci}$[6]	—	1					0.84	
Strength Reduction Factor — Water-Saturated Concrete — $h_{ef} > 12d_a$			$\phi_{sat,ci}$	—	0.45[8]						
Additional Factor for Water-Saturated Concrete — $h_{ef} > 12d_a$			$k_{sat,ci}$[6]	—	0.57						
Bond Strength in Tension — Bond Strength Reduction Factors for Periodic Special Inspection											
Strength Reduction Factor — Dry Concrete			$\phi_{dry,pi}$	—	0.55[8]						
Strength Reduction Factor — Water-Saturated Concrete — $h_{ef} \le 12d_a$			$\phi_{sat,pi}$	—	0.45[8]						
Additional Factor for Water-Saturated Concrete — $h_{ef} \le 12d_a$			$K_{sat,pi}$[6]	—	1		0.93			0.71	
Strength Reduction Factor — Water-Saturated Concrete — $h_{ef} > 12d_a$			$\phi_{sat,pi}$	—	0.45[8]						
Additional Factor for Water-Saturated Concrete — $h_{ef} > 12d_a$			$K_{sat,pi}$[6]	—	0.48						

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 or ACI 318-11.
2. Temperature Range: Maximum short-term temperature of 150°F. Maximum long-term temperature of 110°F.
3. Short-term concrete temperatures are those that occur over short intervals (diurnal cycling).
4. Long-term concrete temperatures are constant temperatures over a significant time period.
5. For anchors that only resist wind or seismic loads, bond strengths may be increased by 72%.
6. In water-saturated concrete, multiply $\tau_{k,uncr}$ and $\tau_{k,cr}$ by K_{sat}.
7. The value of ϕ applies when the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of ϕ.
8. The value of ϕ applies when both the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3 or ACI 318-11 D.4.4 (c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of ϕ.
9. The value of ϕ applies when both the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3 or ACI 318-11 D.4.4 (c) for Condition B are met. If the load combinations of ACI 318-11 Section 9.2 are used and the requirements of ACI 318-11 D.4.4 (c) for Condition A are met, refer to ACI 318-11 D.4.4 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to ACI 318-11 D.4.5 to determine the appropriate value of ϕ.
10. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, the bond strength values for ⅞" anchors must be multiplied by $\alpha_{N,seis}$ = 0.80.
11. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, the bond strength values for 1" anchors must be multiplied by $\alpha_{N,seis}$ = 0.92.
12. The values of f'_c used for calculation purposes must not exceed 8,000 psi (55.1 MPa) for uncracked concrete. The value of f'_c used for calculation purposes must not exceed 2,500 psi (17.2 MPa) for tension resistance in cracked concrete.

* See p. 12 for an explanation of the load table icons.

SET-XP® Design Information — Concrete

SET-XP Tension Strength Design Data for Rebar[1]

Characteristic			Symbol	Units	Rebar Size #3	#4	#5	#6	#7	#8	#10
Steel Strength in Tension											
Rebar	Minimum Tensile Stress Area		A_{se}	in²	0.11	0.2	0.31	0.44	0.6	0.79	1.23
Rebar	Tension Resistance of Steel — Rebar (ASTM A615 Grade 60)		N_{sa}	lb.	9,900	18,000	27,900	39,600	54,000	71,100	110,700
Rebar	Strength Reduction Factor — Steel Failure		ϕ	—	0.65[7]						
Concrete Breakout Strength in Tension (2,500 psi ≤ f'_c ≤ 8,000 psi)[10]											
Effectiveness Factor — Uncracked Concrete			k_{uncr}	—	24						
Effectiveness Factor — Cracked Concrete			k_{cr}	—	17						
Strength Reduction Factor — Breakout Failure			ϕ	—	0.65[9]						
Bond Strength in Tension (2,500 psi ≤ f'_c ≤ 8,000 psi)[10]											
Uncracked Concrete[2,3,4]	Characteristic Bond Strength[5,11]		$\tau_{k,uncr}$	psi	895	870	845	820	795	770	720
Uncracked Concrete[2,3,4]	Permitted Embedment Depth Range	Minimum	h_{ef}	in.	2⅜	2¾	3⅛	3½	3¾	4	5
Uncracked Concrete[2,3,4]	Permitted Embedment Depth Range	Maximum	h_{ef}	in.	7½	10	12½	15	17½	20	25
Cracked Concrete[2,3,4]	Characteristic Bond Strength[5,11]		$\tau_{k,cr}$	psi	365	735	660	590	515	440	275
Cracked Concrete[2,3,4]	Permitted Embedment Depth Range	Minimum	h_{ef}	in.	3	4	5	6	7	8	10
Cracked Concrete[2,3,4]	Permitted Embedment Depth Range	Maximum	h_{ef}	in.	7½	10	12½	15	17½	20	25
Bond Strength in Tension — Bond Strength Reduction Factors for Continuous Special Inspection											
Strength Reduction Factor — Dry Concrete			$\phi_{dry,ci}$	—	0.65[8]						
Strength Reduction Factor — Water-Saturated Concrete – $h_{ef} \le 12d_a$			$\phi_{sat,ci}$	—	0.55[8]		0.45[8]				
Additional Factor for Water-Saturated Concrete – $h_{ef} \le 12d_a$			$K_{sat,ci}$[6]	—	1					0.84	
Strength Reduction Factor — Water-Saturated Concrete – $h_{ef} > 12d_a$			$\phi_{sat,ci}$	—	0.45[8]						
Additional Factor for Water-Saturated Concrete – $h_{ef} > 12d_a$			$K_{sat,ci}$[6]	—	0.57						
Bond Strength in Tension — Bond Strength Reduction Factors for Periodic Special Inspection											
Strength Reduction Factor — Dry Concrete			$\phi_{dry,pi}$	—	0.55[8]						
Strength Reduction Factor — Water-Saturated Concrete – $h_{ef} \le 12d_a$			$\phi_{sat,pi}$	—	0.45[8]						
Additional Factor for Water-Saturated Concrete – $h_{ef} \le 12d_a$			$K_{sat,pi}$[6]	—	1		0.93			0.71	
Strength Reduction Factor — Water-Saturated Concrete – $h_{ef} > 12d_a$			$\phi_{sat,pi}$	—	0.45[8]						
Additional Factor for Water-Saturated Concrete – $h_{ef} > 12d_a$			$K_{sat,pi}$[6]	—	0.48						

