Product Submittal/Substitution Request

TO:

PROJECT:

PROJECT LOCATION:

SPECIFIED ITEM:

Section | Page | Paragraph | Description

PRODUCT SUBMIT TAL / SUBSTITUTION REQUESTED:

DEWALT® Engineered By Powers® AC100+ Gold(R) -

The attached submittal package includes the product description, specifications, drawings, and performance data for use in the evaluation of the request.

SUBMITTED BY:

Name: Signature:

Company:

Address:

Date: Telephone: Fax:

FOR USE BY THE ARCHITECT AND/OR ENGINEER

☐ **Approved** ☐ **Approved as Noted** ☐ **Not Approved**

(If not approved, please briefly explain why the product was not accepted.)

By: Date:

Remarks:

Questions or inquiries? Contact us at engineering@powers.com, or call 1.800.524.3244

DEWALT® AC100+ Gold(R) Submittal Section:

Product Pages:

- General Information
- Design Tables
- Installation Instructions
- Ordering Information

Code Reports & Agency Listings:

- ICC–ES Approval: ESR–2582 (Cracked & Uncracked Concrete)
- ICC–ES Approval: ESR–3200 (Concrete Masonry Units)
- ICC–ES Approval: ESR–4105 (Unreinforced Masonry)
- Potable Drinking Water Certification From NSF International: NSF/ANSI–61

GENERAL INFORMATION

AC100+ GOLD®

Vinylester Injection Adhesive Anchoring System

PRODUCT DESCRIPTION

The AC100+ Gold is a two-component vinylester adhesive anchoring system. The system includes injection adhesive in plastic cartridges, mixing nozzles, dispensing tools and hole cleaning equipment. The AC100+ Gold is designed for bonding threaded rod and reinforcing bar elements into drilled holes in concrete and masonry base materials.

GENERAL APPLICATIONS AND USES

- Bonding threaded rod and reinforcing bar into hardened concrete and masonry
- Evaluated for use in dry and water-saturated concrete (including water filled holes)
- Suitable to resist loads in cracked or uncracked concrete base materials
- Fast curing system which can be installed in a wide range of base material temperatures; qualified for structural applications in concrete and masonry as low as 14ºF (-10ºC)
- Qualified for seismic (earthquake) and wind loading

FEATURES AND BENEFITS

+ Designed for use with threaded rod and reinforcing bar hardware elements
+ Consistent performance in low and high strength concrete
+ Evaluated and recognized for freeze/thaw performance (interior and exterior applications)
+ Evaluated and recognized for a range of embedments
+ Versatile low odor formula with quick cure time
+ Evaluated and recognized for long term and short term loading (see performance tables)
+ Mixing nozzles proportion adhesive and provide simple delivery method into drilled holes
+ Cartridge design allows for multiple uses using extra mixing nozzles
+ Universal product for concrete and masonry (hollow and solid base materials)

APPROVALS AND LISTINGS

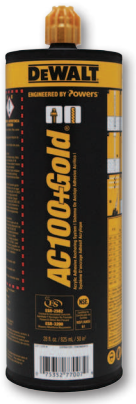
- International Code Council, Evaluation Service (ICC-ES) ESR-2582 for concrete
- International Code Council, Evaluation Service (ICC-ES) ESR-3200 for masonry
- International Code Council, Evaluation Service (ICC-ES) ESR-4105 for Unreinforced Masonry (URM)
- Code compliant with the 2018 IBC/IRC, 2015 IBC/IRC, 2012 IBC/IRC, and 2009 IBC/IRC
- Tested in accordance with ASTM E488 / ACI 355.4 and ICC-ES AC308 for use in structural concrete with ACI 318-14 Chapter 17 or ACI 318-11/08 Appendix D
- Compliant with NSF/ANSI Standard 61 for drinking water system components – health effects; meets requirements for materials in contact with potable water and water treatment
- Conforms to requirements of ASTM C 881 and AASHTO M235, Types I, II, IV and V, Grade 3, Classes A & B (meets Type III with exception of elongation)
- Department of Transportation listings – see www.DEWALT.com or contact transportation agency

GUIDE SPECIFICATIONS

CSI Divisions: 03 16 00 - Concrete Anchors, 04 05 19.16 - Masonry Anchors and 05 05 19 - Post-Installed Concrete Anchors. Adhesive anchoring system shall be AC100+ Gold as supplied by DEWALT, Towson, MD. Anchors shall be installed in accordance with published instructions and requirements of the Authority Having Jurisdiction.

TENSION ZONE CRACKED CONCRETE · SEISMIC REGION QUALIFICATION · NSF · CODE LISTED ICC-ES ESR-2582 CONCRETE · CODE LISTED ICC-ES ESR-3200 MASONRY · CODE LISTED ICC-ES ESR-4105 URM · DDA DEWALT DESIGN ASSIST

SECTION CONTENTS



AC100+ GOLD

PACKAGING

Coaxial Cartridge

- 9.5 fl. oz. (280 ml or 17.1 in³)

Dual (side-by-side Cartridge)

- 11.5 fl. oz. (345 ml or 21.0 in³)
- 28 fl. oz. (825 ml or 50.3 in³)

STORAGE LIFE & CONDITIONS

Eighteen months in a dry, dark environment with temperature ranging from 32°F and 86°F (-0°C to 30°C)

ANCHOR SIZE RANGE (TYPICAL)

- 3/8" to 1-1/4" diameter rod
- No. 3 to No. 10 rebar

SUITABLE BASE MATERIALS

- Normal-weight concrete
- Lightweight concrete
- Grouted concrete masonry (CMU)
- Hollow concrete masonry (CMU)
- Hollow core concrete
- Brick masonry
- Unreinforced Masonry (URM)

PERMISSIBLE INSTALLATION CONDITIONS (ADHESIVE)

