AT *High Strength Acrylic-Tie® Anchoring Adhesive*

AT Acrylic-Tie® is a two component, high solids, 10:1 ratio acrylic-based adhesive for use as a high strength, anchor-grouting material. Formulated for use in all types of weather, AT is designed to dispense easily and cure at temperatures down to 0°F. Resin and initiator are dispensed and mixed simultaneously through the mixing nozzle. AT meets the physical requirements of ASTM C881, Type I & IV, Grade 3, Classes A, B & C, except Acrylic-Tie is a non-epoxy product formulated for fast cure time.

USES:
- Threaded rod anchoring
- Rebar doweling
- Pick-proof sealant around doors, windows and fixtures

CODES: ICC-ES ER-5791* (CMU & URM); City of L.A. RR25459*; Florida FL 11506.1*; NSF/ANSI Standard 61 (11 in²/5000 gal); Multiple DOT listings. The load tables list values based upon results from the most recent testing and may not reflect those in current code reports. Where code jurisdictions apply, consult the current reports for applicable load values. *Applies to all AT products except AT10.

APPLICATION: Surfaces to receive adhesive must be clean and free of frost. The base material temperature must be 0°F or above at the time of installation. For information on installations below 0°F contact Simpson. Mixed material in nozzle can harden in 5–7 minutes. For installations in or through standing water, see page 15 for details.

INSTALLATION: See pages 31–32.

SHELF LIFE: 12 months from date of manufacture in unopened cartridge.

STORAGE CONDITIONS: For best results store between 32°F – 80°F. Partially used cartridges can be stored for a limited time by leaving nozzle in place. To re-use, attach new nozzle.

COLOR: Resin — white, initiator — black
When properly mixed, adhesive will be a uniform gray color.

CLEAN UP: Uncured material — Wipe up with cotton cloths. If desired approved, solvents such as ketones (MEK, acetone, etc.), lacquer thinner, or adhesive remover can be used. DO NOT USE SOLVENTS TO CLEAN ADHESIVE FROM SKIN. Take appropriate precautions when handling flammable solvents. Solvents may damage surfaces to which they are applied. Cured material — Chip or grind off surface.

TEST CRITERIA: Anchors installed with AT Acrylic-Tie® adhesive have been tested in accordance with ICC-ES's *Acceptance Criteria for Adhesive Anchors (AC58)* for the following:
- Seismic/wind loading
- Long-term creep at elevated-temperature
- Static loading at elevated-temperature
- Damp and water-filled holes
- Freeze-thaw conditions
- Critical and minimum edge distance and spacing

In addition, anchors installed with AT Acrylic-Tie® adhesive have been tested in accordance with ICC-ES's *Acceptance Criteria for Unreinforced Masonry Anchors (AC60) and NSF/ANSI Standard 61, Drinking Water System Components - Health Effects.*

PROPERTY	TEST METHOD	RESULTS
Consistency (77°F)	ASTM C 881	Non-sag/thixotropic paste
Heat deflection	ASTM D 648	149°F (65°C)
Bond strength (moist cure)	ASTM C 882	2,900 psi (2 days) 2,970 psi (14 days)
Water absorption	ASTM D 570	0.23% (24 hours)
Compressive yield strength	ASTM D 695	10,210 psi (7 days)
Compressive modulus	ASTM D 695	660,800 psi (7 days)
Gel time (77°F)	ASTM C 881	9 min – Thin film

CHEMICAL RESISTANCE Very good to excellent against distilled water and inorganic acids. Fair to good against organic acids and alkalis, inorganic alkalis, and many organic solvents. Poor against ketones. For more detailed information visit our website or contact Simpson Strong-Tie and request Technical Bulletin T-SAS-CHEMRES06.

The performance of this product results from its unique formulation which is proprietary to Simpson Strong-Tie. The product may also be protected by one or more of U.S. Pats. 5,643,994; 5,965,635; 6,228,207, licensed from ITW.

AT13
(AT08 similar)

AMN813

ADT813B

FAST-PAC™ (ATPAC05KT)
Includes 5 ounce coaxial cartridge, adaptor and mixing nozzle.

AT10
Includes 9.6 ounce cartridge, and mixing nozzle.

AT30
(The EMN22i is the required mixing nozzle for the AT30)

EMN22i

When the concrete temperature is at or below freezing, ensure any holes drilled in advance are free of frost or ice.

- IMPORTANT -
SEE Pages 31–32 FOR INSTALLATION INSTRUCTIONS

SUGGESTED SPECIFICATIONS: Anchoring adhesive shall be a two-component acrylic based system supplied in manufacturer's standard side-by-side or coaxial cartridge and dispensed through a static-mixing nozzle supplied by the manufacturer. Adhesive shall meet the physical requirements of ASTM C-881 for Type I and IV, Grade 3, Class A, B and C and must develop a minimum 10,210 psi compressive yield strength after 7 day cure. Adhesive must have a heat deflection temperature of a minimum 149°F (65°C). Adhesive shall be AT Acrylic-Tie® adhesive from Simpson Strong-Tie, Pleasanton, CA. Anchors shall be installed per Simpson Strong-Tie instructions for AT Acrylic-Tie® adhesive.

ACCESSORIES: See pages 87–92 for information on dispensing tools, mixing nozzles and other accessories.

AT Acrylic-Tie® Cartridge Systems

Model No.	Capacity ounces (cubic inches)	Cartridge Type	Carton Quantity	Dispensing Tool(s)	Mixing[3] Nozzle
ATPAC05KT	5 (9.0)	coaxial	12	CDT10 or Standard 10 oz. Single Tube Dispensing Tool	AMN813 (included)
AT08	8 (14.4)	side-by-side	10	ADT813B	AMN813 (included)
AT10	9.6 (17.33)	single	12	CDT10 or Standard 10 oz. Single Tube Dispensing Tool	AMN813 (included)
AT13	13 (23.5)	side-by-side	10	ADT813B	AMN813 (included)
AT30	30 (54.2)	side-by-side	5	ADT30, ADT30P, or ADT30CKT	EMN22i (sold separately)

1. Cartridge estimation guides are available on pages 83–86.
2. Detailed information on dispensing tools, mixing nozzles and other adhesive accessories is available on pages 87–92.
3. Use only appropriate Simpson Strong-Tie® mixing nozzle in accordance with Simpson Strong-Tie instructions. Modification or improper use of mixing nozzle may impair AT Acrylic-Tie® adhesive performance.

Cure Schedule

Base Material Temperature °F	Base Material Temperature °C	Cure Time
0	-18	24 hrs.
25	-4	8 hrs.
40	4	4 hrs.
60	16	1 hr.
70	21	30 min.
100	38	20 min.

In-Service Temperature Sensitivity

Base Material Temperature °F	Base Material Temperature °C	Percent Allowable Load for T_{inst} = 0°F	Percent Allowable Load for $T_{inst} \geq 70$°F
0	-18	100%	100%
32	0	100%	100%
70	21	100%	100%
110	43	100%	100%
135	57	74%	100%
150	66	38%	88%
180	82	22%	60%

1. Refer to in-service temperature sensitivity chart for allowable bond strength reduction for in-service temperature. See page 15 for more information.
2. T_{inst} is the base material temperature during installation and curing of the adhesive.
3. Percent allowable load for T_{inst} = 0°F is to be used for T_{inst} between 0°F and 70°F.
4. Percent allowable load may be linearly interpolated for intermediate base material in-service temperatures.
5. °C = (°F-32) / 1.8

Tension Loads for Threaded Rod Anchors in Normal-Weight Concrete (continued on next page)

*See page 10 for an explanation of the load table icons

Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing Dist. in. (mm)	Tension Load Based on Bond Strength f'c ≥ 2000 psi (13.8 MPa) Concrete: Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Tension Load Based on Steel Strength: A307 (SAE 1018) Allowable lbs. (kN)	A193 GR B7 (SAE 4140) Allowable lbs. (kN)	F593 (A304SS) Allowable lbs. (kN)
⅜ (9.5)	7⁄16	**1¾** (44)	**2⅝** (67)	**7** (178)	**3,362** (15.0)	**99** (0.4)	**840** (3.7)	**2,105** (9.4)	**4,535** (20.2)	**3,630** (16.1)
		3½ (89)	**5¼** (133)	**6⅛** (156)	**8,937** (39.8)	**314** (1.4)	**2,235** (9.9)			
		4½ (114)	**6¾** (171)	**18** (457)	**10,411** (46.3)	**525** (2.3)	**2,605** (11.6)			
½ (12.7)	9⁄16	**2⅛** (54)	**3³⁄₁₆** (81)	**8½** (216)	**5,252** (23.4)	**501** (2.2)	**1,315** (5.8)	**3,750** (16.7)	**8,080** (35.9)	**6,470** (28.8)
		4¼ (108)	**6⅜** (162)	**7½** (191)	**16,668** (74.1)	**822** (3.7)	**4,165** (18.5)			
		6 (152)	**9** (229)	**24** (610)	**19,182** (85.3)	**331** (1.5)	**4,795** (21.3)			
⅝ (15.9)	11⁄16	**2½** (64)	**3¾** (95)	**10** (254)	**8,495** (37.8)	**561** (2.5)	**2,125** (9.5)	**5,875** (26.1)	**12,660** (56.3)	**10,120** (45.0)
		4 (102)	**5⅝** (143)	**16** (406)	•	•	**4,315** (19.2)			
		5½ (140)	**7½** (191)	**9⅝** (244)	**26,025** (115.8)	**1,866** (8.3)	**6,505** (28.9)			
		7⁷⁄₁₆ (189)	**10⅞** (276)	**29¾** (756)	•	•	**7,215** (32.1)			
		9⅜ (238)	**14⅛** (359)	**37½** (953)	**31,683** (140.9)	**1,571** (7.0)	**7,920** (35.2)			

See Notes on Next Page

¾" – 1¼" Diameters on next page

Tension Loads for Threaded Rod Anchors in Normal-Weight Concrete (continued from previous page)