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 or ACI 318-11.
2. Temperature Range: Maximum short-term temperature of 150°F. Maximum long-term temperature of 110°F.
3. Short-term concrete temperatures are those that occur over short intervals (diurnal cycling).
4. Long-term concrete temperatures are constant temperatures over a significant time period.
5. For anchors that only resist wind or seismic loads, bond strengths may be increased by 72%.
6. In water-saturated concrete, multiply $\tau_{k,uncr}$ and $\tau_{k,cr}$ by K_{sat}.
7. The value of ϕ applies when the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of ϕ.
8. The value of ϕ applies when both the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3 or ACI 318-11 D.4.4 (c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of ϕ.
9. The value of ϕ applies when both the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3 or ACI 318-11 D.4.4 (c) for Condition B are met. If the load combinations of ACI 318-11 Section 9.2 are used and the requirements of ACI 318-11 D.4.4 (c) for Condition A are met, refer to ACI 318-11 D.4.4 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to ACI 318-11 D.4.5 to determine the appropriate value of ϕ.
10. The values of f'_c used for calculation purposes must not exceed 8,000 psi (55.1 MPa) for uncracked concrete. The value of f'_c used for calculation purposes must not exceed 2,500 psi (17.2 MPa) for tension resistance in cracked concrete.

* See p. 12 for an explanation of the load table icons.

SET-XP® Design Information — Concrete

SET-XP Shear Strength Design Data for Threaded Rod[1]

IBC *

Characteristic		Symbol	Units	Nominal Anchor Diameter (in.)						
				3/8	1/2	5/8	3/4	7/8	1	1 1/4
Steel Strength in Shear										
Threaded Rod	Minimum Shear Stress Area	A_{se}	in.^{2}	0.078	0.142	0.226	0.334	0.462	0.606	0.969
	Shear Resistance of Steel — ASTM F1554, Grade 36	V_{sa}	lb.	2,260	4,940	7,865	11,625	16,080	21,090	33,720
	Shear Resistance of Steel — ASTM A193, Grade B7			4,875	10,650	16,950	25,050	34,650	45,450	72,675
	Shear Resistance of Steel — Type 410 Stainless (ASTM A193, Grade B6)			4,290	9,370	14,910	22,040	30,490	40,000	63,955
	Shear Resistance of Steel — Type 304 and 316 Stainless (ASTM A193, Grade B8 & B8M)			2,225	4,855	7,730	11,420	15,800	20,725	33,140
	Reduction for Seismic Shear — ASTM F1554, Grade 36	$\alpha_{V,seis}$[5]	—	0.87	0.78	0.68				0.65
	Reduction for Seismic Shear — ASTM A193, Grade B7			0.87	0.78	0.68				0.65
	Reduction for Seismic Shear — Stainless (ASTM A193, Grade B6)			0.69	0.82	0.75			0.83	0.72
	Reduction for Seismic Shear — Stainless (ASTM A193, Grade B8 & B8M)			0.69	0.82	0.75			0.83	0.72
	Strength Reduction Factor — Steel Failure	ϕ	—	0.65[2]						
Concrete Breakout Strength in Shear										
Outside Diameter of Anchor		d_o	in.	0.375	0.5	0.625	0.75	0.875	1	1.25
Load Bearing Length of Anchor in Shear		ℓ_e	in.	Min. of h_{ef} and 8 times anchor diameter						
Strength Reduction Factor — Breakout Failure		ϕ	—	0.70[3]						
Concrete Pryout Strength in Shear										
Coefficient for Pryout Strength		k_{cp}	—	1.0 for h_{ef} < 2.50"; 2.0 for h_{ef} ≥ 2.50"						
Strength Reduction Factor — Pryout Failure		ϕ	—	0.70[4]						

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 and ACI 318-11.
2. The value of ϕ applies when the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of ϕ.
3. The value of ϕ applies when both the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3 or ACI 318-11 D.4.3 (c) for Condition B are met. If the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3 or ACI 318-11 D.4.3 (c) for Condition A are met, refer to ACI 318-11 D.4.3 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of ϕ.
4. The value of ϕ applies when both the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 5.3 or ACI 318-11 D.4.3 (c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of ϕ.
5. The values of V_{sa} are applicable for both cracked concrete and uncracked concrete. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, V_{sa} must be multiplied by $\alpha_{V,seis}$ for the corresponding anchor steel type.

* See p. 12 for an explanation of the load table icons.

SET-XP® Design Information — Concrete

SET-XP Shear Strength Design Data for Rebar[1]

IBC *

Characteristic		Symbol	Units	Rebar Size						
				#3	#4	#5	#6	#7	#8	#10
Steel Strength in Shear										
Rebar	Minimum Shear Stress Area	A_{se}	in²	0.11	0.2	0.31	0.44	0.6	0.79	1.23
	Shear Resistance of Steel — Rebar (ASTM A615 Grade 60)	V_{sa}	lb.	4,950	10,800	16,740	23,760	32,400	42,660	66,420
	Reduction for Seismic Shear — Rebar (ASTM A615 Grade 60)	$\alpha_{V,seis}$[5]	—	0.85	0.88	0.84		0.77		0.59
	Strength Reduction Factor — Steel Failure	ϕ	—	0.60[2]						
Concrete Breakout Strength in Shear										
Outside Diameter of Anchor		d_o	in.	0.375	0.5	0.625	0.75	0.875	1	1.25
Load-Bearing Length of Anchor in Shear		ℓ_e	in.	Min. of h_{ef} and 8 times anchor diameter						
Strength Reduction Factor — Breakout Failure		ϕ	—	0.70[3]						
Concrete Pryout Strength in Shear										
Coefficient for Pryout Strength		k_{cp}	—	1.0 for h_{ef} < 2.50"; 2.0 for $h_{ef} \geq$ 2.50"						
Strength Reduction Factor — Pryout Failure		ϕ	—	0.70[4]						