- Dry concrete
- Water-saturated concrete (wet)
- Water-filled holes (flooded)

REFERENCE DATA (ASD)

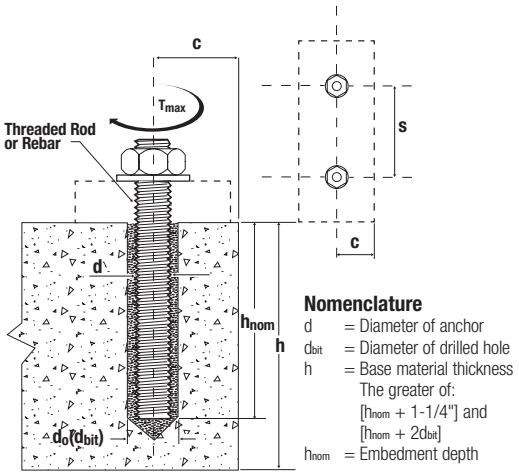
Allowable Stress Design (ASD) Installation Table for AC100+ Gold (Solid Concrete Base Materials)

Dimension/Property		Notation	Units	Nominal Anchor Size									
Nominal threaded rod size		-	in.	3/8	1/2	-	5/8	3/4	7/8	1	-	1-1/4	-
Reinforcing bar size		-	No.	3	-	4	5	6	7	8	9	-	10
Nominal anchor diameter		d	in. (mm)	0.375 (9.5)	0.500 (12.7)		0.625 (15.9)	0.750 (19.1)	0.875 (22.2)	1.000 (25.4)	1.125 (28.6)	1.250 (31.8)	1.250 (31.8)
Minimum nominal embedment depth		$h_{nom,min}$	in. (mm)	2-3/8 (61)	2-3/4 (70)		3-1/8 (79)	3-1/2 (89)	3-1/2 (89)	4 (102)	4-1/2 (114)	5 (127)	5 (127)
Maximum torque (only possible after full cure time of adhesive)	A36 or F1554 carbon steel rod	T_{max}	ft.-lb. (N-m)	10 (13)	25 (34)		50 (68)	90 (122)	125 (169)	165 (224)	-	280 (379)	-
	F593 Condition CW stainless steel rod or ASTM A193, Grade B7 carbon steel rod	T_{max}	ft.-lb. (N-m)	16 (22)	33 (45)		60 (81)	105 (142)	125 (169)	165 (224)	-	280 (379)	-

Allowable Stress Design (ASD) Installation Table for AC100+ Gold (Hollow Base Material with Screen Tube)

Dimension/Property	Notation	Units	Nominal Size - Stainless Steel					Nominal Size - Plastic			
Nominal threaded rod size	-	in.	1/4	3/8	1/2	5/8	3/4	1/4	3/8	1/2	5/8
Nominal anchor diameter	d	in. (mm)	0.250 (6.4)	0.375 (9.5)	0.500 (12.7)	0.625 (15.9)	0.750 (19.1)	0.250 (6.4)	0.375 (9.5)	0.500 (12.7)	0.625 (15.9)
Nominal screen tube diameter	-	in.	1/4	3/8	1/2	5/8	3/4	1/4	3/8	1/2	5/8
Nominal diameter of drilled hole	d_{bit}	in.	3/8 ANSI	1/2 ANSI	5/8 ANSI	3/4 ANSI	7/8 ANSI	1/2 ANSI	9/16 ANSI	3/4 ANSI	7/8 ANSI
Maximum torque (only possible after full cure time of adhesive)	T_{max}	ft.-lbf. (N-m)	4 (5)	6 (8)	10 (14)	10 (14)	10 (14)	4 (5)	6 (8)	10 (14)	10 (14)

Detail of Steel Hardware Elements used with Injection Adhesive System



Nomenclature

d = Diameter of anchor
d_{bit} = Diameter of drilled hole
h = Base material thickness
The greater of:
[h_{nom} + 1-1/4"] and
[h_{nom} + 2d_{bit}]
h_{nom} = Embedment depth

Threaded Rod and Deformed Reinforcing Bar Material Properties

Steel Description (General)	Steel Specification (ASTM)	Nominal Anchor Size (inch)	Minimum Yield Strength, f_y (ksi)	Minimum Ultimate Strength, f_u (ksi)
Carbon Rod	A36 or F1554 Grade 36	3/8 through 1-1/4	36.0	58.0
Stainless Rod (Alloy 304 / 316)	F593, Condition CW	3/8 through 5/8	65.0	100.0
		3/4 through 1-1/4	45.0	85.0
High Strength Carbon Rod	A193 Grade B7	3/8 through 1-1/4	105.0	125.0
Reinforcing Bar	A615, A767, Grade 75	3/8 through 1-1/4 (#3 through #10)	75.0	100.0
	A615, A767, Grade 60	3/8 through 1-1/4 (#3 through #10)	60.0	90.0
	A706, A767, Grade 60	3/8 through 1-1/4 (#3 through #10)	60.0	80.0
	A615, A767, Grade 40	3/8 through 1-1/4 (#3 through #10)	40.0	60.0

Ultimate and Allowable Load Capacities for AC100+ Gold Installed into Normal Weight Concrete with Threaded Rod and Reinforcing Bar (based on bond strength/concrete capacity)[1,2,3,4,5,6]