*See page 10 for an explanation of the load table icons

Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing Dist. in. (mm)	Tension Load Based on Bond Strength			Tension Load Based on Steel Strength		
					f'c ≥ 2000 psi (13.8 MPa) Concrete			A307 (SAE 1018)	A193 GR B7 (SAE 4140)	F593 (A304SS)
					Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
¾ (19.1)	13⁄16	3⅜ (86)	5 1⁄16 (129)	13½ (343)	12,991 (57.8)	725 (3.2)	3,250 (14.5)	8,460 (37.6)	18,230 (81.1)	12,400 (55.2)
		5 1⁄16 (129)	7⅝ (194)	20¼ (514)	•	•	6,330 (28.2)			
		6¾ (171)	10⅛ (257)	11⅞ (302)	37,616 (167.3)	1,817 (8.1)	9,405 (41.8)			
		9 (229)	13½ (343)	36 (914)	•	•	10,000 (44.5)			
		11¼ (286)	16⅞ (429)	45 (1143)	42,381 (188.5)	683 (3.0)	10,595 (47.1)			
⅞ (22.2)	1	3⅞ (98)	5 13⁄16 (148)	15½ (394)	14,206 (63.2)	457 (2.0)	3,550 (15.8)	11,500 (51.2)	24,785 (110.2)	16,860 (75.0)
		5 13⁄16 (148)	8¾ (222)	23¼ (591)	•	•	7,130 (31.7)			
		7¾ (197)	11⅝ (295)	13⅝ (346)	42,848 (190.6)	3,155 (14.0)	10,710 (47.6)			
		10 7⁄16 (265)	15⅝ (397)	41¾ (1060)	•	•	12,250 (54.5)			
		13⅛ (333)	19⅝ (498)	52½ (1334)	55,148 (245.3)	5,673 (25.2)	13,785 (61.3)			
1 (25.4)	1 1⁄16	4½ (114)	6¾ (171)	18 (457)	20,797 (92.5)	1,763 (7.8)	5,200 (23.1)	15,025 (66.8)	32,380 (144.0)	22,020 (97.9)
		6¾ (171)	10⅛ (257)	27 (686)	•	•	10,165 (45.2)			
		9 (229)	13½ (343)	15¾ (400)	60,504 (269.1)	2,065 (9.2)	15,125 (67.3)			
		12 (305)	18 (457)	48 (1219)	•	•	17,880 (79.5)			
		15 (381)	22½ (572)	60 (1524)	82,529 (367.1)	5,146 (22.9)	20,630 (91.8)			
1⅛ (28.6)	1 3⁄16	5⅛ (130)	7¾ (197)	20½ (521)	26,600 (118.3)	•	6,650 (29.6)	19,025 (84.6)	41,000 (182.4)	27,880 (124.0)
		7⅝ (194)	11½ (292)	30½ (775)	•	•	11,780 (52.4)			
		10⅛ (257)	15¼ (387)	17¾ (451)	67,600 (300.7)	•	16,900 (75.2)			
		13½ (343)	20¼ (514)	54 (1372)	•	•	21,385 (95.1)			
		16⅞ (429)	25⅜ (645)	67½ (1715)	103,460 (460.2)	•	25,865 (115.1)			
1¼ (31.8)	1 5⁄16	5⅝ (143)	8 7⁄16 (214)	22½ (572)	32,368 (144.0)	2,054 (9.1)	8,090 (36.0)	23,490 (104.5)	50,620 (225.2)	34,420 (153.1)
		8 7⁄16 (214)	12¾ (324)	33¾ (857)	•	•	13,090 (58.2)			
		11¼ (286)	16⅞ (429)	19¾ (502)	72,363 (321.9)	7,457 (33.2)	18,090 (80.5)			
		15 (381)	22½ (572)	60 (1524)	•	•	24,860 (110.6)			
		18¾ (476)	28⅛ (714)	75 (1905)	126,500 (562.7)	15,813 (70.3)	31,625 (140.7)			

1. Reference page 15 for oversize holes.
2. Allowable load must be the lesser of the bond or steel strength.
3. The allowable loads listed under allowable bond are based on a safety factor of 4.0.
4. Allowable loads may be increased by 33⅓ percent for short-term loading due to wind or seismic forces where permitted by code.
5. Refer to allowable load-adjustment factors for spacing and edge distance on pages 77, 79 and 80.
6. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
7. Anchors are permitted to be used within fire-resistive construction, provided the anchors resist wind or seismic loads only. For use in fire-resistive construction, the anchors can also be permitted to be used to resist gravity loads, provided special consideration has been given to fire-exposure conditions.
8. Anchors are not permitted to resist tension forces in overhead or wall installations unless proper consideration is given to fire-exposure and elevated-temperature conditions.

Shear Loads for Threaded Rod Anchors in Normal-Weight Concrete

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*See page 10 for an explanation of the load table icons

Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing Dist. in. (mm)	Shear Load Based on Concrete Edge Distance			Shear Load Based on Steel Strength		
					f'c ≥ 2000 psi (13.8 MPa) Concrete			A307 (SAE 1018)	A193 GR B7 (SAE 4140)	F593 (A304SS)
					Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
⅜ (9.5)	7⁄16	1¾ (44)	5¼ (133)	2⅝ (67)	4,869 (21.7)	369 (1.6)	1,215 (5.4)	1,085 (4.8)	2,340 (10.4)	1,870 (8.3)
		3½ (89)		5¼ (133)	5,540 (24.6)	620 (2.8)	1,385 (6.2)			
		4½ (114)		5¼ (133)	•	•	1,385 (6.2)			
½ (12.7)	9⁄16	2⅛ (54)	6⅜ (162)	3¼ (83)	8,318 (37.0)	643 (2.9)	2,080 (9.3)	1,930 (8.6)	4,160 (18.5)	3,330 (14.8)
		4¼ (108)		6⅜ (162)	9,998 (44.5)	522 (2.3)	2,500 (11.1)			
		6 (152)		6⅜ (162)	•	•	2,500 (11.1)			
⅝ (15.9)	11⁄16	2½ (64)	7½ (191)	3¾ (95)	14,806 (65.9)	728 (3.2)	3,700 (16.5)	3,025 (13.5)	6,520 (29.0)	5,220 (23.2)
		5½ (140)		8¼ (210)	15,692 (69.8)	305 (1.4)	3,925 (17.5)			
		9⅜ (238)		8¼ (210)	•	•	3,925 (17.5)			
¾ (19.1)	13⁄16	3⅜ (86)	10⅛ (257)	5⅛ (130)	20,350 (90.5)	•	5,090 (22.6)	4,360 (19.4)	9,390 (41.8)	6,385 (28.4)
		6¾ (171)		10⅛ (257)	20,350 (90.5)	1,521 (6.8)	5,090 (22.6)			
		11¼ (286)		10⅛ (257)	•	•	5,090 (22.6)			
⅞ (22.2)	1	3⅞ (98)	11⅝ (295)	5⅞ (149)	27,475 (122.2)	1,655 (7.4)	6,870 (30.6)	5,925 (26.4)	12,770 (56.8)	8,685 (38.6)
		7¾ (197)		11⅝ (295)	30,876 (137.3)	1,714 (7.6)	7,720 (34.3)			
		13⅛ (333)		11⅝ (295)	•	•	7,720 (34.3)			
1 (25.4)	1⅟16	4½ (114)	13½ (343)	6¾ (171)	32,687 (145.4)	2,287 (10.2)	8,170 (36.3)	7,740 (34.4)	16,680 (74.2)	11,345 (50.5)
		9 (229)		13½ (343)	33,858 (150.6)	2,035 (9.1)	8,465 (37.7)			
		15 (381)		13½ (343)	•	•	8,465 (37.7)			
1⅛ (28.6)	1³⁄16	5⅛ (130)	15¼ (387)	7¾ (197)	41,536 (184.8)	•	10,385 (46.2)	9,800 (43.6)	21,125 (94.0)	14,365 (63.9)
		10⅛ (257)		15¼ (387)	49,812 (221.6)	•	12,455 (55.4)			
		16⅞ (429)		15¼ (387)	•	•	12,455 (55.4)			
1¼ (31.8)	1⁵⁄16	5⅝ (143)	16⅞ (429)	8½ (216)	50,385 (224.1)	1,090 (4.8)	12,595 (56.0)	12,100 (53.8)	26,075 (116.0)	17,730 (78.9)
		11¼ (286)		16⅞ (429)	65,765 (292.5)	4,636 (20.6)	16,440 (73.1)			
		18¾ (476)		16⅞ (429)	•	•	16,440 (73.1)			

1. Allowable load must be the lesser of the load based on concrete edge distance or steel strength.
2. The allowable loads based on concrete edge distance are based on a safety factor of 4.0.
3. Allowable loads may be increased by 33⅓ percent for short-term loading due to wind or seismic forces where permitted by code.
4. Refer to allowable load-adjustment factors for spacing and edge distance on pages 78 and 80.
5. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
6. Anchors are permitted to be used within fire-resistive construction, provided the anchors resist wind or seismic loads only. For use in fire-resistive construction, the anchors can also be permitted to be used to resist gravity loads, provided special consideration has been given to fire-exposure conditions.

Tension Loads for Rebar Dowels in Normal-Weight Concrete

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Rebar Size No. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing Dist. in. (mm)	Tension Load Based on Bond Strength						Tension Load Based on Steel Strength
					f'c ≥ 2000 psi (13.8 MPa) Concrete			f'c ≥ 4000 psi (27.6 MPa) Concrete			ASTM A615 Grade 60 Rebar
					Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
#3 (9.5)	½	**3½** (89)	**5¼** (133)	**6⅛** (156)	**8,245** (36.7)	**849** (3.8)	**2,060** (9.2)	•	•	**2,060** (9.2)	**2,640** (11.7)
		4½ (114)	**5¼** (133)	**6⅛** (156)	•	•	**2,060** (9.2)	•	•	**2,060** (9.2)	
#4 (12.7)	9⁄16	**4¼** (108)	**6⅜** (162)	**7½** (191)	**12,743** (56.7)	**1,760** (7.8)	**3,185** (14.2)	•	•	**3,185** (14.2)	**4,800** (21.4)
		5⅞ (149)	**8⅞** (225)	**23½** (597)	•	•	**3,185** (14.2)	•	•	**3,985** (17.7)	
		7½ (191)	**11¼** (286)	**30** (762)	•	•	**3,185** (14.2)	**19,124** (85.1)	**854** (3.8)	**4,780** (21.3)	
#5 (15.9)	¾	**5½** (140)	**7½** (191)	**9⅝** (244)	**20,396** (90.7)	**1,412** (6.3)	**5,100** (22.7)	•	•	**5,100** (22.7)	**7,440** (33.1)
		7¼ (184)	**10⅞** (276)	**29** (737)	•	•	**5,100** (22.7)	•	•	**6,095** (27.1)	
		9⅜ (191)	**14⅛** (359)	**37½** (953)	•	•	**5,100** (22.7)	**28,115** (125.1)	**1,496** (6.7)	**7,030** (31.3)	
#6 (19.1)	⅞	**6¾** (171)	**10⅛** (257)	**11⅞** (302)	**31,839** (141.6)	**1,454** (6.5)	**7,960** (35.4)	•	•	**7,960** (35.4)	**10,560** (47.0)
		9 (229)	**13½** (343)	**36** (914)	•	•	**7,960** (35.4)	•	•	**8,730** (38.8)	
		11¼ (286)	**16⅞** (429)	**45** (1143)	•	•	**7,960** (35.4)	**37,992** (169.0)	**1,999** (8.9)	**9,500** (42.3)	
#7 (22.2)	1	**7¾** (197)	**11⅝** (295)	**13⅝** (346)	**35,250** (156.8)	**2,693** (12.0)	**8,815** (39.2)	•	•	**8,815** (39.2)	**14,400** (64.1)
		10½ (267)	**15¾** (400)	**42** (1067)	•	•	**8,815** (39.2)	•	•	**10,815** (48.1)	
		13⅛ (333)	**19⅝** (498)	**52½** (1334)	•	•	**8,815** (39.2)	**50,889** (226.4)	**3,717** (16.5)	**12,720** (56.6)	
#8 (25.4)	1⅛	**9** (229)	**13½** (343)	**15¾** (400)	**49,973** (222.3)	**5,023** (22.3)	**12,495** (55.6)	•	•	**12,495** (55.6)	**18,960** (84.3)
		12 (305)	**18** (457)	**48** (1219)	•	•	**12,495** (55.6)	•	•	**16,325** (72.6)	
		15 (381)	**22½** (572)	**60** (1524)	•	•	**12,495** (55.6)	**80,598** (358.5)	**2,195** (9.8)	**20,150** (89.6)	
#9 (28.6)	1¼	**16⅞** (429)	**25⅜** (645)	**67½** (1715)	•	•	•	**96,096** (427.5)	**489** (2.2)	**24,025** (106.9)	**24,000** (106.8)
#10 (31.8)	1⅜	**18¾** (476)	**28⅛** (714)	**75** (1905)	•	•	•	**124,031** (551.7)	**2,447** (10.9)	**31,010** (137.9)	**30,480** (135.6)
#11 (34.9)	1⅝	**20⅝** (524)	**31** (787)	**82½** (2096)	•	•	•	**166,059** (738.7)	**4,222** (18.8)	**41,515** (184.7)	**37,440** (166.5)

1. Oversize holes may reduce load capacity.
2. Allowable load must be the lesser of the bond or steel strength.
3. The allowable loads listed under allowable bond are based on a safety factor of 4.0.
4. Allowable loads may be increased by 33⅓ percent for short-term loading due to wind or seismic forces where permitted by code.
5. Refer to allowable load-adjustment factors for spacing and edge distance on pages 77, 79 and 80.
6. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
7. Anchors are permitted to be used within fire-resistive construction, provided the anchors resist wind or seismic loads only. For use in fire-resistive construction, the anchors can also be permitted to be used to resist gravity loads, provided special consideration has been given to fire-exposure conditions.
8. Anchors are not permitted to resist tension forces in overhead or wall installations unless proper consideration is given to fire-exposure and elevated-temperature conditions.