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 or ACI 318-11.
2. The value of ϕ applies when the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of ϕ.
3. The value of ϕ applies when both the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3 or ACI 318-11 D.4.3 (c) for Condition B are met. If the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3 or ACI 318-11 D.4.3 (c) for Condition A are met, refer to ACI 318-11 D.4.3 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of ϕ.
4. The value of ϕ applies when both the load combinations of ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 5.3 or ACI 318-11 D.4.3 (c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of ϕ.
5. The values of V_{sa} are applicable for both cracked concrete and uncracked concrete. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, V_{sa} must be multiplied by $\alpha_{V,seis}$.

For additional load tables, visit **strongtie.com/setxp**.

* See p. 12 for an explanation of the load table icons.

SET-XP® Design Information — Concrete

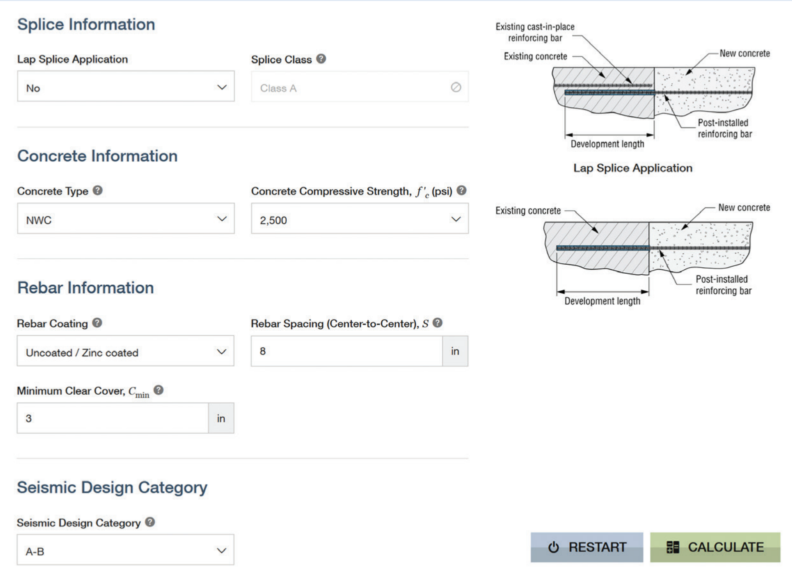
SET-XP Development Length for Rebar Dowels

Rebar Size	Drill Bit Diameter (in.)	Clear Cover in. (mm)	Development Length, in. (mm)				
			f'_c = 2,500 psi (17.2 MPa) Concrete	f'_c = 3,000 psi (20.7 MPa) Concrete	f'_c = 4,000 psi (27.6 MPa) Concrete	f'_c = 6,000 psi (41.4 MPa) Concrete	f'_c = 8,000 psi (55.2 MPa) Concrete
#3 (9.5)	½	1½ (38)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)
#4 (12.7)	⅝	1½ (38)	14.4 (366)	14 (356)	12 (305)	12 (305)	12 (305)
#5 (15.9)	¾	1½ (38)	18 (457)	17 (432)	14.2 (361)	12 (305)	12 (305)
#6 (19.1)	⅞	1½ (38)	21.6 (549)	20 (508)	17.1 (434)	14 (356)	13 (330)
#7 (22.2)	1	3 (76)	31.5 (800)	29 (737)	25 (635)	21 (533)	18 (457)
#8 (25.4)	1⅛	3 (76)	36 (914)	33 (838)	28.5 (724)	24 (610)	21 (533)
#9 (28.7)	1⅜	3 (76)	40.5 (1,029)	38 (965)	32 (813)	27 (686)	23 (584)
#10 (32.3)	1⅜	3 (76)	45 (1,143)	42 (1,067)	35.6 (904)	30 (762)	26 (660)
#11 (35.8)	1¾	3 (76)	51 (1,295)	47 (1,194)	41 (1,041)	33 (838)	29 (737)

1. Tabulated development lengths are for static, wind and seismic load cases in Seismic Design Category A and B. Development lengths in SDC C through F must comply with ACI 318-14 Chapter 18 or ACI 318-11 Chapter 12, as applicable. The value of f'_c used to calculate development lengths shall not exceed 2,500 psi in SDC C through F.
2. Rebar is assumed to be ASTM A615 Grade 60 or A706 (f_y = 60,000 psi). For rebar with a higher yield strength, multiply tabulated values by f_y / 60,000 psi.
3. Concrete is assumed to be normal-weight concrete. For lightweight concrete, multiply tabulated values by 1.33.
4. Tabulated values assume bottom cover of less than 12" cast below rebars (Ψ_t = 1.0).
5. Uncoated rebar must be used.
6. The value of K_{tr} is assumed to be 0. Refer to ACI 318-14 Section 25.4.2.3 or ACI 318 Section 12.2.3.

Rebar Development Length Calculator

Rebar Development Length Calculator is a web application that supports the design of post-installed rebar in concrete applications by calculating the necessary tension and compression development lengths required in accordance with ACI 318-18 / ACI 318-14.



* See p. 12 for an explanation of the load table icons.