Nominal Rod Diameter or Rebar Size d in. or #	Minimum Embedment Depth h_{nom} in.	Minimum Concrete Compressive Strength							
		f'c = 3,000 psi		f'c = 4,000 psi		f'c = 5,000 psi		f'c = 6,000 psi	
		Ultimate Tension Load Capacity lbs (kN)	Allowable Tension Load Capacity lbs (kN)	Ultimate Tension Load Capacity lbs (kN)	Allowable Tension Load Capacity lbs (kN)	Ultimate Tension Load Capacity lbs (kN)	Allowable Tension Load Capacity lbs (kN)	Ultimate Tension Load Capacity lbs (kN)	Allowable Tension Load Capacity lbs (kN)
3/8 or #3	2-3/8	4,840 (21.5)	1,210 (5.4)	5,040 (22.4)	1,260 (5.6)	5,180 (23.0)	1,295 (5.8)	5,320 (23.7)	1,330 (5.9)
	3-1/2	7,140 (31.8)	1,785 (7.9)	7,420 (33.0)	1,855 (8.3)	7,640 (34.0)	1,910 (8.5)	7,820 (34.8)	1,955 (8.7)
	4-1/2	9,180 (40.8)	2,295 (10.2)	9,540 (42.4)	2,385 (10.6)	9,820 (43.7)	2,455 (10.9)	10,060 (44.7)	2,515 (11.2)
1/2 or #4	2-3/4	7,980 (35.5)	1,995 (8.9)	8,280 (36.8)	2,070 (9.2)	8,540 (38.0)	2,135 (9.5)	8,740 (38.9)	2,185 (9.7)
	4-3/8	12,720 (56.6)	3,180 (14.1)	13,200 (58.7)	3,300 (14.7)	13,580 (60.4)	3,395 (15.1)	13,900 (61.8)	3,475 (15.5)
	6	17,420 (77.5)	4,355 (19.4)	18,100 (80.5)	4,525 (20.1)	18,620 (82.8)	4,655 (20.7)	19,080 (84.9)	4,770 (21.2)
5/8 or #5	3-1/8	11,220 (49.9)	2,805 (12.5)	11,660 (51.9)	2,915 (13.0)	12,000 (53.4)	3,000 (13.3)	12,300 (54.7)	3,075 (13.7)
	5-1/4	19,200 (85.4)	4,800 (21.4)	19,960 (88.8)	4,990 (22.2)	20,540 (91.4)	5,135 (22.8)	21,020 (93.5)	5,255 (23.4)
	7-1/2	27,660 (123.0)	6,915 (30.8)	28,720 (127.8)	7,180 (31.9)	29,560 (131.5)	7,390 (32.9)	30,280 (134.7)	7,570 (33.7)
3/4 or #6	3-1/2	13,320 (59.3)	3,330 (14.8)	13,820 (61.5)	3,455 (15.4)	14,220 (63.3)	3,555 (15.8)	14,560 (64.8)	3,640 (16.2)
	6-1/4	26,880 (119.6)	6,720 (29.9)	27,900 (124.1)	6,975 (31.0)	28,720 (127.8)	7,180 (31.9)	29,420 (130.9)	7,355 (32.7)
	9	40,440 (179.9)	10,110 (45.0)	42,000 (186.8)	10,500 (46.7)	43,220 (192.3)	10,805 (48.1)	44,260 (196.9)	11,065 (49.2)
7/8 or #7	3-1/2	13,320 (59.3)	3,330 (14.8)	13,820 (61.5)	3,455 (15.4)	14,220 (63.3)	3,555 (15.8)	14,560 (64.8)	3,640 (16.2)
	7	36,680 (163.2)	9,170 (40.8)	38,080 (169.4)	9,520 (42.3)	39,200 (174.4)	9,800 (43.6)	40,140 (178.6)	10,035 (44.6)
	10-1/2	60,040 (267.1)	15,010 (66.8)	62,340 (277.3)	15,585 (69.3)	64,180 (285.5)	16,045 (71.4)	65,700 (292.2)	16,425 (73.1)
1 or #8	4	16,260 (72.3)	4,065 (18.1)	16,880 (75.1)	4,220 (18.8)	17,380 (77.3)	4,345 (19.3)	17,800 (79.2)	4,450 (19.8)
	8	46,540 (207.0)	11,635 (51.8)	48,300 (214.8)	12,075 (53.7)	49,740 (221.3)	12,435 (55.3)	50,920 (226.5)	12,730 (56.6)
	12	76,820 (341.7)	19,205 (85.4)	79,740 (354.7)	19,935 (88.7)	82,080 (365.1)	20,520 (91.3)	84,060 (373.9)	21,015 (93.5)
1-1/4 or #10	5	22,740 (101.2)	5,685 (25.3)	23,600 (105.0)	5,900 (26.2)	24,300 (108.1)	6,075 (27.0)	24,880 (110.7)	6,220 (27.7)
	10	65,880 (293.0)	16,470 (73.3)	68,400 (304.3)	17,100 (76.1)	70,420 (313.2)	17,605 (78.3)	72,100 (320.7)	18,025 (80.2)
	15	109,040 (485.0)	27,260 (121.3)	113,200 (503.5)	28,300 (125.9)	116,540 (518.4)	29,135 (129.6)	119,320 (530.8)	29,830 (132.7)

1. Allowable load capacities listed are calculated using an applied safety factor of 4.0 which includes an assessment of freezing/thawing conditions and sensitivity to sustained loads (i.e. creep resistance). Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
2. Linear interpolation may be used to determine allowable loads for intermediate embedments and compressive strengths.
3. The tabulated load values are applicable to single anchors installed at critical edge and spacing distances and where the minimum member thickness is the greater of [h_{nom} + 1-1/4] and [h_{nom} + 2d_{bit}].
4. The tabulated load values are applicable for dry concrete. Holes must be drilled with a hammer drill and an ANSI carbide drill bit. Installations into saturated (wet) concrete and water-filled holes require a reduction in capacity for tabulated values of 15 percent and 50 percent, respectively. Contact DEWALT for more information concerning these installation conditions.
5. Adhesives experience reductions in capacity at elevated temperatures. See the In-Service Temperature chart for allowable loads capacity reduction factors.
6. Allowable bond strength/concrete capacity must be checked against allowable steel strength to determine the controlling allowable load. Allowable shear capacity is controlled by allowable steel strength for the given conditions.