*See page 10 for an explanation of the load table icons

Shear Loads for Rebar Dowels in Normal-Weight Concrete

*See page 10 for an explanation of the load table icons

Rebar Size No. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing Dist. in. (mm)	Shear Load Based on Concrete Edge Distance			Shear Load Based on Steel Strength
					f'c ≥ 2000 psi (13.8 MPa) Concrete			ASTM A615 Grade 60 Rebar
					Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
#3 (9.5)	½	**3½** (89)	**6** (152)	**5¼** (133)	**8,294** (36.9)	**515** (2.3)	**2,075** (9.2)	**1,680** (7.5)
		4½ (114)			•	•	**2,075** (9.2)	
#4 (12.7)	9⁄16	**4¼** (108)	**8** (203)	**6⅜** (162)	**11,012** (49.0)	**383** (1.7)	**2,755** (12.3)	**3,060** (13.6)
		7½ (191)			•	•	**2,755** (12.3)	
#5 (15.9)	¾	**5½** (140)	**10** (254)	**8¼** (210)	**15,758** (70.1)	**1,154** (5.1)	**3,940** (17.5)	**4,740** (21.1)
		9⅜ (238)			•	•	**3,940** (17.5)	
#6 (19.1)	⅞	**6¾** (171)	**12** (305)	**10⅛** (257)	**23,314** (103.7)	**1,494** (6.6)	**5,830** (25.9)	**6,730** (29.9)
		11¼ (286)			•	•	**5,830** (25.9)	
#7 (22.2)	1	**7¾** (197)	**14** (356)	**11⅝** (295)	**32,662** (145.3)	**5,588** (24.9)	**8,165** (36.3)	**9,180** (40.8)
		13⅛ (333)			•	•	**8,165** (36.3)	
#8 (25.4)	1⅛	**9** (229)	**16** (406)	**13½** (343)	**33,428** (148.7)	**2,319** (10.3)	**8,360** (37.2)	**12,085** (53.8)
		15 (381)			•	•	**8,360** (37.2)	

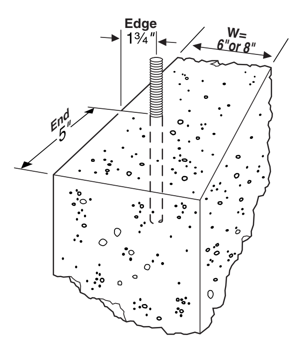
1. Allowable load must be the lesser of the load based on concrete edge distance or steel strength.
2. The allowable loads based on concrete edge distance are based on a safety factor of 4.0.
3. Allowable loads may be increased by 33⅓ percent for short-term loading due to wind or seismic forces where permitted by code.
4. Refer to allowable load-adjustment factors for spacing and edge distance on pages 78 and 80.
5. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
6. Anchors are permitted to be used within fire-resistive construction, provided the anchors resist wind or seismic loads only. For use in fire-resistive construction, the anchors can also be permitted to be used to resist gravity loads, provided special consideration has been given to fire-exposure conditions.

Tension Loads for Threaded Rod Anchors in Normal-Weight Concrete Stemwall

*

Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Stemwall Width in. (mm)	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	Tension Load Based on Bond Strength		Tension Load Based on Steel Strength
						f'c ≥ 2500 psi (17.2 MPa) Concrete		A307 (SAE 1018)
						Ultimate lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
⅝ (15.9)	**11⁄16**	**10** (254.0)	**6** (152.4)	**1¾** (44.5)	**5** (127.0)	**12,913** (57.4)	**3,230** (14.4)	**5,875** (26.1)
⅞ (22.2)	**1**	**15** (381.0)	**8** (203.2)	**1¾** (44.5)	**5** (127.0)	**21,838** (97.1)	**5,460** (24.3)	**11,500** (51.2)

1. Allowable load must be the lesser of the bond or steel strength.
2. The allowable loads listed under allowable bond are based on a safety factor of 4.0.
3. Allowable loads may be increased by 33⅓ percent for short-term loading due to wind or seismic forces where permitted by code.
4. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
5. Anchors are permitted to be used within fire-resistive construction, provided the anchors resist wind or seismic loads only. For use in fire-resistive construction, the anchors can also be permitted to be used to resist gravity loads, provided special consideration has been given to fire-exposure conditions.



Edge and end distances for threaded rod in concrete foundation stemwall corner installation

Tension Loads for Threaded Rod Anchors in Sand-Lightweight Concrete

*See page 10 for an explanation of the load table icons

Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing Dist. in. (mm)	Tension Load Based on Bond Strength			Tension Load Based on Steel Strength		
					f'c ≥ 3000 psi (20.7 MPa) Lightweight Concrete			A307 (SAE 1018)	A193 GR B7 (SAE 4140)	F593 (A304SS)
					Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
3/8 (9.5)	7/16	1¾ (44)	2⅝ (67)	3½ (89)	2,842 (12.6)	226 (1.0)	710 (3.2)	2,105 (9.4)	4,535 (20.2)	3,630 (16.1)
		3½ (89)	5¼ (133)	7 (178)	5,132 (22.8)	762 (3.4)	1,280 (5.7)			
1/2 (12.7)	9/16	2⅛ (54)	3⅛ (79)	4¼ (108)	4,415 (19.6)	454 (2.0)	1,100 (4.9)	3,750 (16.7)	8,080 (35.9)	6,470 (28.8)
		4¼ (108)	6⅜ (162)	8½ (216)	6,709 (29.8)	1,002 (4.5)	1,675 (7.5)			
5/8 (15.9)	11/16	2½ (64)	3¾ (95)	5 (127)	5,568 (24.8)	498 (2.2)	1,390 (6.2)	5,875 (26.1)	12,660 (56.3)	10,120 (45.0)
		5 (127)	7½ (191)	10 (254)	6,298 (28.0)	1,155 (5.1)	1,575 (7.0)			

1. Oversize holes may reduce load capacity.
2. Allowable load must be the lesser of the bond or steel strength.
3. The allowable loads listed under allowable bond are based on a safety factor of 4.0.
4. Allowable loads must be decreased by 8 percent for short-term loading due to wind or seismic forces.
5. 100% of the allowable load is permitted at critical spacing. No reduction in spacing is allowed.
6. Refer to allowable load-adjustment factors for edge distance on page 81.
7. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
8. Anchors are permitted to be used within fire-resistive construction, provided the anchors resist wind or seismic loads only. For use in fire-resistive construction, the anchors can also be permitted to be used to resist gravity loads, provided special consideration has been given to fire-exposure conditions.
9. Anchors are not permitted to resist tension forces in overhead or wall installations unless proper consideration is given to fire-exposure and elevated-temperature conditions.

Shear Loads for Threaded Rod Anchors in Sand-Lightweight Concrete

*See page 10 for an explanation of the load table icons

Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing Dist. in. (mm)	Shear Load Based on Concrete Edge Distance			Shear Load Based on Steel Strength		
					f'c ≥ 3000 psi (20.7 MPa) Lightweight Concrete			A307 (SAE 1018)	A193 GR B7 (SAE 4140)	F593 (A304SS)
					Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
3/8 (9.5)	7/16	1¾ (44)	2⅝ (67)	3½ (89)	3,042 (13.5)	249 (1.1)	760 (3.4)	1,085 (4.8)	2,340 (10.4)	1,870 (8.3)
		3½ (89)	5¼ (133)	7 (178)	5,320 (23.7)	187 (0.8)	1,330 (5.9)			
1/2 (12.7)	9/16	2⅛ (54)	3⅛ (79)	4¼ (108)	4,076 (18.1)	458 (2.0)	1,020 (4.5)	1,930 (8.6)	4,160 (18.5)	3,330 (14.8)
		4¼ (108)	6⅜ (162)	8½ (216)	9,838 (43.8)	625 (2.8)	2,460 (10.9)			
5/8 (15.9)	11/16	2½ (64)	3¾ (95)	5 (127)	5,360 (23.8)	351 (1.6)	1,340 (6.0)	3,025 (13.5)	6,520 (29.0)	5,220 (23.2)
		5 (127)	7½ (191)	10 (254)	12,430 (55.3)	518 (2.3)	3,105 (13.8)			

1. Allowable load must be the lesser of the load based on concrete edge distance or steel strength.
2. The allowable loads based on concrete edge distance are based on a safety factor of 4.0.
3. Allowable loads may be increased by 29 percent for short-term loading due to wind or seismic forces where permitted by code.
4. 100% of the allowable load is permitted at critical spacing. No reduction in spacing is allowed.
5. Refer to allowable load-adjustment factors for edge distance on page 81.
6. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
7. Anchors are permitted to be used within fire-resistive construction, provided the anchors resist wind or seismic loads only. For use in fire-resistive construction, the anchors can also be permitted to be used to resist gravity loads, provided special consideration has been given to fire-exposure conditions.

Tension and Shear Loads for Threaded Rod Anchors in 6 and 8-Inch Normal-Weight Grout-Filled CMU

Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	Min. Spacing Dist. in. (mm)	6-Inch Grout-Filled CMU Allowable Loads Based on CMU Strength		8-Inch Grout-Filled CMU Allowable Loads Based on CMU Strength	
						Tension	Shear	Tension	Shear
						Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
Anchor Installed in Face Shell (See Figure 1)									
½ (12.7)	9⁄16	4¼ (108)	12 (305)	12 (305)	17 (432)	770 (3.4)	1,325 (5.9)	770 (3.4)	1,325 (5.9)
¾ (19.1)	13⁄16	6¾ (171)	12 (305)	4 (102)	27 (686)	•	•	1,375 (6.1)	•
				12 (305)	27 (686)	•	•	•	2,670 (11.9)
Anchor Installed in Mortar "T" Joint (See Figure 2)									
¾ (19.1)	13⁄16	6¾ (171)	16 (406)	8 (203)	27 (686)	•	•	•	1,030 (4.6)

See Notes 1–7 Below

*See page 10 for an explanation of the load table icons

Tension and Shear Loads for Threaded Rod Anchors in 6 and 8-Inch Normal-Weight Grout-Filled CMU

Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	Min. Spacing Dist. in. (mm)	6 and 8-Inch Grout-Filled CMU Allowable Loads Based on CMU Strength		
						Tension	Shear Perpendicular[8]	Shear Parallel[9]
						Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
Anchor Installed in Cell Opening (Top-of-Wall) (See Figure 3)								
½ (12.7)	9⁄16	4¼ (108)	1¾ (44)	11 (279)	17 (432)	650 (2.9)	285 (1.3)	705 (3.1)
⅝ (15.9)	11⁄16	5 (127)	1¾ (44)	11 (279)	20 (508)	815 3.6	330 (1.5)	755 (3.4)
		12 (305)	1¾ (44)	11 (279)	48 (1219)	1,120 (5.0)	410 (1.8)	815 (3.6)
⅞ (22.2)	1	12 (305)	1¾ (44)	11 (279)	48 (1219)	1,385 (6.2)	290 (1.3)	1,030 (4.6)

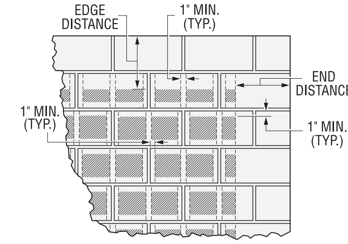
1. Threaded rods must comply with ASTM A 307 minimum.
2. Values for 6 and 8-inch wide CMU Grade N, Type II concrete masonry units conforming to UBC Standard 21-4 or ASTM C90. The masonry units, when grouted, must be fully grouted with grout complying with UBC Section 2103.4, or IBC Section 2103.12. Mortar is prepared in accordance with Section 2103.3 of the UBC and UBC Standard 21-15, or IBC Section 2103.8. The minimum specified compressive strength of masonry, f'm, at 28 days is 1,500 psi.
3. Embedment depth is measured from the outside face of the concrete masonry unit for installations through a face shell.
4. Allowable loads may not be increased for short-term loading due to wind or seismic forces.
5. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
6. The tabulated allowable loads are based on a safety factor of 5.0 for installations under the IBC and IRC. For installations under the UBC use a safety factor of 4.0 (multiply the tabulated allowable loads by 1.25).
7. Anchors must be spaced a minimum distance of four times the anchor embedment.
8. Shear load applied perpendicular to edge of CMU wall.
9. Shear load applied parallel to edge of CMU wall.