SET-XP® Design Information — Masonry

SET-XP Allowable Tension and Shear Loads for Threaded Rod and Rebar in the Face of Fully Grouted CMU Wall Construction[1, 3, 4, 5, 6, 8, 9, 10, 11]

Diameter (in.) or Rebar Size No.	Drill Bit Diameter (in.)	Minimum Embedment[2] (in.)	Allowable Load Based on Bond Strength[7] (lb.)	
			Tension Load	Shear Load
Threaded Rod Installed in the Face of CMU Wall				
3/8	1/2	3 3/8	1,490	1,145
1/2	5/8	4 1/2	1,825	1,350
5/8	3/4	5 5/8	1,895	1,350
3/4	7/8	6 1/2	1,895	1,350
Rebar Installed in the Face of CMU Wall				
#3	1/2	3 3/8	1,395	1,460
#4	5/8	4 1/2	1,835	1,505
#5	3/4	5 5/8	2,185	1,505

1. Allowable load shall be the lesser of the bond values shown in this table and steel values, shown on p. 43.
2. Embedment depth shall be measured from the outside face of masonry wall.
3. Critical and minimum edge distance and spacing shall comply with the information on p. 38. Figure 2 on p. 38 illustrates critical and minimum edge and end distances.
4. Minimum allowable nominal width of CMU wall shall be 8". No more than one anchor shall be permitted per masonry cell.
5. Anchors shall be permitted to be installed at any location in the face of the fully grouted masonry wall construction (cell, web, bed joint), except anchors shall not be installed within 1½" of the head joint, as show in Figure 2 on p. 38.
6. Tabulated allowable load values are for anchors installed in fully grouted masonry walls.
7. Tabulated allowable loads are based on a safety factor of 5.0 .
8. Tabulated allowable load values shall be adjusted for increased base material temperatures in accordance with Figure 1 below, as applicable.
9. Threaded rod and rebar installed in fully grouted masonry walls are permitted to resist dead, live, seismic and wind loads.
10. Threaded rod shall meet or exceed the tensile strength of ASTM F1554, Grade 36 steel, which is 58,000 psi.
11. For installations exposed to severe, moderate or negligible exterior weathering conditions, as defined in Figure 1 of ASTM C62, allowable tension loads shall be multiplied by 0.80.

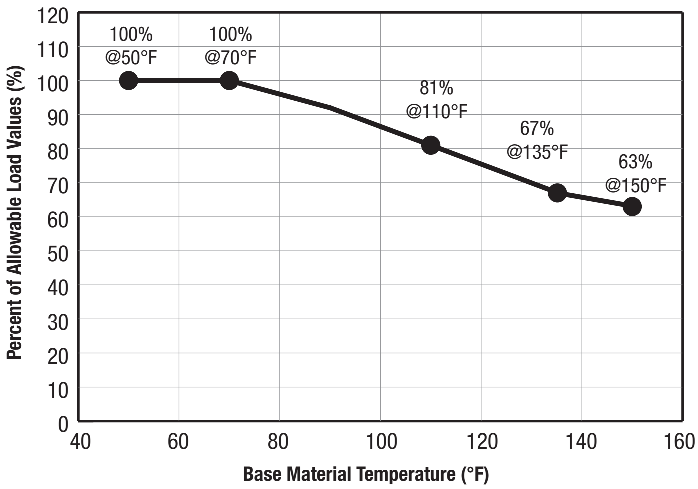


Figure 1. Load Capacity Based on In-Service Temperature for SET-XP® Epoxy Adhesive in the Face of Fully Grouted CMU Wall Construction

* See p. 12 for an explanation of the load table icons.

SET-XP® Design Information — Masonry

SET-XP Edge Distance and Spacing Requirements and Allowable Load Reduction Factors — Threaded Rod and Rebar in the Face of Fully Grouted CMU Wall Construction[7]

Rod Dia. (in.) or Rebar Size No.	Minimum Embed. Depth (in.)	Edge or End Distance[1,8]						Spacing[2,9]				
		Critical (Full Anchor Capacity)[3]		Minimum (Reduced Anchor Capacity)[4]				Critical (Full Anchor Capacity)[5]		Minimum (Reduced Anchor Capacity)[6]		
		Critical Edge or End Distance, C_{cr} (in.)	Allowable Load Reduction Factor	Minimum Edge or End Distance, C_{min} (in.)	Allowable Load Reduction Factor			Critical Spacing, S_{cr} (in.)	Allowable Load Reduction Factor	Minimum Spacing, S_{min} (in.)	Allowable Load Reduction Factor	
		Load Direction		Load Direction				Load Direction		Load Direction		
		Tension or Shear	Tension or Shear	Tension or Shear	Tension	Shear[10] Perp.	Shear[10] Para.	Tension or Shear	Tension or Shear	Tension or Shear	Tension	Shear
⅜	3⅜	12	1.00	4	0.91	0.72	0.94	8	1.00	4	1.00	1.00
½	4½	12	1.00	4	1.00	0.58	0.87	8	1.00	4	0.82	1.00
⅝	5⅝	12	1.00	4	1.00	0.48	0.87	8	1.00	4	0.82	1.00
¾	6½	12	1.00	4	1.00	0.44	0.85	8	1.00	4	0.82	1.00
#3	3⅜	12	1.00	4	0.96	0.62	0.84	8	1.00	4	0.87	0.91
#4	4½	12	1.00	4	0.88	0.54	0.82	8	1.00	4	0.87	0.91
#5	5⅝	12	1.00	4	0.88	0.43	0.82	8	1.00	4	0.87	1.00