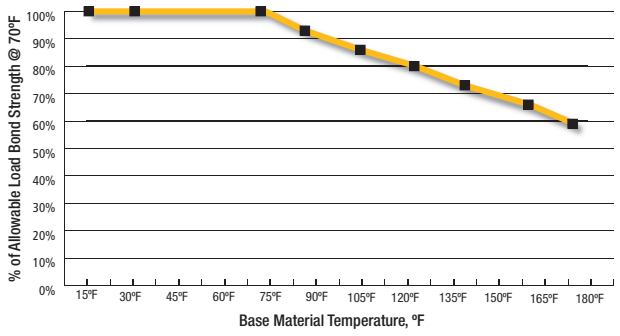
Allowable Load Capacities for Threaded Rod and Reinforcing Bar (Based on Steel Strength)[1,2,3,4,5]

Nominal Rod Diameter or Rebar Size (in. or #)	Steel Elements - Threaded Rod and Reinforcing Bar																	
	A36 or F1554, Grade 36		A36 or F1554, Grade 55		A 193, Grade B7 or F1554, Grade 105		F 593, CW (SS)		ASTM A615 Grade 40 Rebar		ASTM A615 Grade 60 Rebar		ASTM A706 Grade 60 Rebar		ASTM A615 Grade 75 Rebar		ASTM A706 Grade 80 Rebar	
	Tension lbs. (kN)	Shear lbs (kN)	Tension lbs. (kN)	Shear lbs (kN)	Tension lbs. (kN)	Shear lbs (kN)	Tension lbs. (kN)	Shear lbs (kN)	Tension lbs. (kN)	Shear lbs (kN)	Tension lbs. (kN)	Shear lbs (kN)	Tension lbs. (kN)	Shear lbs (kN)	Tension lbs. (kN)	Shear lbs (kN)	Tension lbs. (kN)	Shear lbs (kN)
3/8 or #3	2,115 (9.4)	1,090 (4.8)	2,735 (12.2)	1,410 (6.3)	4,555 (20.3)	2,345 (10.4)	3,645 (16.2)	1,880 (8.4)	2,210 (9.8)	1,125 (5.0)	2,650 (11.8)	1,690 (7.5)	2,650 (11.8)	1,500 (6.7)	2,650 (11.8)	1,875 (8.3)	2,650 (11.8)	1,875 (8.3)
1/2 or #4	3,760 (16.7)	1,935 (8.6)	4,860 (21.6)	2,505 (11.1)	8,100 (36.0)	4,170 (18.5)	6,480 (28.8)	3,340 (14.9)	3,925 (17.5)	2,005 (8.9)	4,710 (21.0)	3,005 (13.4)	4,710 (21.0)	2,670 (11.9)	4,710 (21.0)	3,335 (14.8)	4,710 (21.0)	3,335 (14.8)
5/8 or #5	5,870 (26.1)	3,025 (13.5)	7,595 (33.8)	3,910 (17.4)	12,655 (56.3)	6,520 (29.0)	10,125 (45.0)	5,215 (23.2)	6,135 (27.3)	3,130 (13.9)	7,365 (32.8)	4,695 (20.9)	7,365 (32.8)	4,170 (18.5)	7,365 (32.8)	5,215 (23.2)	7,365 (32.8)	5,215 (23.2)
3/4 or #6	8,455 (37.6)	4,355 (19.4)	10,935 (48.6)	5,635 (25.1)	18,225 (81.1)	9,390 (41.8)	12,390 (55.1)	6,385 (28.4)	8,835 (39.3)	4,505 (20.0)	10,605 (47.2)	6,760 (30.1)	10,605 (47.2)	6,010 (26.7)	10,605 (47.2)	7,510 (33.4)	10,605 (47.2)	7,510 (33.4)
7/8 or #7	11,510 (51.2)	5,930 (26.4)	14,885 (66.2)	7,665 (34.1)	24,805 (110.3)	12,780 (56.8)	16,865 (75.0)	8,690 (38.7)	-	-	14,430 (64.2)	9,200 (40.9)	14,430 (64.2)	8,180 (36.4)	14,430 (64.2)	10,220 (45.5)	14,430 (64.2)	10,220 (45.5)
1 or #8	15,035 (66.9)	7,745 (34.5)	19,440 (86.5)	10,015 (44.5)	32,400 (144.1)	16,690 (74.2)	22,030 (98.0)	11,350 (50.5)	-	-	18,850 (83.8)	12,015 (53.4)	18,850 (83.8)	10,680 (47.5)	18,850 (83.8)	13,350 (59.4)	18,850 (83.8)	13,350 (59.4)
#9	-	-	-	-	-	-	-	-	-	-	23,985 (106.7)	15,290 (68.0)	23,985 (106.7)	13,590 (60.5)	23,985 (106.7)	16,990 (75.6)	23,985 (106.7)	16,990 (75.6)
1-1/4	23,490 (104.5)	12,100 (53.8)	30,375 (135.1)	15,645 (69.6)	50,620 (225.2)	26,080 (116.0)	34,425 (153.1)	17,735 (78.9)	-	-	-	-	-	-	-	-	-	-
#10	-	-	-	-	-	-	-	-	-	-	30,405 (135.2)	19,380 (86.2)	30,405 (135.2)	17,230 (76.6)	30,405 (135.2)	21,535 (95.8)	30,405 (135.2)	21,535 (95.8)