Tension and Shear Loads for Threaded Rod Anchors in Lightweight, Medium-Weight and Normal-Weight Hollow CMU

Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	6 and 8-Inch Hollow CMU Allowable Loads Based on CMU Strength			
					Tension		Shear	
					Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)
Anchor Installed in Face Shell w/Simpson Stong-Tie® Acrylic-Tie Stainless-Steel Screen Tube (See Figure 4)								
⅜ (9.5)	9⁄16	3 (76.2)	4 (101.6)	4⅝ (117.5)	1,400 (6.2)	280 (1.2)	1,326 (5.9)	265 (1.2)
½ (12.7)	11⁄16	3 (76.2)	4 (101.6)	4⅝ (117.5)	•	280 (1.2)	•	265 (1.2)
⅝ (15.9)	⅞	3 (76.2)	4 (101.6)	4⅝ (117.5)	•	280 (1.2)	•	265 (1.2)

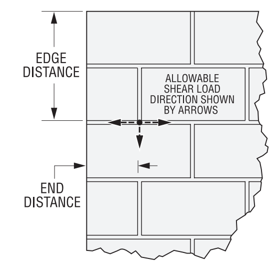
See Notes 1–7 Above
1. Set drill to rotation only mode when drilling into hollow CMU.

Figure 1



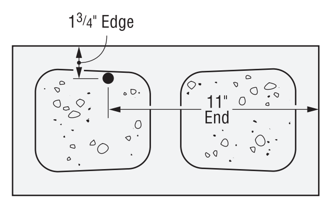
Allowable anchor placement in grouted CMU face shell

Figure 2



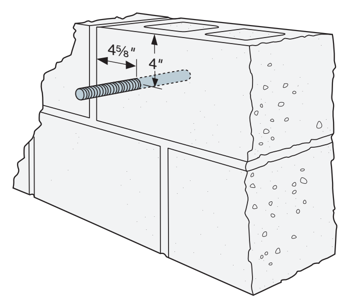
Anchor placement in grouted CMU mortar "T" joint

Figure 3



Anchor installed in cell opening (top of wall)

Figure 4



Anchor installed in face shell w/screen tube in hollow cell

Tension and Shear Loads for Installations in Unreinforced Brick Masonry Walls Minimum URM Wall Thickness is 13" (3 wythes thick) *

Rod/Rebar Dia./Size in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Min. Edge/End Dist. in. (mm)	Min. Vertical Spacing Dist. in. (mm)	Min. Horiz. Spacing Dist. in. (mm)	Tension Load Based on URM Strength	Shear Load Based on URM Strength
						Minimum Net Mortar Strength = 50 psi	Minimum Net Mortar Strength = 50 psi
						Allowable lbs. (kN)	Allowable lbs. (kN)
Configuration A (Simpson Strong-Tie® ATS or ATSP Screen Tube Required)							
¾ (19.1)	**1**	**8** (203)	**24** (610)	**18** (457)	**18** (457)	•	**1,000** (4.4)
#5 (15.9)	**1**	**8** (203)	**24** (610)	**18** (457)	**18** (457)	•	**750** (3.3)
#6 (19.1)	**1**	**8** (203)	**24** (610)	**18** (457)	**18** (457)	•	**1,000** (4.4)
Configuration B (Simpson Strong-Tie ATS or ATSP Screen Tube Required)							
¾ (19.1)	**1**	**13** (330)	**16** (406)	**18** (457)	**24** (610)	**1,200** (5.3)	**1,000** (4.4)
Configuration C (Simpson Strong-Tie ATS Screen Tube and AST Steel Sleeve Required)							
⅝ (15.9)	**1**	**	**24** (610)	**18** (457)	**18** (457)	**1,200** (5.3)	**750** (3.3)

1. Threaded rods must comply with ASTM A 307 minimum.
2. All holes are drilled with a 1" diameter carbide-tipped drill bit with the drill set in the rotation-only mode.
3. The unreinforced brick walls must have a minimum thickness of 13 inches (three wythes of brick).
4. The allowable load is applicable only where in-place shear tests indicate minimum net mortar strength of 50 psi.
5. The allowable load for Configuration B and C anchors subjected to a combined tension and shear load is determined by assuming a straight-line relationship between allowable tension and shear.
6. The anchors installed in unreinforced brick walls are limited to resisting seismic or wind forces only.
7. Configuration A has a straight threaded rod or rebar embedded 8 inches into the wall with a ³¹⁄₃₂" diameter by 8-inch long screen tube (part # ATS758 or ATS758P). This configuration is designed to resist shear loads only.
8. Configuration B has a ¾" threaded rod bent and installed at a 22.5-degree angle and installed 13 inches into the wall, to within 1-inch (maximum) of the exterior wall surface. This configuration is designed to resist tension and shear loads. The pre-bent threaded rod is installed with a ³¹⁄₃₂" diameter by 13-inch long screen tube (part # ATS7513 or ATS7513P).
9. Configuration C is designed to resist tension and shear forces. It consists of a ⅝" diameter, ASTM A 307 threaded rod and an 8" long steel sleeve (part # AST800) and a ³¹⁄₃₂" diameter by 8-inch long screen tube (part # ATS758). The steel sleeve has a plastic plug in one end. A 6" by 6" by ⅜" thick ASTM A 36 steel plate is located on the back face of the wall.
10. Special inspection requirements are determined by local jurisdiction and must be confirmed by the local building official.
11. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.

*See page 10 for explanation of the load table icons

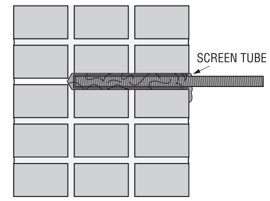
Tension and Shear Loads for Threaded Rod Anchors in Lightweight, Medium-Weight and Normal-Weight Hollow CMU *

Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing Dist. in. (mm)	8-inch Hollow CMU Allowable Loads Based on CMU Strength			
					Tension		Shear	
					Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)
Anchor Installed in Face Shell w/Simpson Strong-Tie ATSP (Plastic) Screen Tube								
⅜ (9.5)	**⁹⁄₁₆**	**3** (76.2)	**12** (305)	**8** (203)	**1,545** (6.9)	**310** (1.4)	**1,385** (6.2)	**275** (1.2)
½ (12.7)	**¾**	**3** (76.2)	**12** (305)	**8** (203)	**1,510** (6.7)	**300** (1.3)	**1,305** (5.8)	**260** (1.2)
⅝ (15.9)	**⅞**	**3** (76.2)	**12** (305)	**8** (203)	**1,590** (7.1)	**320** (1.4)	**1,345** (6.0)	**270** (1.2)

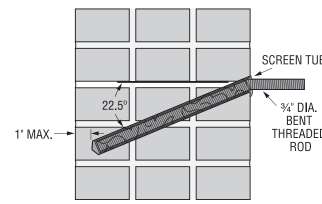
1. Threaded rods must comply with ASTM A 307 minimum.
2. The tabulated allowable loads are based on a safety factor of 5.0 for installations under the IBC and IRC. For installations under the UBC use a safety factor of 4.0 (multiply the tabulated allowable loads by 1.25).
3. Edge distances may be reduced to 4" with a corresponding 37% reduction in tension capacity. Shear capacity is unaffected.
4. Values for 8-inch wide CMU Grade N, Type II, lightweight, medium-weight and normal-weight concrete masonry units conforming to UBC Standard 21-4 or ASTM C90 with min. compressive strength of 1,900 psi and 1¼" thick face shell.
5. Mortar is prepared in accordance with UBC Section 2103.3 and UBC Standard 21-15, or IBC Section 2103.8.
6. Embedment depth is measured from the outside face of the concrete masonry unit.
7. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
8. Allowable loads may not be increased for short-term loading due to wind or seismic forces. Wall design must satisfy applicable design standards and be capable of withstanding applied loads.
9. Set drill to rotation only mode when drilling into hollow CMU.

*See page 10 for explanation of the load table icons

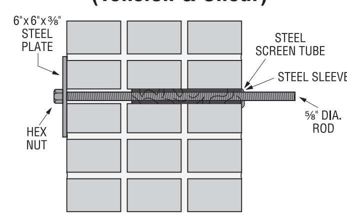
Configuration A (Shear)



Configuration B (Tension & Shear)



Configuration C (Tension & Shear)



Installation Instructions for Configuration C:
1. Drill hole perpendicular to the wall to a depth of 8" with a 1" diameter carbide-tipped drill bit (rotation only mode).
2. Clean hole with oil-free compressed air and a nylon brush.
3. Fill 8" steel screen tube with mixed adhesive and insert into hole.
4. Insert steel sleeve slowly into screen tube (adhesive will displace).
5. Allow adhesive to cure (see cure schedule).
6. Drill through plastic plug in (inside) end of steel sleeve with ⅝" bit.
7. Drill completely through the wall with ⅝" carbide tipped concrete drill bit (rotation mode only).
8. Insert ⅝" rod through hole and attach metal plate and nut.

Load Adjustment Factors for AT Acrylic-Tie® Adhesive in Normal-Weight Concrete: Edge Distance, Tension Load

How to use these charts:

1. The following tables are for reduced edge distance.
2. Locate the anchor size to be used for either a tension and/or shear load application.
3. Locate the embedment (E) at which the anchor is to be installed.
4. Locate the edge distance (C_{act}) at which the anchor is to be installed.
5. The load-adjustment factor (f_c) is the intersection of the row and column.
6. Multiply the allowable load by the applicable load-adjustment factor.
7. Reduction factors for multiple edges are multiplied together.
8. Adjustment factors do not apply to allowable steel strength values.
9. Adjustment factors are to be applied to allowable Tension Load Based on Bond Strength values only.