1. Edge distance (C_{cr} or C_{min}) is the distance measured from anchor centerline to edge or end of CMU masonry wall. Refer to Figure 2 below for an illustration showing critical and minimum edge and end distances.
2. Anchor spacing (S_{cr} or S_{min}) is the distance measured from centerline to centerline of two anchors.
3. Critical edge distance, C_{cr}, is the least edge distance at which tabulated allowable load of an anchor is achieved where a load reduction factor equals 1.0 (no load reduction).
4. Minimum edge distance, C_{min}, is the least edge distance where an anchor has an allowable load capacity which shall be determined by multiplying the allowable loads assigned to anchors installed at critical edge distance, C_{cr}, by the load reduction factors shown above.
5. Critical spacing, S_{cr}, is the least anchor spacing at which tabulated allowable load of an anchor is achieved such that anchor performance is not influenced by adjacent anchors.
6. Minimum spacing, S_{min}, is the least spacing where an anchors has an allowable load capacity, which shall be determined by multiplying the allowable loads assigned to anchors installed at critical spacing distance, S_{cr}, by the load reduction factors shown above.
7. Reduction factors are cumulative. Multiple reduction factors for more than one spacing or edge or end distance shall be calculated separately and multiplied.
8. Load reduction factor for anchors loaded in tension or shear with edge distances between critical and minimum shall be obtained by linear interpolation.
9. Load reduction factor for anchors loaded in tension with spacing between critical and minimum shall be obtained by linear interpolation.
10. Perpendicular shear loads act towards the edge or end. Parallel shear loads act parallel to the edge or end (see Figure 5 on p. 40). Perpendicular and parallel shear load reduction factors are cumulative when the anchor is located between the critical minimum edge and end distance.

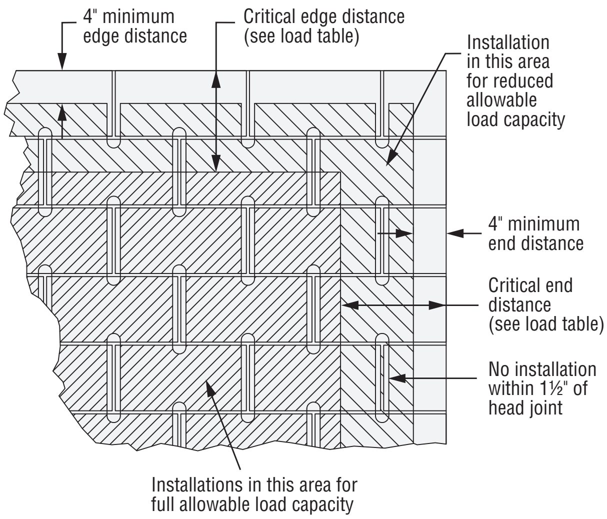


Figure 2. Allowable Anchor Locations for Full and Reduced Load Capacity When Installation Is in the Face of Fully Grouted CMU Masonry Wall Construction

* See p. 12 for an explanation of the load table icons.

SET-XP® Design Information — Masonry

SET-XP Allowable Tension and Shear Loads for Threaded Rod and Rebar in the Top of Fully Grouted CMU Wall Construction[1, 2, 4, 5, 6, 7, 9, 10, 11, 12]

IBC *

Diameter (in.) or Rebar Size No.	Drill Bit Diameter (in.)	Minimum Embedment[3] (in.)	Allowable Load Based on Bond Strength[7, 8] (lb.)		
			Tension Load	Shear Perp.	Shear Parallel
Threaded Rod Installed in the Top of CMU Wall					
½	⅝	4½	1,485	590	1,050
		12	2,440	665	1,625
⅝	¾	5⅝	1,700	565	1,435
		15	2,960	660	1,785
⅞	1	7⅞	1,610	735	1,370
		21	4,760	670	1,375
Rebar Installed in the Top of CMU Wall					
#4	⅝	4½	1,265	550	865
		12	2,715	465	1,280
#5	¾	5⅝	1,345	590	1,140
		15	3,090	590	1,285

1. Allowable load shall be the lesser of the bond values shown in this table and steel values, shown on p. 43.
2. Allowable loads are for installation in the grouted CMU core opening.
3. Embedment depth shall be measured from the horizontal surface of the grouted CMU core opening on top of the masonry wall.
4. Critical and minimum edge distance, end distance and spacing shall comply with the information on pp. 38 and 40. Figures 3A and 3B on p. 40 illustrate critical and minimum edge and end distances.
5. Minimum allowable nominal width of CMU wall shall be 8" (203 mm).
6. Anchors are permitted to be installed in the CMU core opening shown in Figures 3A and 3B on p. 40. Anchors are limited to one installation per CMU core opening.
7. Tabulated allowable load values are for anchors installed in fully grouted masonry walls.
8. Tabulated allowable loads are based on a safety factor of 5.0 .
9. Tabulated allowable load values shall be adjusted for increased base material temperatures in accordance with Figure 1 on p. 37, as applicable.
10. Threaded rod and rebar installed in fully grouted masonry walls with SET-XP® adhesive are permitted to resist dead, live, seismic and wind loads.
11. Threaded rod shall meet or exceed the tensile strength of ASTM F1554, Grade 36 steel, which is 58,000 psi.
12. For installations exposed to severe, moderate or negligible exterior weathering conditions, as defined in Figure 1 of ASTM C62, allowable tension loads shall be multiplied by 0.80.