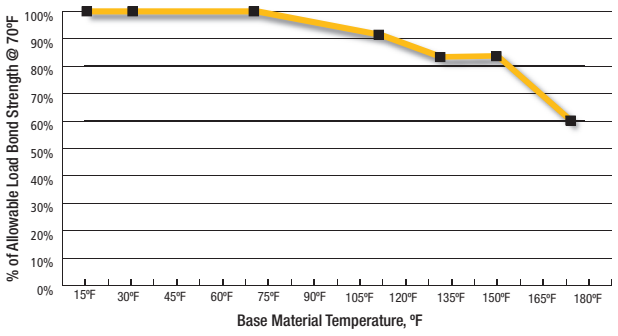
1. AISC defined steel strength (ASD) for threaded rod: Tensile = 0.33 • F_u • A_{nom}, Shear = 0.17 • F_u • A_{nom}
2. For reinforcing bars: The allowable steel tensile strength is based on 20 ksi for Grade 40 and 24 ksi for Grade 60 and higher, applied to the cross sectional area of the bar; allowable steel shear strength = 0.17 • F_u • A_{nom}
3. Allowable load capacities are calculated for the steel element type. Consideration of applying additional safety factors may be necessary depending on the application, such as life safety or overhead.
4. Allowable steel strength in tension must be checked against allowable bond strength/concrete capacity in tension to determine the controlling allowable load.
5. The tabulated load values are applicable to single anchors installed at critical edge and spacing distances and where the minimum member thickness is the greater of [h_{nom} + 1-1/4"] and [h_{nom} + 2d_{bit}]

In-Service Temperature Chart For Allowable Load Capacities

Concrete Base Materials



Masonry Units



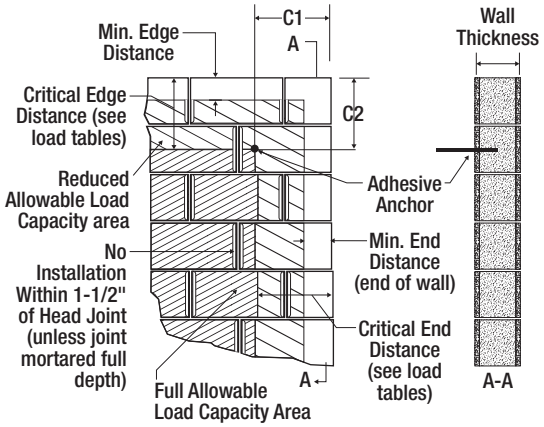
Allowable Load Capacities for Threaded Rod Installed with AC100+ Gold into Grout-Filled Concrete Masonry (Based on Bond Strength/Masonry Strength)[1,2,3,7,9,12]

Anchor Diameter d (inch)	Minimum Embedment h_{nom} (inch)	Critical Spacing Distance s_{cr} (inch)	Minimum Edge Distance cmin (inch)	Minimum End Distance c_{min} (inch)	Tension Load (lbs)	Direction of Shear Loading	Shear Load (lbs)
Anchor Installed Into Grouted Masonry Wall Faces[4,5,6,8,10,11,13]							
3/8	3	6	3	3	615	Towards Edge/End	275
		6	3	3	615	Away From Edge/End	340
		6	3	4	735	Any	490
		6	12	12	960	Any	855
1/2	4	8	3	3	720	Towards Edge/End	430
		8	3	3	720	Away From Edge/End	1320
		8	4	4	985	Any	655
		8	12	12	960	Towards Edge/End	1430
		8	12	12	960	Away From Edge/End	1760
		8	7-3/4 (Bed Joint)	3	935	Load To Edge	460
5/8	5	10	3	3	710	Towards Edge/End	460
		10	3	3	710	Away From Edge/End	1410
		10	12	12	1095	Towards Edge/End	1530
		10	12	12	1095	Away From Edge/End	1880
		10	7-3/4 (Bed Joint)	3	1030	Load To Edge	590
3/4	6	12	4	4	755	Towards Edge/End	630
		12	4	4	755	Away From Edge/End	1450
		12	12	12	1160	Towards Edge/End	1570
		12	12	12	1160	Away From Edge/End	1930
		12	7-3/4 (Bed Joint)	4	945	Load To Edge	565

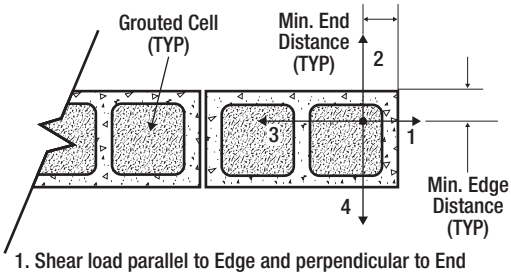
Anchor Diameter d (inch)	Minimum Embedment h_{nom} (inch)	Minimum Spacing Distance	Minimum Edge Distance c_{min} (inch)	Minimum End Distance c_{min} (inch)	Tension Load (lbs)	Direction of Shear Loading	Shear Load (lbs)
Anchor Installed Into Tops of Grouted Masonry Walls[14,15]							
1/2	2.75	1 anchor per cell	1.75	4	595	Any	300
	4	1 anchor per cell	1.75	3	520	Load To Edge	190
	4	1 anchor per cell	1.75	3	520	Load To End	300
	10	1 anchor per block[16]	1.75	10.5	1670	Load To Edge	190
	10	1 anchor per block[16]	1.75	10.5	1670	Load To End	300
5/8	5	1 anchor per cell	1.75	3	745	Load To Edge	240
	5	1 anchor per cell	1.75	3	745	Load To End	300
	12.5	1 anchor per block[16]	2.75	10.5	2095	Load To Edge	240
	12.5	1 anchor per block[16]	2.75	10.5	2095	Load To End	300
3/4	6	1 anchor per cell	2.75	4	1260	Load To Edge	410
	6	1 anchor per cell	2.75	4	1260	Load To End	490