Edge Distance Tension (f_c)

*See page 10 for an explanation of the load table icons

Edge Dist. C_{act} (in.)	Dia.	⅜			½				⅝			¾		
	Rebar		#3			#4		#4		#5			#6	
	E	1¾	3½	4½	2⅛	4¼	6	7½	2½	5½	9⅜	3⅜	6¾	11¼
	C_{cr}	2⅝	5¼	6¾	3³⁄₁₆	6⅜	9	11¼	3¾	7½	14⅛	5¹⁄₁₆	10⅛	16⅞
	C_{min}	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾
	f_{cmin}	**0.59**	**0.59**	**0.65**	**0.50**	**0.50**	**0.65**	**0.65**	**0.50**	**0.50**	**0.61**	**0.50**	**0.50**	**0.56**
1¾		0.59	0.59	0.65	0.50	0.50	0.65	0.65	0.50	0.50	0.61	0.50	0.50	0.56
2		0.71	0.62	0.67	0.59	0.53	0.66	0.66	0.56	0.52	0.62	0.54	0.51	0.57
3		1.00	0.74	0.74	0.93	0.64	0.71	0.70	0.81	0.61	0.65	0.69	0.57	0.60
4			0.85	0.81	1.00	0.74	0.76	0.73	1.00	0.70	0.68	0.84	0.63	0.63
5			0.97	0.88		0.85	0.81	0.77		0.78	0.71	0.99	0.69	0.65
6			1.00	0.95		0.96	0.86	0.81		0.87	0.74	1.00	0.75	0.68
7				1.00		1.00	0.90	0.84		0.96	0.78		0.81	0.71
8							0.95	0.88		1.00	0.81		0.87	0.74
9							1.00	0.92			0.84		0.93	0.77
10								0.95			0.87		0.99	0.80
11								0.99			0.90		1.00	0.83
12								1.00			0.93			0.86
13											0.96			0.89
14											1.00			0.92
15														0.95
16														0.97
17														1.00

See Notes Below

Edge Distance Tension (f_c) (cont'd)

*See page 10 for an explanation of the load table icons

Edge Dist. C_{act} (in.)	Dia.	⅞			1			1⅛			1¼			
	Rebar		#7			#8				#9			#10	#11
	E	3⅞	7¾	13⅛	4½	9	15	5⅛	10⅛	16⅞	5⅝	11¼	18¾	20⅝
	C_{cr}	5¹³⁄₁₆	11⅝	19⅝	6¾	13½	22½	7¾	15¼	25⅜	8⁷⁄₁₆	16⅞	28⅛	31
	C_{min}	1¾	1¾	1¾	1¾	1¾	1¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾
	f_{cmin}	**0.49**	**0.49**	**0.52**	**0.44**	**0.44**	**0.39**	**0.47**	**0.47**	**0.43**	**0.47**	**0.47**	**0.43**	**0.43**
1¾		0.49	0.49	0.52	0.44	0.44	0.39							
2¾		0.62	0.54	0.55	0.55	0.49	0.42	0.47	0.47	0.43	0.47	0.47	0.43	0.43
4		0.77	0.61	0.58	0.69	0.55	0.46	0.60	0.52	0.46	0.59	0.52	0.46	0.46
6		1.00	0.71	0.63	0.92	0.64	0.51	0.81	0.61	0.51	0.77	0.59	0.50	0.50
8			0.81	0.69	1.00	0.74	0.57	1.00	0.69	0.56	0.96	0.67	0.55	0.54
10			0.92	0.74		0.83	0.63		0.78	0.61	1.00	0.74	0.59	0.58
12			1.00	0.80		0.93	0.69		0.86	0.66		0.82	0.64	0.62
14				0.85		1.00	0.75		0.95	0.71		0.89	0.68	0.66
16				0.90			0.81		1.00	0.76		0.97	0.73	0.70
18				0.96			0.87			0.81		1.00	0.77	0.74
20				1.00			0.93			0.86			0.82	0.78
22							0.99			0.91			0.86	0.82
24							1.00			0.97			0.91	0.86
26										1.00			0.95	0.90
28													1.00	0.94
30														0.98
32														1.00

1. E = Embedment depth (inches).
2. C_{act} = actual edge distance at which anchor is installed (inches).
3. C_{cr} = critical edge distance for 100% load (inches).
4. C_{min} = minimum edge distance for reduced load (inches).
5. f_c = adjustment factor for allowable load at actual edge distance.
6. f_{ccr} = adjustment factor for allowable load at critical edge distance. f_{ccr} is always = 1.00.
7. f_{cmin} = adjustment factor for allowable load at minimum edge distance.
8. $f_c = f_{cmin} + [(1 - f_{cmin}) (C_{act} - C_{min}) / (C_{cr} - C_{min})]$.

Load Adjustment Factors for AT Acrylic-Tie® Adhesive in Normal-Weight Concrete: Edge Distance, Shear Load

How to use these charts:

1. The following tables are for reduced edge distance.
2. Locate the anchor size to be used for either a tension and/or shear load application.
3. Locate the embedment (E) at which the anchor is to be installed.
4. Locate the edge distance (C_{act}) at which the anchor is to be installed.
5. The load-adjustment factor (f_c) is the intersection of the row and column.
6. Multiply the allowable load by the applicable load-adjustment factor.
7. Reduction factors for multiple edges are multiplied together.
8. Adjustment factors do not apply to allowable steel strength values.
9. Adjustment factors are to be applied to allowable Shear Load Based on Concrete Edge Distance values only.

Edge Distance Shear (f_c)

Edge Dist. C_{act} (in.)	Dia.	⅜					½					⅝					¾				
	Rebar				#3					#4					#5					#6	
	E	1¾	3½	4½	3½	4½	2⅛	4¼	6	4¼	7½	2½	5½	9⅜	5½	9⅜	3⅜	6¾	11¼	6¾	11¼
	C_{cr}	5¼	5¼	5¼	6	6	6⅜	6⅜	6⅜	8	8	7½	7½	7½	10	10	10⅛	10⅛	10⅛	12	12
	C_{min}	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾
	f_{cmin}	**0.40**	**0.35**	**0.39**	**0.19**	**0.39**	**0.18**	**0.15**	**0.25**	**0.16**	**0.25**	**0.12**	**0.11**	**0.14**	**0.10**	**0.14**	**0.10**	**0.11**	**0.14**	**0.10**	**0.14**
1¾		0.40	0.35	0.39	0.19	0.39	0.18	0.15	0.25	0.16	0.25	0.12	0.11	0.14	0.10	0.14	0.10	0.11	0.14	0.10	0.14
2¾		0.57	0.54	0.56	0.38	0.53	0.36	0.33	0.41	0.29	0.37	0.27	0.26	0.29	0.21	0.24	0.21	0.22	0.24	0.19	0.22
3		0.61	0.58	0.61	0.43	0.57	0.40	0.38	0.45	0.33	0.40	0.31	0.30	0.33	0.24	0.27	0.23	0.24	0.27	0.21	0.24
3½		0.70	0.68	0.70	0.52	0.64	0.49	0.47	0.53	0.40	0.46	0.39	0.38	0.40	0.29	0.32	0.29	0.30	0.32	0.25	0.29
4		0.79	0.77	0.78	0.62	0.71	0.58	0.56	0.61	0.46	0.52	0.46	0.46	0.48	0.35	0.37	0.34	0.35	0.37	0.30	0.33
4½		0.87	0.86	0.87	0.71	0.78	0.67	0.66	0.70	0.53	0.58	0.54	0.54	0.55	0.40	0.43	0.40	0.40	0.42	0.34	0.37
5		0.96	0.95	0.96	0.81	0.86	0.76	0.75	0.78	0.60	0.64	0.62	0.61	0.63	0.45	0.48	0.45	0.46	0.47	0.39	0.41
5½		1.00	1.00	1.00	0.90	0.93	0.84	0.84	0.86	0.66	0.70	0.69	0.69	0.70	0.51	0.53	0.50	0.51	0.53	0.43	0.45
6					1.00	1.00	0.93	0.93	0.94	0.73	0.76	0.77	0.77	0.78	0.56	0.58	0.56	0.56	0.58	0.47	0.50
6½							1.00	1.00	1.00	0.80	0.82	0.85	0.85	0.85	0.62	0.64	0.61	0.61	0.63	0.52	0.54
7										0.87	0.88	0.92	0.92	0.93	0.67	0.69	0.66	0.67	0.68	0.56	0.58
7½										0.93	0.94	1.00	1.00	1.00	0.73	0.74	0.72	0.72	0.73	0.60	0.62
8										1.00	1.00				0.78	0.79	0.77	0.77	0.78	0.65	0.66
8½															0.84	0.84	0.83	0.83	0.83	0.69	0.71
9															0.89	0.90	0.88	0.88	0.88	0.74	0.75
9½															0.95	0.95	0.93	0.93	0.94	0.78	0.79
10															1.00	1.00	0.99	0.99	0.99	0.82	0.83
10½																	1.00	1.00	1.00	0.87	0.87
11																				0.91	0.92
11½																				0.96	0.96
12																				1.00	1.00

See Notes Below

*See page 10 for an explanation of the load table icons

Edge Distance Shear (f_c) (cont'd)

Edge Dist. C_{act} (in.)	Dia.	⅞					1					1⅛			1¼		
	Rebar				#7					#8							
	E	3⅞	7¾	13⅛	7¾	13⅛	4½	9	15	9	15	5⅛	10⅛	16⅞	5⅝	11¼	18¾
	C_{cr}	11⅝	11⅝	11⅝	14	14	13½	13½	13½	16	16	15¼	15¼	15¼	16⅞	16⅞	16⅞
	C_{min}	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	2¾	2¾	2¾	2¾	2¾	2¾
	f_{cmin}	**0.09**	**0.08**	**0.09**	**0.09**	**0.09**	**0.08**	**0.08**	**0.09**	**0.08**	**0.09**	**0.14**	**0.12**	**0.12**	**0.14**	**0.12**	**0.12**
1¾		0.09	0.08	0.09	0.09	0.09	0.08	0.08	0.09	0.08	0.09						
2¾		0.18	0.17	0.18	0.16	0.16	0.16	0.16	0.17	0.14	0.15	0.14	0.12	0.12	0.14	0.12	0.12
3		0.21	0.20	0.21	0.18	0.18	0.18	0.18	0.19	0.16	0.17	0.16	0.14	0.14	0.16	0.14	0.14
4		0.30	0.29	0.30	0.26	0.26	0.26	0.26	0.26	0.23	0.23	0.23	0.21	0.21	0.22	0.20	0.20
5		0.39	0.38	0.39	0.33	0.33	0.33	0.33	0.34	0.29	0.30	0.29	0.28	0.28	0.28	0.26	0.26
6		0.48	0.48	0.48	0.41	0.41	0.41	0.41	0.42	0.35	0.36	0.36	0.35	0.35	0.34	0.32	0.32
7		0.57	0.57	0.57	0.48	0.48	0.49	0.49	0.50	0.42	0.43	0.43	0.42	0.42	0.40	0.38	0.38
8		0.67	0.66	0.67	0.55	0.55	0.57	0.57	0.57	0.48	0.49	0.50	0.49	0.49	0.46	0.45	0.45
9		0.76	0.76	0.76	0.63	0.63	0.65	0.65	0.65	0.55	0.55	0.57	0.56	0.56	0.52	0.51	0.51
10		0.85	0.85	0.85	0.70	0.70	0.73	0.73	0.73	0.61	0.62	0.64	0.63	0.63	0.58	0.57	0.57
11		0.94	0.94	0.94	0.78	0.78	0.80	0.80	0.81	0.68	0.68	0.71	0.70	0.70	0.64	0.63	0.63
12		1.00	1.00	1.00	0.85	0.85	0.88	0.88	0.88	0.74	0.74	0.78	0.77	0.77	0.70	0.70	0.70
13					0.93	0.93	0.96	0.96	0.96	0.81	0.81	0.85	0.84	0.84	0.76	0.76	0.76
14					1.00	1.00	1.00	1.00	1.00	0.87	0.87	0.91	0.91	0.91	0.82	0.82	0.82
15										0.94	0.94	0.98	0.98	0.98	0.89	0.88	0.88
16										1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
17															1.00	1.00	1.00

*See page 10 for an explanation of the load table icons

1. E = Embedment depth (inches).
2. C_{act} = actual edge distance at which anchor is installed (inches).
3. C_{cr} = critical edge distance for 100% load (inches).
4. C_{min} = minimum edge distance for reduced load (inches).
5. f_c = adjustment factor for allowable load at actual edge distance.
6. f_{ccr} = adjustment factor for allowable load at critical edge distance. f_{ccr} is always = 1.00.
7. f_{cmin} = adjustment factor for allowable load at minimum edge distance.
8. $f_c = f_{cmin} + [(1 - f_{cmin}) (C_{act} - C_{min}) / (C_{cr} - C_{min})]$.