** See p. 12 for an explanation of the load table icons.*

SET-XP® Design Information — Masonry

SET-XP Edge and End Distance Requirements and Allowable Load Reduction Factors — Threaded Rod and Rebar in the Top of Fully Grouted CMU Wall Construction[1,4,5]

IBC *

Rod Dia. (in.) or Rebar Size No.	Minimum Embed. Depth (in.)	Critical (Full Anchor Capacity)[2]			Minimum End (Reduced Anchor Capacity)[3]				Minimum Edge (Reduced Anchor Capacity)[6]			
		Critical Edge, C_{cr} (in.)	Critical End Distance, C_{cr} (in.)	Allowable Load Reduction Factor	Minimum End Distance, C_{min} (in.)	Minimum End Allowable Load Reduction Factor			Minimum Edge, C_{min} (in.)	Allowable Load Reduction Factor		
		Load Direction			Load Direction				Load Direction			
		Tension or Shear	Tension or Shear	Tension or Shear	Tension or Shear	Tension	Shear[6] Perp.	Shear[6] Parallel	Tension or Shear	Tension	Shear[6] Perp.	Shear[6] Parallel
½	4½	2¾	20	1.00	3¹³⁄₁₆	0.88	0.84	0.66	1¾	0.83	0.63	0.77
	12	2¾	20	1.00	3¹³⁄₁₆	0.64	0.91	0.34	1¾	0.95	0.55	0.69
⅝	5⅝	2¾	20	1.00	4¼	0.90	1.00	0.50	1¾	0.82	0.57	0.71
	15	2¾	20	1.00	4¼	0.38	0.85	0.29	1¾	0.91	0.72	0.73
⅞	7⅞	2¾	20	1.00	4¼	0.98	0.72	0.57	—	—	—	—
	21	2¾	20	1.00	4¼	0.63	0.96	0.64	—	—	—	—
#4	4½	2¾	20	1.00	4¼	0.96	0.90	0.76	—	—	—	—
	12	2¾	20	1.00	4¼	0.58	1.00	0.46	—	—	—	—
#5	5⅝	2¾	20	1.00	4¼	1.00	0.86	0.60	—	—	—	—
	15	2¾	20	1.00	4¼	0.41	0.76	0.49	—	—	—	—

1. Edge and end distances (C_{cr} or C_{min}) are the distances measured from anchor centerline to edge or end of CMU masonry wall. Refer to Figures 3A and 3B below for illustrations showing critical and minimum edge and end distances.
2. Critical edge and end distances, C_{cr}, are the least edge distances at which tabulated allowable load of an anchor is achieved where a load reduction factor equals 1.0 (no load reduction).
3. Minimum edge and end distances, C_{min}, are the least edge distances where an anchor has an allowable load capacity, which shall be determined by multiplying the allowable loads assigned to anchors installed at critical edge distance, C_{cr}, by the load reduction factors shown above.
4. Reduction factors are cumulative. Multiple reduction factors for more than one spacing or edge or end distance shall be calculated separately and multiplied.
5. Load reduction factor for anchors loaded in tension or shear with edge distances between critical and minimum shall be obtained by linear interpolation.
6. Perpendicular shear loads act towards the edge or end. Parallel shear loads act parallel to the edge or end (see Figure 5 below). Perpendicular and parallel shear load reduction factors are cumulative when the anchor is located between the critical minimum edge and end distance.

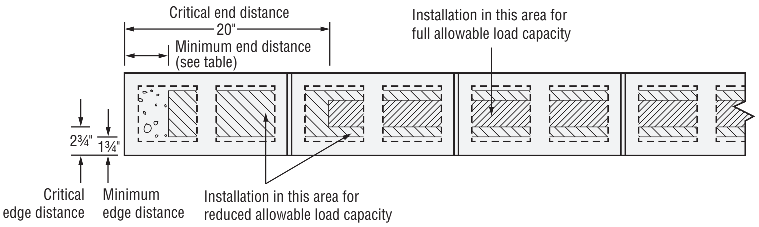


Figure 3A. Allowable Anchor Locations of ½"- and ⅝"-Diameter Threaded Rod for Full and Reduced Load Capacity When Installation Is in the Top of Fully Grouted CMU Masonry Wall Construction

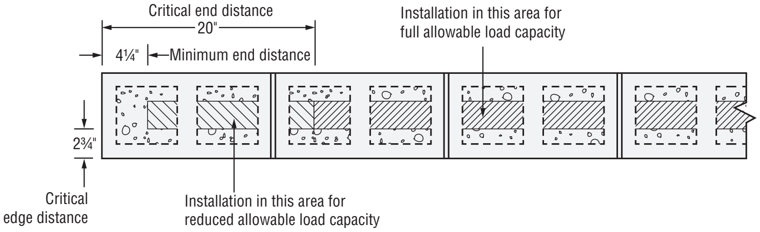
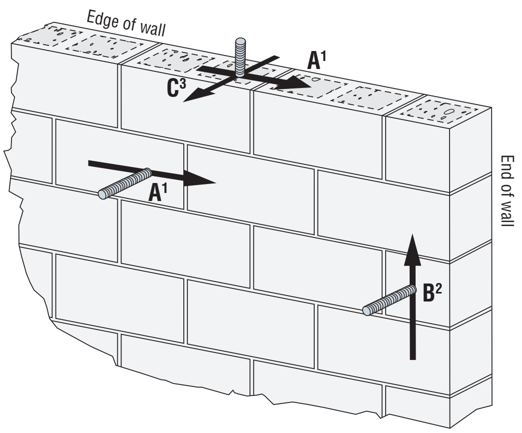


Figure 3B. Allowable Anchor Locations of ⅞"-Diameter Threaded Rod and #4 and #5 Rebar for Full and Reduced Load Capacity When Installation Is in the Top of Fully Grouted CMU Masonry Wall Construction



1. Direction of shear load A is parallel to edge of wall and perpendicular to end of wall.
2. Direction of shear load B is parallel to end of wall and perpendicular to edge of wall.
3. Direction of shear load C is perpendicular to edge of wall.

Figure 5. Direction of Shear Load in Relation to Edge and End of Wall

* See p. 12 for an explanation of the load table icons.