1. Tabulated load values are for anchors installed in nominal 8-inch wide (203 mm) Grade N, Type II, lightweight, medium-weight or normal-weight grout filled concrete masonry units with a minimum masonry strength, f'm, of 1,500 psi (10.3 MPa) conforming to ASTM C 90. If the specified compressive strength of the masonry, f'm, is 2,000 psi (13.8 MPa) minimum the tabulated values may be increased by 4 percent (multiplied by 1.04).
2. Allowable bond or masonry strengths in tension and shear are calculated using a safety factor of 5.0 and must be checked against the allowable tension and shear capacities for threaded rod based on steel strength to determine the controlling factor. See allowable load table based on steel strength.
3. Embedment is measured from the outside surface of the concrete masonry unit to the embedded end of the anchor.
4. Anchors may be installed in the grouted cells, cell webs and bed joints not closer than 1-1/2-inch from the vertical mortar joint (head joint) provided the minimum edge and end distances are maintained. Anchors may be placed in the head joint if the vertical joint is mortared full-depth.
5. A maximum of two anchors may be installed in a single masonry cell in accordance with the spacing and edge or end distance requirements.
6. The critical spacing, s_{cr}, for use with the anchor values shown in this table is 16 anchor diameters. The critical spacing, s_{cr}, distance is the distance where the full load values in the table may be used. The minimum spacing distance, s_{min}, is the minimum anchor spacing for which values are available and installation is permitted. For 3/8-inch diameter anchors, the spacing may be reduced to 8 anchor diameters when using a tension reduction factor of 0.70 and a shear reduction factor of 0.45. For ½ - and 5/8 – inch diameter anchors, the spacing may be reduced to 8 anchor diameters when using a tension reduction factor of 0.85 and a shear reduction factor of 0.45. For 3/4-inch diameter anchors, the spacing may be reduced to 8 anchor diameters when using a tension reduction factor of 1.00 and a shear reduction factor of 0.45.
7. Spacing distance is measured from the centerline to centerline between two anchors.
8. The critical edge or end distance, c_{cr}, is the distance where full load values in the table may be used. The minimum edge or end distance, c_{min}, is the minimum distance for which values are available and installation is permitted.
9. Edge or end distance is measured from anchor centerline to the closest unrestrained edge.
10. Linear interpolation of load values between the minimum spacing, s_{min}, and critical spacing, s_{cr}, distances and between minimum edge or end distance, c_{min}, and critical edge or end distance, c_{cr}, is permitted.
11. The tabulated values are applicable for anchors in the ends of grout-filled concrete masonry units where minimum edge and end distances are maintained.
12. The tabulated values must be adjusted for increased in-service base material temperatures in accordance with the In-Service Temperature chart, as applicable.
13. Concrete masonry width (wall thickness) must be equal to or greater than 1.5 times the anchor embedment depth (e.g. 3/8-inch and 1/2-inch diameter anchors are permitted in nominally 6-inch-thick concrete masonry). The 5/8-inch and 3/4-inch diameter anchors must be installed in minimum nominally 8-inch-thck concrete masonry.
14. Anchors must be installed into the grouted cell; anchors are not permitted to be installed in a head joint, flange or wen of the concrete masonry unit.
15. Allowable shear loads parallel or perpendicular to the edge of a masonry wall may be applied in or out of plane.
16. Anchors with minimum spacing distance of one anchor per block may not be installed in adjacent cells (i.e. one cell must separate the anchor locations).

AC100+ Gold Adhesive Anchors Installed into Grouted Concrete Masonry Wall

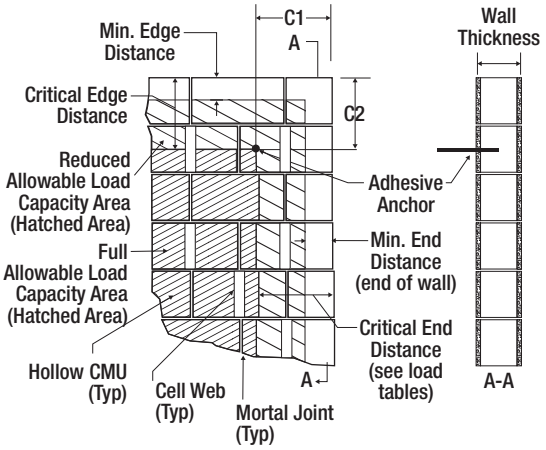


AC100+ Gold Adhesive Anchors Installed into Top of Grouted Concrete Masonry Wall

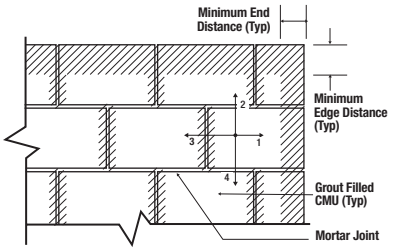


1. Shear load parallel to Edge and perpendicular to End
2. Shear load parallel to End and perpendicular to Edge
3. Shear load parallel to Edge and perpendicular away from End
4. Shear load parallel to End and perpendicular to opposite Edge

AC100+ Gold Adhesive Anchors Installed into Hollow Concrete Masonry Wall



Direction of Shear Loading in Relation to Edge and End of Masonry Wall



1. Shear load parallel to Edge and perpendicular to End
2. Shear load parallel to End and perpendicular to Edge
3. Shear load parallel to Edge and perpendicular away from End
4. Shear load parallel to End and perpendicular away from Edge

Allowable Load Capacities for Threaded Rod Installed with AC100+ Gold into Hollow Concrete Masonry Walls with Stainless Steel and Plastic Screen Tubes[1,2,3,4,5,6,7,8,9,10,11,12,13]