SIMPSON Strong-Tie ANCHOR SYSTEMS®

Load Adjustment Factors for AT Acrylic-Tie® Adhesive in Normal-Weight Concrete: Spacing, Tension Load

How to use these charts:

1. The following tables are for reduced spacing.
2. Locate the anchor size to be used for either a tension and/or shear load application.
3. Locate the embedment (E) at which the anchor is to be installed.
4. Locate the spacing (S_{act}) at which the anchor is to be installed.
5. The load-adjustment factor (f_s) is the intersection of the row and column.
6. Multiply the allowable load by the applicable load-adjustment factor.
7. Reduction factors for multiple spacings are multiplied together.
8. Adjustment factors do not apply to allowable steel strength values.
9. Adjustment factors are to be applied to allowable Tension Load Based on Bond Strength values only.

Acrylic Adhesives

Spacing Tension (f_s)

*See page 10 for an explanation of the load table icons

S_{act} (in.)	Dia.	⅜			½				⅝			¾		
	Rebar		#3			#4		#4		#5			#6	
	E	1¾	3½	4½	2⅛	4¼	6	7½	2½	5½	9⅜	3⅜	6¾	11¼
	S_{cr}	7	6⅛	18	8½	7½	24	30	10	9⅝	37½	13½	11⅞	45
	S_{min}	⅞	1¾	2¼	1⅛	2⅛	3	3¾	1¼	2¾	4¾	1¾	3⅜	5⅝
	f_{smin}	0.57	0.58	0.80	0.57	0.58	0.80	0.80	0.57	0.58	0.80	0.57	0.58	0.80
⅞		0.57												
1		0.58												
1½		0.61			0.59				0.58					
2		0.65	0.60		0.62				0.61			0.58		
2½		0.68	0.64	0.80	0.65	0.61			0.63			0.60		
3		0.72	0.68	0.81	0.67	0.64	0.80		0.66	0.59		0.61		
3½		0.75	0.72	0.82	0.70	0.68	0.80		0.68	0.62		0.63	0.59	
4		0.79	0.76	0.82	0.73	0.71	0.81	0.80	0.71	0.65		0.65	0.61	
5		0.86	0.84	0.83	0.78	0.79	0.82	0.81	0.75	0.71	0.80	0.68	0.66	
6		0.93	0.92	0.85	0.84	0.86	0.83	0.82	0.80	0.77	0.81	0.72	0.71	0.80
7		1.00	1.00	0.86	0.89	0.93	0.84	0.82	0.85	0.83	0.81	0.75	0.76	0.81
8				0.87	0.95	1.00	0.85	0.83	0.90	0.88	0.82	0.79	0.81	0.81
9				0.89	1.00		0.86	0.84	0.95	0.94	0.82	0.82	0.85	0.82
10				0.90			0.87	0.84	1.00	1.00	0.83	0.86	0.90	0.82
12				0.92			0.89	0.86			0.84	0.93	1.00	0.83
14				0.95			0.90	0.87			0.85	1.00		0.84
16				0.97			0.92	0.89			0.86			0.85
18				1.00			0.94	0.90			0.88			0.86
20							0.96	0.92			0.89			0.87
24							1.00	0.94			0.91			0.89
28								0.97			0.93			0.91
32								1.00			0.95			0.93
36											0.98			0.95
40											1.00			0.97
45														1.00

⅞" – 1¼" Diameters on next page

1. E = Embedment depth (inches).
2. S_{act} = actual spacing distance at which anchors are installed (inches).
3. S_{cr} = critical spacing distance for 100% load (inches).
4. S_{min} = minimum spacing distance for reduced load (inches).
5. f_s = adjustment factor for allowable load at actual spacing distance.
6. f_{scr} = adjustment factor for allowable load at critical spacing distance. f_{scr} is always = 1.00.
7. f_{smin} = adjustment factor for allowable load at minimum spacing distance.
8. $f_s = f_{smin} + [(1 - f_{smin}) (S_{act} - S_{min}) / (S_{cr} - S_{min})]$.

SIMPSON Strong-Tie ANCHOR SYSTEMS®

Spacing Tension (f_s) (cont'd)

S_{act} (in.)	Dia.	⅞			1			1⅛			1¼			
	Rebar		#7			#8				#9			#10	#11
	E	3⅞	7¾	13⅛	4½	9	15	5⅛	10⅛	16⅞	5⅝	11¼	18¾	20⅝
	S_{cr}	15½	13⅝	52½	18	15¾	60	20½	17¾	67½	22½	19¾	75	82½
	S_{min}	2	3⅞	6⅝	2¼	4½	7½	2⅝	5⅛	8½	2⅞	5⅝	9⅜	10⅜
	f_{smin}	0.57	0.58	0.80	0.57	0.58	0.80	0.57	0.58	0.80	0.57	0.58	0.80	0.80
2		0.57												
3		0.60			0.59			0.58			0.57			
4		0.63	0.59		0.62			0.60			0.59			
5		0.67	0.63		0.65	0.60		0.63			0.62			
6		0.70	0.67		0.67	0.64		0.65	0.61		0.64	0.59		
8		0.76	0.76	0.81	0.73	0.71	0.80	0.70	0.68		0.68	0.65		
10		0.82	0.84	0.81	0.78	0.79	0.81	0.75	0.74	0.81	0.73	0.71	0.80	
12		0.89	0.93	0.82	0.84	0.86	0.82	0.80	0.81	0.81	0.77	0.77	0.81	0.80
14		0.95	1.00	0.83	0.89	0.93	0.82	0.84	0.88	0.82	0.81	0.83	0.81	0.81
16		1.00		0.84	0.95	1.00	0.83	0.89	0.94	0.83	0.86	0.89	0.82	0.82
20				0.86	1.00		0.85	0.99	1.00	0.84	0.95	1.00	0.83	0.83
24				0.88			0.86	1.00		0.85	1.00		0.84	0.84
28				0.89			0.88			0.87			0.86	0.85
32				0.91			0.89			0.88			0.87	0.86
36				0.93			0.91			0.89			0.88	0.87
40				0.95			0.92			0.91			0.89	0.88
50				0.99			0.96			0.94			0.92	0.91
60				1.00			1.00			0.97			0.95	0.94
70										1.00			0.98	0.97
80													1.00	0.99
83														1.00

*See page 10 for an explanation of the load table icons

See notes on previous page

Load Adjustment Factors for AT Acrylic-Tie® Adhesive in Normal-Weight Concrete: Spacing, Shear Load

How to use these charts:

1. The following tables are for reduced spacing.
2. Locate the anchor size to be used for either a tension and/or shear load application.
3. Locate the embedment (E) at which the anchor is to be installed.
4. Locate the spacing (S_{act}) at which the anchor is to be installed.
5. The load-adjustment factor (f_s) is the intersection of the row and column.
6. Multiply the allowable load by the applicable load-adjustment factor.
7. Reduction factors for multiple spacings are multiplied together.
8. Adjustment factors do not apply to allowable steel strength values.
9. Adjustment factors are to be applied to allowable Shear Load Based on Concrete Edge Distance values only.

Spacing Shear (f_s)

S_{act} (in.)	Dia.	⅜		½		⅝		¾		⅞		1		1⅛		1¼	
	Rebar		#3		#4		#5		#6		#7		#8				
	E	1¾	3½	2⅛	4¼	2½	5½	3⅜	6¾	3⅞	7¾	4½	9	5⅛	10⅛	5⅝	11¼
	S_{cr}	2⅝	5¼	3¼	6⅜	3¾	8¼	5⅛	10⅛	5⅞	11⅝	6¾	13½	7¾	15¼	8½	16⅞
	S_{min}	⅞	1¾	1⅛	2⅛	1¼	2¾	1¾	3⅜	2	3⅞	2¼	4½	2⅝	5⅛	2⅞	5⅝
	f_{smin}	0.90	0.83	0.90	0.83	0.90	0.83	0.90	0.83	0.90	0.83	0.90	0.83	0.90	0.83	0.90	0.83
⅞		0.90															
1		0.91															
1½		0.94		0.92		0.91											
2		0.96	0.84	0.94		0.93		0.91		0.90							
2½		0.99	0.87	0.96	0.85	0.95		0.92		0.91		0.91					
3		1.00	0.89	0.99	0.87	0.97	0.84	0.94		0.93		0.92		0.91		0.90	
3½			0.92	1.00	0.89	0.99	0.85	0.95	0.83	0.94		0.93		0.92		0.91	
4			0.94		0.91	1.00	0.87	0.97	0.85	0.95	0.83	0.94		0.93		0.92	
5			0.99		0.95		0.90	1.00	0.87	0.98	0.85	0.96	0.84	0.95		0.94	
6			1.00		0.99		0.93		0.90	1.00	0.88	0.98	0.86	0.97	0.84	0.96	0.84
7					1.00		0.96		0.92		0.90	1.00	0.88	0.99	0.86	0.97	0.85
8							0.99		0.95		0.92		0.90	1.00	0.88	0.99	0.87
9							1.00		0.97		0.94		0.92		0.90	1.00	0.88
10									1.00		0.96		0.93		0.91		0.90
12											1.00		0.97		0.95		0.93
14													1.00		0.98		0.96
16															1.00		0.99
17																	1.00

1. E = Embedment depth (inches).
2. S_{act} = actual spacing distance at which anchors are installed (inches).
3. S_{cr} = critical spacing distance for 100% load (inches).
4. S_{min} = minimum spacing distance for reduced load (inches).
5. f_s = adjustment factor for allowable load at actual spacing distance.
6. f_{scr} = adjustment factor for allowable load at critical spacing distance. f_{scr} is always = 1.00.
7. f_{smin} = adjustment factor for allowable load at minimum spacing distance.
8. $f_s = f_{smin} + [(1 - f_{smin}) (S_{act} - S_{min}) / (S_{cr} - S_{min})]$.

Load Adjustment Factors for AT Acrylic-Tie® Adhesive in Sand-Lightweight Concrete: Edge Distance, Tension and Shear Loads

How to use these charts:

1. The following tables are for reduced edge distance only.
2. Locate the anchor size to be used for either a tension and/or shear load application.
3. Locate the embedment (E) at which the anchor is to be installed.
4. Locate the edge distance (C_{act}) at which the anchor is to be installed.
5. The load-adjustment factor (f_c) is the intersection of the row and column.
6. Multiply the allowable load by the applicable load-adjustment factor.
7. Reduction factors for multiple edges are multiplied together.
8. Adjustment factors do not apply to allowable steel strength values.
9. Adjustment factors are to be applied to allowable Tension Load Based on Bond Strength values or allowable Shear Load Based on Concrete Edge Distance values only.