SET-XP® Design Information — Masonry

SET-XP Spacing Distance Requirements and Allowable Load Reduction Factors — Threaded Rod and Rebar in the Top of Fully Grouted CMU Wall Construction[1,4,5]

Rod Dia. (in.) or Rebar Size No.	Minimum Embed. Depth (in.)	Critical Spacing (Full Anchor Capacity)[2]		Minimum Spacing (Reduced Anchor Capacity)[3]		
		Critical Spacing, S_{cr} (in.)	Allowable Load Reduction Factor	Minimum Spacing, S_{cr} (in.)	Allowable Load Reduction Factor	
		Load Direction		Load Direction		
		Tension or Shear	Tension or Shear	Tension or Shear	Tension	Shear
½	4½	18	1.00	8	0.80	0.92
	12	48	1.00	8	0.63	0.98
⅝	5⅝	22.5	1.00	8	0.86	1.00
	15	60	1.00	8	0.56	1.00
⅞	7⅞	31.5	1.00	8	0.84	0.82
	21	84	1.00	8	0.51	0.98
#4	4½	18	1.00	8	0.97	0.93
	12	48	1.00	8	0.75	1.00
#5	5⅝	22.5	1.00	8	1.00	1.00
	15	60	1.00	8	0.82	1.00

1. Anchor spacing (S_{cr} or S_{min}) is the distance measured from centerline to centerline of two anchors.
2. Critical spacing, S_{cr}, is the least anchor spacing at which tabulated allowable load of an anchor is achieved such that anchor perofrmance is not influenced by adjacent anchors.
3. Minimum spacing, S_{min}, is the least spacing where an anchor has an allowable load capacity, which shall be determined by multiplying the allowable loads assigned to anchors installed at critical spacing distance, S_{cr}, by the load reduction factors shown above.
4. Reduction factors are cumulative. Multiple reduction factors for more than one spacing or edge or end distance shall be calculated separately and multiplied.
5. Load reduction factor for anchors loaded in tension or shear with spacing critical and minimum shall be obtained by linear interpolation.

SET-XP Allowable Tension and Shear Loads — Threaded Rod in the Face of Hollow CMU Wall Construction[1,3,4,5,6,8,9,10,11]

Diameter (in.)	Drill Bit Diameter (in.)	Minimum Embed.[2] (in.)	Allowable Load Based on Bond Strength[7] (lb.)	
			Tension	Shear
⅜	9⁄16	1¼	215	385
½	¾	1¼	220	410
⅝	⅞	1¼	225	435

1. Allowable load shall be the lesser of bond values shown in this table and steel values shown on p. 43.
2. Embedment depth is considered the minimum wall thickness of 8" x 8" x 16" ASTM C90 concrete masonry blocks, and is measured from the outside to the inside face of the block wall. The minimum length Opti-Mesh plastic screen tube for use in hollow CMU is 3½".
3. Critical and minimum edge distance and spacing shall comply with the information provided on p. 42. Figure 4 on p. 42 illustrates critical and minimum edge and end distances.
4. Anchors are permitted to be installed in the face shell of hollow masonry wall construction as shown in Figure 4.
5. Anchors are limited to one or two anchors per masonry cell and must comply with the spacing and edge distance requirements provided.
6. Tabulated load values are for anchors installed in hollow masonry walls.
7. Tabulated allowable loads are based on a safety factor of 5.0.
8. Tabulated allowable load values shall be adjusted for increased base material temperatures in accordance with Figure 1 on p. 37, as applicable.
9. Threaded rods installed in hollow masonry walls with SET-XP® adhesive are permitted to resist dead, live load and wind load applications.
10. Threaded rods must meet or exceed the tensile strength of ASTM F1554, Grade 36, which is 58,000 psi.
11. For installations exposed to severe, moderate or negligible exterior weathering conditions, as defined in Figure 1 of ASTM C62, allowable tension loads must be multiplied by 0.80.
12. Screen tubes are required and available on p. 71.

See p. 12 for an explanation of the load table icons.

SET-XP® Design Information — Masonry

SET-XP Edge, End and Spacing Distance Requirements and Allowable Load Reduction Factors — Threaded Rod in the Face of Hollow CMU Wall Construction[7]

IBC *

Rod Diameter (in.)	Edge or End Distance[1,8]					Spacing[2,9]				
	Critical (Full Anchor Capacity)[3]		Minimum (Reduced Anchor Capacity)[4]			Critical (Full Anchor Capacity)[5]		Minimum (Reduced Anchor Capacity)[6]		
	Critical Edge or End Distance, C_{cr} (in.)	Allowable Load Reduction Factor	Minimum Edge or End Distance, C_{min} (in.)	Allowable Load Reduction Factor		Critical Spacing, S_{cr} (in.)	Allowable Load Reduction Factor	Minimum Spacing, S_{min} (in.)	Allowable Load Reduction Factor	
	Load Direction		Load Direction			Load Direction		Load Direction		
	Tension or Shear	Tension or Shear	Tension or Shear	Tension	Shear[10]	Tension or Shear	Tension or Shear	Tension or Shear	Tension	Shear
⅜	12	1.00	4	1.00	0.74	8	1.00	4	0.82	0.73
½	12	1.00	4	0.96	0.69	8	1.00	4	0.79	0.73
⅝	12	1.00	4	0.96	0.55	8	1.00	4	0.75	0.73

1. Edge and end distances (C_{cr} or C_{min}) are the distances measured from anchor centerline to edge or end of CMU masonry wall. Refer to Figure 4 below for an illustration showing critical and minimum edge and end distances.
2. Anchor spacing (S_{cr} or S_{min}) is the distance measured from centerline to centerline of two anchors.
3. Critical edge and end distances, C_{cr}, are the least edge distances at which tabulated allowable load of an anchor is achieved where a load reduction factor equals 1.0 (no load reduction).
4. Minimum edge and end distances, C_{min}, are the least edge distances where an anchor has an allowable load capacity which shall be determined by multiplying the allowable loads assigned to anchors installed at critical edge distance, C_{cr}, by the load reduction factors shown above.
5. Critical spacing, S_{cr}, is the least anchor spacing at which tabulated allowable load of an anchor is achieved such that anchor performance is not influenced by adjacent anchors.
6. Minimum spacing, S_{min}, is the least spacing where an anchors has an allowable load capacity, which shall be determined by multiplying the allowable loads assigned to anchors installed at critical spacing distance, S_{cr}, by the load reduction factors shown above.
7. Reduction factors are cumulative. Multiple reduction factors for more than one spacing or edge or end distance shall be calculated separately and multiplied.
8. Load reduction factor for anchors loaded in tension or shear with edge distances between critical and minimum shall be obtained by linear interpolation.
9. Load reduction factor for anchors loaded in tension with spacing between critical and minimum shall be obtained by linear interpolation.
10. Perpendicular shear loads act toward the edge or end. Parallel shear loads act parallel to the edge or end (see Figure 5 on p. 40). Perpendicular and parallel shear load reduction factors are cumulative when the anchor is located between the critical minimum edge and end distance.
11. Screen tubes are required and available on p. 71.