Anchor Diameter d (inch)	Screen Tube (type)	Minimum Embedment h_{nom} (inch)	Critical Spacing Distance s_{cr} (inch)	Minimum Edge Distance c_{min} (inch)	Minimum End Distance c_{min} (inch)	Allowable Load		
						Tension Load (lbs)	Direction of Shear Loading	Shear Load (lbs)
1/4 (6.4)	Stainless Steel	1-1/4 (31.8)	4 (101.6)	1-1/2 (38.1)	1-1/2 (38.1)	280 (1.2)	Towards Edge/End	140 (0.6)
		1-1/4 (31.8)	4 (101.6)	3 (76.2)	3 (76.2)	350 (1.6)	Towards Edge/End	275 (1.2)
		1-1/4 (31.8)	4 (101.6)	1-1/2 (38.1)	1-1/2 (38.1)	280 (1.2)	Away From Edge/End	235 (1.0)
		1-1/4 (31.8)	4 (101.6)	3 (76.2)	3 (76.2)	350 (1.6)	Away From Edge/End	465 (2.1)
	Plastic	1-1/4 (31.8)	1 anchor per cell	3 (76.2)	3 (76.2)	140 (0.6)	Towards Edge/End	235 (1.0)
3/8 (9.5)	Stainless Steel	1-1/4 (31.8)	6 (152.4)	1-7/8 (47.6)	1-7/8 (47.6)	320 (1.4)	Towards Edge/End	145 (0.6)
		1-1/4 (31.8)	6 (152.4)	3-3/4 (95.3)	3-3/4 (95.3)	400 (1.8)	Towards Edge/End	290 (1.3)
		1-1/4 (31.8)	6 (152.4)	1-7/8 (47.6)	1-7/8 (47.6)	320 (1.4)	Away From Edge/End	245 (1.1)
		1-1/4 (31.8)	6 (152.4)	3-3/4 (95.3)	3-3/4 (95.3)	400 (1.8)	Away From Edge/End	490 (2.2)
	Plastic	1-1/4 (31.8)	1 anchor per cell	3 (76.2)	3 (76.2)	140 (0.6)	Towards Edge/End	235 (1.0)
1/2 (12.7)	Stainless Steel	1-1/4 (31.8)	8 (203.2)	3-3/4 (95.3)	3-3/4 (95.3)	380 (1.7)	Towards Edge/End	215 (1.0)
		1-1/4 (31.8)	8 (203.2)	11-1/4 (285.8)	11-1/4 (285.8)	400 (1.8)	Towards Edge/End	430 (1.9)
		1-1/4 (31.8)	8 (203.2)	3-3/4 (95.3)	3-3/4 (95.3)	380 (1.7)	Away From Edge/End	365 (1.6)
		1-1/4 (31.8)	8 (203.2)	11-1/4 (285.8)	11-1/4 (285.8)	400 (1.8)	Away From Edge/End	730 (3.2)
	Plastic	1-1/4 (31.8)	1 anchor per cell	3 (76.2)	3 (76.2)	150 (0.7)	Towards Edge/End	215 (1.0)
5/8 (15.9)	Stainless Steel	1-1/4 (31.8)	8 (203.2)	3-3/4 (95.3)	3-3/4 (95.3)	380 (1.7)	Towards Edge/End	215 (1.0)
		1-1/4 (31.8)	8 (203.2)	11-1/4 (285.8)	11-1/4 (285.8)	400 (1.8)	Towards Edge/End	430 (1.9)
		1-1/4 (31.8)	8 (203.2)	3-3/4 (95.3)	3-3/4 (95.3)	380 (1.7)	Away From Edge/End	365 (1.6)
		1-1/4 (31.8)	8 (203.2)	11-1/4 (285.8)	11-1/4 (285.8)	400 (1.8)	Away From Edge/End	730 (3.2)
	Plastic	1-1/4 (31.8)	1 anchor per cell	3 (76.2)	3 (76.2)	150 (0.7)	Towards Edge/End	215 (1.0)
3/4 (19.1)	Stainless Steel	1-1/4 (31.8)	8 (203.2)	3-3/4 (95.3)	3-3/4 (95.3)	380 (1.7)	Towards Edge/End	215 (1.0)
		1-1/4 (31.8)	8 (203.2)	11-1/4 (285.8)	11-1/4 (285.8)	400 (1.8)	Towards Edge/End	430 (1.9)
		1-1/4 (31.8)	8 (203.2)	3-3/4 (95.3)	3-3/4 (95.3)	380 (1.7)	Away From Edge/End	365 (1.6)
		1-1/4 (31.8)	8 (203.2)	11-1/4 (285.8)	11-1/4 (285.8)	400 (1.8)	Away From Edge/End	730 (3.2)

1. Tabulated load values are for anchors installed in hollow concrete masonry with minimum masonry strength, f'm, of 1,500 psi (10.3 MPa). Concrete masonry units must be lightweight, medium-weight or normal-weight conforming to ASTM C 90. Allowable loads have been calculated using a safety factor of 5.0.
2. Anchors must be installed into the hollow cell; anchors are not permitted to be installed in a mortar joint, flange or web of the concrete masonry unit.
3. A maximum of two anchor may be installed in a single masonry cell in accordance with the spacing and edge distance requirements, except as noted in the table.
4. Embedment is measured from the outside surface of the concrete masonry unit to the embedded end of the anchor.
5. Edge or end distance is measured from anchor centerline to the closest unrestrained edge of the CMU block.
6. The critical spacing, s_{cr}, for use with the anchor values shown in this table is 16 anchor diameters, except as noted in the table. The critical spacing, s_{cr}, distance is the distance where the full load values in the table may be used. The minimum spacing distance, s_{min}, is the minimum anchor spacing for which values are available and installation is permitted. The spacing may be reduced to 8 anchor diameters by multiplying the tension load value by a reduction factor of 0.60 and multiplying the shear load value by a reduction factor of 0.45.
7. Spacing distance is measured from the centerline to centerline between two anchors.
8. Linear interpolation of load values between the minimum spacing, s_{min}, and critical spacing, s_{cr}, distances and between minimum edge or end distance, c_{min}, and critical edge or end distance, c_{cr}, is permitted if applicable.
9. Concrete masonry width (wall thickness) may be minimum nominal 6-inch-thick provided the minimum embedment (i.e. face shell thickness) is maintained.
10. The tabulated values are applicable for anchors in the ends of hollow concrete masonry units where minimum face shell thickness, minimum edge and end distances are maintained.
11. Anchors are recognized to resist dead, live and wind tension and shear load applications.
12. Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel strength values.
13. The tabulated values must be adjusted for increased in-service base material temperatures in accordance with the In-Service Temperature chart, as applicable.