Edge Distance Tension (f_c) *

Edge Dist. C_{act} (in.)	Dia.	3/8		1/2		5/8	
	E	1¾	3½	2⅛	4¼	2½	5
	C_{cr}	2⅝	5¼	3⅛	6⅜	3¾	7½
	C_{min}	1¾	1¾	1¾	1¾	1¾	1¾
	f_{cmin}	**0.59**	**0.59**	**0.50**	**0.50**	**0.50**	**0.50**
1¾		0.59	0.59	0.50	0.50	0.50	0.50
2		0.71	0.62	0.59	0.53	0.56	0.52
2¼		0.82	0.65	0.68	0.55	0.63	0.54
2½		0.94	0.68	0.77	0.58	0.69	0.57
2¾		1.00	0.71	0.86	0.61	0.75	0.59
3			0.74	0.95	0.64	0.81	0.61
3¼			0.77	1.00	0.66	0.88	0.63
3½			0.80		0.69	0.94	0.65
3¾			0.82		0.72	1.00	0.67
4			0.85		0.74		0.70
4¼			0.88		0.77		0.72
4½			0.91		0.80		0.74
4¾			0.94		0.82		0.76
5			0.97		0.85		0.78
5¼			1.00		0.88		0.80
5½					0.91		0.83
5¾					0.93		0.85
6					0.96		0.87
6¼					0.99		0.89
6½					1.00		0.91
6¾							0.93
7							0.96
7¼							0.98
7½							1.00

Edge Distance Shear (f_c) *

Edge Dist. C_{act} (in.)	Dia.	3/8		1/2		5/8	
	E	1¾	3½	2⅛	4¼	2½	5
	C_{cr}	2⅝	5¼	3⅛	6⅜	3¾	7½
	C_{min}	1¾	1¾	1¾	1¾	1¾	1¾
	f_{cmin}	**0.40**	**0.35**	**0.18**	**0.15**	**0.12**	**0.11**
1¾		0.40	0.35	0.18	0.15	0.12	0.11
2		0.57	0.40	0.33	0.20	0.23	0.15
2¼		0.74	0.44	0.48	0.24	0.34	0.19
2½		0.91	0.49	0.63	0.29	0.45	0.23
2¾		1.00	0.54	0.78	0.33	0.56	0.26
3			0.58	0.93	0.38	0.67	0.30
3¼			0.63	1.00	0.43	0.78	0.34
3½			0.68		0.47	0.89	0.38
3¾			0.72		0.52	1.00	0.42
4			0.77		0.56		0.46
4¼			0.81		0.61		0.50
4½			0.86		0.66		0.54
4¾			0.91		0.70		0.57
5			0.95		0.75		0.61
5¼			1.00		0.79		0.65
5½					0.84		0.69
5¾					0.89		0.73
6					0.93		0.77
6¼					0.98		0.81
6½					1.00		0.85
6¾							0.88
7							0.92
7¼							0.96
7½							1.00

1. E = Embedment depth (inches).
2. C_{act} = actual edge distance at which anchor is installed (inches).
3. C_{cr} = critical edge distance for 100% load (inches).
4. C_{min} = minimum edge distance for reduced load (inches).
5. f_c = adjustment factor for allowable load at actual edge distance.
6. f_{ccr} = adjustment factor for allowable load at critical edge distance. f_{ccr} is always = 1.00.
7. f_{cmin} = adjustment factor for allowable load at minimum edge distance.
8. $f_c = f_{cmin} + [(1 - f_{cmin}) (C_{act} - C_{min}) / (C_{cr} - C_{min})]$.

*See page 10 for an explanation of the load table icons

Estimating Guide for 5 oz. Cartridge using Threaded Rod – Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD IN SOLID BASE MATERIAL HOLE DEPTH (inches)																		
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3/8	7/16	39	26	20	16	13	11	10	9	8	7	7	6	6	5	5	5	4	4	4
3/8	1/2	25	17	12	10	8	7	6	6	5	5	4	4	4	3	3	3	3	3	2
1/2	9/16	29	19	14	11	10	8	7	6	6	5	5	4	4	4	4	3	3	3	3
1/2	5/8	18	12	9	7	6	5	5	4	4	3	3	3	3	2	2	2	2	2	2
5/8	11/16	21	14	11	8	7	6	5	5	4	4	4	3	3	3	3	2	2	2	2
5/8	3/4	14	9	7	6	5	4	4	3	3	3	2	2	2	2	2	2	2	1	1
3/4	13/16	17	11	8	7	6	5	4	4	3	3	3	3	2	2	2	2	2	2	2
3/4	7/8	11	8	6	5	4	3	3	3	2	2	2	2	2	2	1	1	1	1	1
7/8	15/16	13	9	7	5	4	4	3	3	3	2	2	2	2	2	2	2	1	1	1
7/8	1	10	6	5	4	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1
1	1 1/16	11	7	6	4	4	3	3	2	2	2	2	2	2	1	1	1	1	1	1
1	1 1/8	8	5	4	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1
1 1/8	1 3/16	9	6	5	4	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1
1 1/8	1 1/4	7	5	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1
1 1/4	1 5/16	8	5	4	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1
1 1/4	1 3/8	6	4	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 5 oz. Cartridge using Rebar – Installations per Cartridge

Rebar Size (no.)	Drill Bit Dia. (in.)	REBAR IN SOLID BASE MATERIAL HOLE DEPTH (inches)																		
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3	1/2	30	20	15	12	10	8	7	7	6	5	5	5	4	4	4	3	3	3	3
4	9/16	43	29	22	17	14	12	11	10	9	8	7	7	6	6	5	5	5	5	4
4	5/8	23	15	12	9	8	7	6	5	5	4	4	4	3	3	3	3	3	2	2
5	3/4	19	12	9	7	6	5	5	4	4	3	3	3	3	2	2	2	2	2	2
6	7/8	15	10	7	6	5	4	4	3	3	3	2	2	2	2	2	2	2	2	1
7	1	13	9	6	5	4	4	3	3	3	2	2	2	2	2	2	2	1	1	1
8	1 1/8	11	7	6	4	4	3	3	2	2	2	2	2	2	1	1	1	1	1	1
9	1 1/4	10	7	5	4	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1
10	1 3/8	10	7	5	4	3	3	3	2	2	2	2	2	1	1	1	1	1	1	1
11	1 5/8	5	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 5 oz. Cartridge and Steel Screen Tubes – Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD INSERTED IN SCREEN TUBE HOLE DEPTH (inches)																		
		3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	9	10	11	12	13	14	15	16	17
3/8	9/16	11	10	9	8	7	6	6	6	5	5	4	4							
1/2	11/16	7	6	5	5	4	4	4	4	3	3	3	2							
5/8	7/8	4	3	3	3	3	2	2	2	2	2	2	1	1	1	1				
3/4	1	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 5 oz. Cartridge and Plastic Screen Tubes – Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD INSERTED IN SCREEN TUBE HOLE DEPTH (inches)																					
		3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	9	10	11	12	13	14	15	16	17	18	19	20	21
3/8	9/16	13	11	10	9	8	8	7	7	6	6	5	5										
1/2	11/16	7	6	5	5	4	4	4	3	3	3	3	2										
5/8	7/8	5	4	4	3	3	3	2	2	2	2	2	2	1	1	1							
3/4	1	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 8 oz. Cartridge using Threaded Rod – Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD IN SOLID BASE MATERIAL HOLE DEPTH (inches)																		
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3/8	7/16	63	42	32	25	21	18	16	14	13	11	11	10	9	8	8	7	7	7	6
3/8	1/2	40	27	20	16	13	11	10	9	8	7	7	6	6	5	5	5	4	4	4
1/2	9/16	46	31	23	18	15	13	11	10	9	8	8	7	7	6	6	5	5	5	5
1/2	5/8	29	19	14	12	10	8	7	6	6	5	5	4	4	4	4	3	3	3	3
5/8	11/16	34	22	17	13	11	10	8	7	7	6	6	5	5	4	4	4	4	4	3
5/8	3/4	23	15	11	9	8	6	6	5	5	4	4	3	3	3	3	3	3	2	2
3/4	13/16	27	18	13	11	9	8	7	6	5	5	4	4	4	4	3	3	3	3	3
3/4	7/8	18	12	9	7	6	5	5	4	4	3	3	3	3	2	2	2	2	2	2
7/8	15/16	21	14	11	9	7	6	5	5	4	4	4	3	3	3	3	3	2	2	2
7/8	1	15	10	8	6	5	4	4	3	3	3	3	2	2	2	2	2	2	2	2
1	1 1/16	18	12	9	7	6	5	4	4	4	3	3	3	3	2	2	2	2	2	2
1	1 1/8	13	8	6	5	4	4	3	3	3	2	2	2	2	2	2	1	1	1	1
1 1/8	1 3/16	15	10	7	6	5	4	4	3	3	3	2	2	2	2	2	2	2	2	1
1 1/8	1 1/4	11	7	5	4	4	3	3	2	2	2	2	2	2	1	1	1	1	1	1
1 1/4	1 5/16	13	9	6	5	4	4	3	3	3	2	2	2	2	2	2	2	1	1	1
1 1/4	1 3/8	10	7	5	4	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 8 oz. Cartridge using Rebar – Installations per Cartridge

Rebar Size (no.)	Drill Bit Dia. (in.)	REBAR IN SOLID BASE MATERIAL HOLE DEPTH (inches)																		
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3	1/2	47	32	24	19	16	14	12	11	9	9	8	7	7	6	6	6	5	5	5
4	9/16	70	46	35	28	23	20	17	15	14	13	12	11	10	9	9	8	8	7	7
4	5/8	37	25	18	15	12	11	9	8	7	7	6	6	5	5	5	4	4	4	4
5	3/4	30	20	15	12	10	8	7	7	6	5	5	5	4	4	4	3	3	3	3
6	7/8	24	16	12	10	8	7	6	5	5	4	4	4	3	3	3	3	3	3	2
7	1	21	14	10	8	7	6	5	5	4	4	3	3	3	3	3	2	2	2	2
8	1 1/8	18	12	9	7	6	5	4	4	4	3	3	3	3	2	2	2	2	2	2
9	1 1/4	16	11	8	6	5	5	4	4	3	3	3	2	2	2	2	2	2	2	2
10	1 3/8	16	11	8	6	5	5	4	4	3	3	3	2	2	2	2	2	2	2	2
11	1 5/8	8	5	4	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 8 oz. Cartridge and Steel Screen Tubes – Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD INSERTED IN SCREEN TUBE HOLE DEPTH (inches)																		
		3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	9	10	11	12	13	14	15	16	17
3/8	9/16	18	16	14	12	11	10	10	9	8	8	7	6							
1/2	11/16	11	10	9	8	7	7	6	6	5	5	4	4							
5/8	7/8	6	6	5	4	4	4	3	3	3	3	2	2	2	2	2				
3/4	1	5	4	4	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 8 oz. Cartridge and Plastic Screen Tubes – Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD INSERTED IN SCREEN TUBE HOLE DEPTH (inches)																					
		3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	9	10	11	12	13	14	15	16	17	18	19	20	21
3/8	9/16	18	16	14	12	11	10	10	9	8	8	7	6											
1/2	11/16	11	10	9	8	7	7	6	6	5	5	4	4											
5/8	7/8	6	6	5	4	4	4	3	3	3	3	2	2	2	2	2								
3/4	1	5	4	4	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 10oz Cartridge using Threaded Rod - Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD IN SOLID BASE MATERIAL HOLE DEPTH (inches)																		
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
⅜	7⁄16	73	49	36	29	24	21	18	16	15	13	12	11	10	10	9	9	8	8	7
⅜	½	46	31	23	18	15	13	12	10	9	8	8	7	7	6	6	5	5	5	5
½	9⁄16	53	35	27	21	18	15	13	12	11	10	9	8	8	7	7	6	6	6	5
½	⅝	33	22	17	13	11	10	8	7	7	6	6	5	5	4	4	4	4	4	3
⅝	11⁄16	39	26	19	16	13	11	10	9	8	7	6	6	6	5	5	5	4	4	4
⅝	¾	26	17	13	10	9	7	7	6	5	5	4	4	4	3	3	3	3	3	3
¾	13⁄16	31	21	16	12	10	9	8	7	6	6	5	5	4	4	4	4	3	3	3
¾	⅞	21	14	11	8	7	6	5	5	4	4	4	3	3	3	3	2	2	2	2
⅞	15⁄16	25	17	12	10	8	7	6	6	5	5	4	4	4	3	3	3	3	3	2
⅞	1	18	12	9	7	6	5	4	4	4	3	3	3	3	2	2	2	2	2	2
1	1 1⁄16	20	14	10	8	7	6	5	5	4	4	3	3	3	3	3	2	2	2	2
1	1⅛	15	10	7	6	5	4	4	3	3	3	2	2	2	2	2	2	2	2	1
1⅛	1 3⁄16	17	11	8	7	6	5	4	4	3	3	3	3	2	2	2	2	2	2	2
1⅛	1¼	13	8	6	5	4	4	3	3	3	2	2	2	2	2	2	1	1	1	1
1¼	1 5⁄16	15	10	7	6	5	4	4	3	3	3	2	2	2	2	2	2	2	2	1
1¼	1⅜	11	8	6	5	4	3	3	3	2	2	2	2	2	2	1	1	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 10oz Cartridge using Rebar - Installations per Cartridge