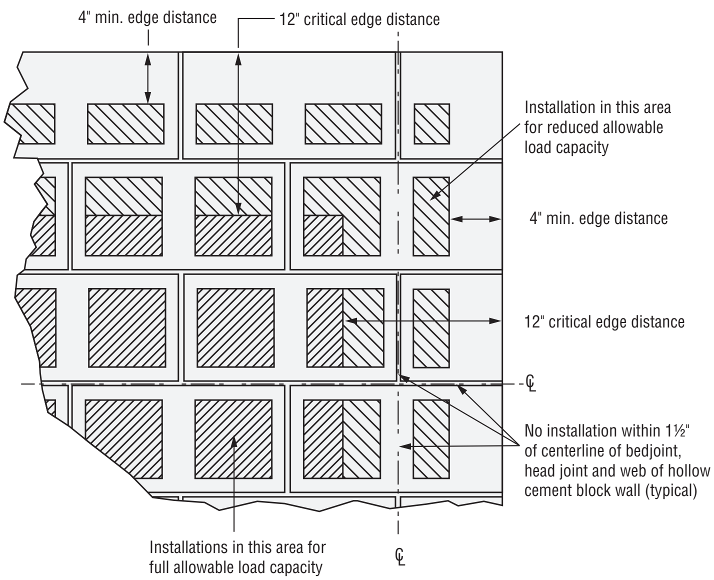


Figure 4. Allowable Anchor Locations for Full and Reduced Load Capacity When Installation Is in the Face of Hollow CMU Masonry Wall Construction

* See p. 12 for an explanation of the load table icons.

SET-XP® Design Information — Steel

SET-XP Allowable Tension and Shear Loads — Threaded Rod Based on Steel Strength[1]

Threaded Rod Diameter (in.)	Tensile Stress Area (in.²)	Tension Load Based on Steel Strength[2] (lb.)				Shear Load Based on Steel Strength[3] (lb.)			
				Stainless Steel				Stainless Steel	
		ASTM F1554 Grade 36[4]	ASTM A193 Grade B7[6]	ASTM A193 Grade B6[5]	ASTM A193 Grades B8 and B8M[7]	ASTM F1554 Grade 36[4]	ASTM A193 Grade B7[6]	ASTM A193 Grade B6[5]	ASTM A193 Grades B8 and B8M[7]
⅜	0.078	1,495	3,220	2,830	1,930	770	1,660	1,460	995
½	0.142	2,720	5,860	5,155	3,515	1,400	3,020	2,655	1,810
⅝	0.226	4,325	9,325	8,205	5,595	2,230	4,805	4,225	2,880
¾	0.334	6,395	13,780	12,125	8,265	3,295	7,100	6,245	4,260
⅞	0.462	8,845	19,055	16,770	11,435	4,555	9,815	8,640	5,890

1. Allowable load shall be the lesser of bond values given on pp. 43, 43 or 43 and steel values in the table above.
2. Allowable Tension Steel Strength is based on the following equation: $F_t = 0.33 \times F_u \times$ Tensile Stress Area.
3. Allowable Shear Steel Strength is based on the following equation: $F_v = 0.17 \times F_u \times$ Tensile Stress Area.
4. Minimum specified tensile strength (F_u = 58,000 psi) of ASTM F1554, Grade 36 used to calculate allowable steel strength.
5. Minimum specified tensile strength (F_u = 110,000 psi) of ASTM A193, Grade B6 used to calculate allowable steel strength.
6. Minimum specified tensile strength (F_u = 125,000 psi) of ASTM A193, Grade B7 used to calculate allowable steel strength.
7. Minimum specified tensile strength (F_u = 75,000 psi) of ASTM A193, Grades B8 and B8M used to calculate allowable steel strength.

SET-XP® Allowable Tension and Shear Loads — Deformed Reinforcing Bar Based on Steel Strength[1]

Rebar Size	Tensile Stress Area (in.²)	Tension Load (lb.)		Shear Load (lb.)	
		Based on Steel Strength		Based on Steel Strength	
		ASTM A615 Grade 40[2]	ASTM A615 Grade 60[3]	ASTM A615 Grade 40[4,5]	ASTM A615 Grade 60[4,6]
#3	0.11	2,200	2,640	1,310	1,685
#4	0.20	4,000	4,800	2,380	3,060
#5	0.31	6,200	7,440	3,690	4,745

1. Allowable load shall be the lesser of bond values given on pp. 43, 43 or 43 and steel values in the table above.
2. Allowable Tension Steel Strength is based on AC58 Section 3.3.3 (20,000 psi x tensile stress area) for Grade 40 rebar.
3. Allowable Tension Steel Strength is based on AC58 Section 3.3.3 (24,000 psi x tensile stress area) for Grade 60 rebar.
4. Allowable Shear Steel Strength is based on AC58 Section 3.3.3 ($F_v = 0.17 \times F_u \times$ Tensile Stress Area.)
5. F_u = 70,000 psi for Grade 40 rebar.
6. F_u = 90,000 psi for Grade 60 rebar.

* See p. 12 for an explanation of the load table icons.