Rebar Size (no.)	Drill Bit Dia. (in.)	REBAR IN SOLID BASE MATERIAL HOLE DEPTH (inches)																		
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3	½	55	37	27	22	18	16	14	12	11	10	9	8	8	7	7	6	6	6	5
4	9⁄16	81	54	40	32	27	23	20	18	16	15	13	12	12	11	10	9	9	8	8
4	⅝	43	28	21	17	14	12	11	9	9	8	7	7	6	6	5	5	5	4	4
5	¾	34	23	17	14	11	10	9	8	7	6	6	5	5	5	4	4	4	4	3
6	⅞	27	18	14	11	9	8	7	6	5	5	5	4	4	4	3	3	3	3	3
7	1	24	16	12	10	8	7	6	5	5	4	4	4	3	3	3	3	3	3	2
8	1⅛	21	14	10	8	7	6	5	5	4	4	3	3	3	3	3	2	2	2	2
9	1¼	19	12	9	7	6	5	5	4	4	3	3	3	3	2	2	2	2	2	2
10	1⅜	19	12	9	7	6	5	5	4	4	3	3	3	3	2	2	2	2	2	2
11	1⅝	9	6	5	4	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 10oz Cartridge and Steel Screen Tubes - Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD INSERTED IN SCREEN TUBE HOLE DEPTH (inches)																		
		3½	4	4½	5	5½	6	6½	7	7½	8	9	10	11	12	13	14	15	16	17
⅜	9⁄16	20	18	16	14	13	12	11	10	9	9	8	7							
½	11⁄16	13	11	10	9	8	7	7	6	6	5	5	4							
⅝	⅞	7	6	5	5	4	4	3	3	3	3	2	2	2	2					
¾	1	5	4	4	3	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 10oz Cartridge and Opti-Mesh Screen Tubes - Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD INSERTED IN OPTI-MESH SCREEN TUBE HOLE DEPTH (inches)																						
		3½	4	4½	5	5½	6	6½	7	7½	8	9	10	11	12	13	14	15	16	17	18	19	20	21
⅜	9⁄16	20	17	15	14	12	11	10	10	9	8	7	7											
½	11⁄16	11	9	8	7	7	6	5	5	5	4	4	3											
⅝	⅞	7	6	5	5	4	4	4	3	3	3	2	2	2	2	2								
¾	1	5	4	4	3	3	3	3	2	2	2	2	1	2	1	1	1	1	1	1	1	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

SIMPSON Strong-Tie ANCHOR SYSTEMS

Estimating Guide for 13 oz. Cartridge using Threaded Rod – Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD IN SOLID BASE MATERIAL HOLE DEPTH (inches)																		
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
⅜	7⁄16	103	69	51	41	34	29	26	23	21	19	17	16	15	14	13	12	11	11	10
⅜	½	65	43	32	26	22	19	16	14	13	12	11	10	9	9	8	8	7	7	6
½	9⁄16	75	50	37	30	25	21	19	17	15	14	12	12	11	10	9	9	8	8	7
½	⅝	47	31	24	19	16	13	12	10	9	9	8	7	7	6	6	6	5	5	5
⅝	11⁄16	55	37	27	22	18	16	14	12	11	10	9	8	8	7	7	6	6	6	5
⅝	¾	37	25	18	15	12	11	9	8	7	7	6	6	5	5	5	4	4	4	4
¾	13⁄16	44	29	22	18	15	13	11	10	9	8	7	7	6	6	6	5	5	5	4
¾	⅞	30	20	15	12	10	8	7	7	6	5	5	5	4	4	4	3	3	3	3
⅞	15⁄16	35	23	17	14	12	10	9	8	7	6	6	5	5	5	4	4	4	4	3
⅞	1	25	17	12	10	8	7	6	6	5	5	4	4	4	3	3	3	3	3	2
1	1 1⁄16	29	19	14	12	10	8	7	6	6	5	5	4	4	4	4	3	3	3	3
1	1⅛	21	14	10	8	7	6	5	5	4	4	3	3	3	3	3	2	2	2	2
1⅛	1 3⁄16	24	16	12	10	8	7	6	5	5	4	4	4	3	3	3	3	3	3	2
1⅛	1¼	18	12	9	7	6	5	4	4	4	3	3	3	3	2	2	2	2	2	2
1¼	1 5⁄16	21	14	10	8	7	6	5	5	4	4	3	3	3	3	3	2	2	2	2
1¼	1⅜	16	11	8	6	5	5	4	4	3	3	3	2	2	2	2	2	2	2	2

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 13 oz. Cartridge using Rebar – Installations per Cartridge

Rebar Size (no.)	Drill Bit Dia. (in.)	REBAR IN SOLID BASE MATERIAL HOLE DEPTH (inches)																		
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3	½	77	52	39	31	26	22	19	17	15	14	13	12	11	10	10	9	9	8	8
4	9⁄16	114	76	57	45	38	32	28	25	23	21	19	17	16	15	14	13	13	12	11
4	⅝	60	40	30	24	20	17	15	13	12	11	10	9	9	8	8	7	7	6	6
5	¾	48	32	24	19	16	14	12	11	10	9	8	7	7	6	6	6	5	5	5
6	⅞	39	26	19	16	13	11	10	9	8	7	6	6	6	5	5	5	4	4	4
7	1	34	23	17	14	11	10	8	8	7	6	6	5	5	5	4	4	4	4	3
8	1⅛	29	19	15	12	10	8	7	6	6	5	5	4	4	4	4	3	3	3	3
9	1¼	26	17	13	10	9	7	7	6	5	5	4	4	4	3	3	3	3	3	3
10	1⅜	26	18	13	11	9	8	7	6	5	5	4	4	4	4	3	3	3	3	3
11	1⅝	13	9	7	5	4	4	3	3	3	2	2	2	2	2	2	2	1	1	1

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 13 oz. Cartridge and Steel Screen Tubes – Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD INSERTED IN SCREEN TUBE HOLE DEPTH (inches)																	
		3½	4	4½	5	5½	6	6½	7	7½	8	9	10	11	12	13	14	15	16	17
⅜	9⁄16	29	25	23	20	18	17	16	15	14	13	11	10							
½	11⁄16	18	16	14	13	12	11	10	9	9	8	7	6							
⅝	⅞	10	9	8	7	7	6	6	5	5	5	4	4	3	3	3				
¾	1	8	7	6	5	5	4	4	4	4	3	3	3	2	2	2	2	2	2	2

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 13 oz. Cartridge and Plastic Screen Tubes – Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD INSERTED IN SCREEN TUBE HOLE DEPTH (inches)																					
		3½	4	4½	5	5½	6	6½	7	7½	8	9	10	11	12	13	14	15	16	17	18	19	20	21
⅜	9⁄16	34	30	26	24	22	20	18	17	16	15	13	12											
½	11⁄16	18	15	14	12	11	10	9	9	8	8	7	6											
⅝	⅞	12	11	9	8	8	7	6	6	6	5	5	4	4	4	3								
¾	1	9	8	7	6	6	5	5	4	4	4	3	3	3	3	2	2	2	2	2	2	2	2	2

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 30 oz. Cartridge using Threaded Rod – Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD IN SOLID BASE MATERIAL HOLE DEPTH (inches)																		
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
⅜	7/16	237	158	119	95	79	68	59	53	47	43	40	37	34	32	30	28	26	25	24
⅜	½	150	100	75	60	50	43	37	33	30	27	25	23	21	20	19	18	17	16	15
½	9/16	173	115	86	69	58	49	43	38	35	31	29	27	25	23	22	20	19	18	17
½	⅝	109	73	54	44	36	31	27	24	22	20	18	17	16	15	14	13	12	11	11
⅝	11/16	127	84	63	51	42	36	32	28	25	23	21	19	18	17	16	15	14	13	13
⅝	¾	85	57	43	34	28	24	21	19	17	15	14	13	12	11	11	10	9	9	9
¾	13/16	102	68	51	41	34	29	25	23	20	18	17	16	15	14	13	12	11	11	10
¾	⅞	68	46	34	27	23	20	17	15	14	12	11	11	10	9	9	8	8	7	7
⅞	15/16	81	54	40	32	27	23	20	18	16	15	13	12	12	11	10	9	9	8	8
⅞	1	58	38	29	23	19	16	14	13	12	10	10	9	8	8	7	7	6	6	6
1	1 1/16	66	44	33	27	22	19	17	15	13	12	11	10	9	9	8	8	7	7	7
1	1⅛	47	32	24	19	16	14	12	11	9	9	8	7	7	6	6	6	5	5	5
1⅛	1 3/16	55	37	27	22	18	16	14	12	11	10	9	8	8	7	7	6	6	6	5
1⅛	1¼	41	27	20	16	14	12	10	9	8	7	7	6	6	5	5	5	5	4	4
1¼	1 5/16	48	32	24	19	16	14	12	11	10	9	8	7	7	6	6	6	5	5	5
1¼	1⅜	37	25	18	15	12	11	9	8	7	7	6	6	5	5	5	4	4	4	4

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 30 oz. Cartridge using Rebar – Installations per Cartridge

Rebar Size (no.)	Drill Bit Dia. (in.)	REBAR IN SOLID BASE MATERIAL HOLE DEPTH (inches)																		
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3	½	178	119	89	71	59	51	45	40	36	32	30	27	25	24	22	21	20	19	18
4	9/16	262	175	131	105	87	75	65	58	52	48	44	40	37	35	33	31	29	28	26
4	⅝	139	92	69	55	46	40	35	31	28	25	23	21	20	18	17	16	15	15	14
5	¾	112	74	56	45	37	32	28	25	22	20	19	17	16	15	14	13	12	12	11
6	⅞	89	60	45	36	30	26	22	20	18	16	15	14	13	12	11	11	10	9	9
7	1	78	52	39	31	26	22	19	17	16	14	13	12	11	10	10	9	9	8	8
8	1⅛	67	45	33	27	22	19	17	15	13	12	11	10	10	9	8	8	7	7	7
9	1¼	60	40	30	24	20	17	15	13	12	11	10	9	9	8	8	7	7	6	6
10	1⅜	61	40	30	24	20	17	15	13	12	11	10	9	9	8	8	7	7	6	6
11	1⅝	31	20	15	12	10	9	8	7	6	6	5	5	4	4	4	4	3	3	3

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 30 oz. Cartridge and Steel Screen Tubes – Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD INSERTED IN SCREEN TUBE HOLE DEPTH (inches)																		
		3½	4	4½	5	5½	6	6½	7	7½	8	9	10	11	12	13	14	15	16	17
⅜	9/16	67	59	52	47	43	39	36	33	31	29	26	23							
½	11/16	42	37	33	30	27	25	23	21	20	19	16	15							
⅝	⅞	24	21	19	17	15	14	13	12	11	10	9	8	8	7	6				
¾	1	18	16	14	12	11	10	10	9	8	8	7	6	6	5	5	4	4	4	4

Tables are estimations. Actual usage may vary depending on waste.

Estimating Guide for 30 oz. Cartridge and Plastic Screen Tubes – Installations per Cartridge

Rod Dia. (in.)	Drill Bit Dia. (in.)	THREADED ROD INSERTED IN SCREEN TUBE HOLE DEPTH (inches)																						
		3½	4	4½	5	5½	6	6½	7	7½	8	9	10	11	12	13	14	15	16	17	18	19	20	21
⅜	9/16	78	69	61	55	50	46	42	39	37	34	31	27											
½	11/16	41	36	32	28	26	24	22	20	19	18	16	14											
⅝	⅞	28	24	22	19	18	16	15	14	13	12	11	10	9	8	7								
¾	1	20	18	16	14	13	12	11	10	9	9	8	7	6	6	5	5	5	4	4	4	4	4	3

Tables are estimations. Actual usage may vary depending on waste.