Ultimate and Allowable Load Capacities for AC100+ Gold into Precast Hollow Core Concrete with Stainless Steel Screen Tubes[1,2,3,4,5,6,7]

Anchor Diameter d in.	Drill Diameter dbit in.	Minimum Embedment hnom in.	Minimum End Distance in.	Minimum Edge Distance in.	Ultimate Load		Allowable Load	
					Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4	3/8	1-1/2 (38.1)	4 (101.6)	4 (101.6)	900 (4.0)	1,550 (6.9)	180 (0.8)	310 (1.4)
3/8	1/2	1-1/2 (38.1)	6 (152.4)	6 (152.4)	1,975 (8.8)	3,650 (16.2)	395 (1.8)	730 (3.2)
1/2	5/8	1-1/2 (38.1)	8 (203.2)	8 (203.2)	4,400 (19.6)	5,875 (26.1)	880 (3.9)	1,175 (5.2)

1. Tabulated load values are for anchors installed in precast hollow core concrete with minimum strength, f'm, of 5,000 psi (34.5 MPa). Allowable loads have been calculated using a safety factor of 5.0.
2. Anchors must be installed into the hollow core; anchors are not permitted to be installed in a cell web of the hollow core concrete member.
3. Embedment is measured from the outside surface of the concrete masonry unit to the embedded end of the anchor.
4. Edge or end distance is measured from anchor centerline to the closest unrestrained edge of the concrete member.
5. The tabulated values are for anchors installed at a minimum of 16 anchor diameters on center for 100 percent capacity. Spacing distance is measured from the centerline to centerline between two anchors.
6. Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel strength values.
7. The tabulated values must be adjusted for increased in-service base material temperatures in accordance with the In-Service Temperature chart, as applicable.

Ultimate and Allowable Load Capacities for Threaded Rod Installed with AC100+ Gold into Brick Masonry Walls[1,2,3,4]

Anchor Diameter d in.	Drill Diameter d_{bit} in.	Minimum Embedment h_{nom} in.	Minimum End Distance in.	Minimum Edge Distance in.	Ultimate Load		Allowable Load	
					Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
Anchors Installed into the Face of Brick Masonry Walls								
3/8	1/2	3-1/2 (88.9)	2-1/2 (63.5)	2-1/2 (63.5)	3,600 (16.0)	4,505 (20.0)	720 (3.2)	900 (4.0)
		3-1/2 (88.9)	6 (152.4)	6 (152.4)	5,845 (26.0)	4,580 (20.4)	1,170 (5.2)	915 (4.1)
		6 (152.4)	6 (152.4)	6 (152.4)	10,420 (46.4)	4,580 (20.4)	2,085 (9.3)	915 (4.1)
1/2	5/8	6 (152.4)	8 (203.2)	8 (203.2)	11,500 (51.2)	9,300 (41.4)	2,300 (10.2)	1,860 (8.3)
Anchors Installed into the Top of Brick Masonry Walls								
3/8	1/2	3-1/2 (88.9)	2-1/2 (63.5)	2-1/2 (63.5)	3,665 (16.3)	2,435 (10.8)	735 (3.3)	485 (2.2)

1. Tabulated load values are for anchors installed in minimum 2 wythe, Grade SW, solid clay brick masonry conforming to ASTM C 62. Motar must be N, S or M.
2. Allowable loads are calculated using an applied safety factor or 5.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety.
3. Allowable loads apply to installations in the face of brick or mortar joint. The tabulated values are for anchors installed at a minimum of 16 anchor diameters on center for 100 percent capacity.
4. The tabulated values must be adjusted for increased in-service base material temperatures in accordance with the In-Service Temperature chart, as applicable.

Ultimate and Allowable Load Capacities for Knurled Dropins Installed with AC100+ Gold into Normal Weight Concrete[1,2,3,4,5]

Anchor Diameter d in.	Anchor Cat. No.	Drill Diameter in.	Minimum Embedment hnom in.	Minimum Edge Distance in.	Ultimate Load		Allowable Load	
					Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4	6340	1/2	1 (25.4)	2 (50.8)	1,340 (6.0)	1,880 (8.4)	335 (1.5)	470 (2.1)
3/8	6342	5/8	1-9/16 (39.7)	3 (76.2)	2,740 (12.2)	3,800 (16.9)	685 (3.0)	950 (4.2)
1/2	6344	3/4	2 (50.8)	4 (101.6)	3,160 (14.1)	5,460 (24.3)	790 (3.5)	1,365 (6.1)

1. Allowable load capacities listed are calculated using an applied safety factor of 4.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety.
2. Knurled dropin anchors installed with AC100+ Gold adhesive are not recommended for overhead applications.
3. The tabulated values are for anchors installed at a minimum of 16 anchor diameters on center for 100 percent capacity. Spacing distance is measured from the centerline to centerline between two anchors.
4. The tabulated values must be adjusted for increased in-service base material temperatures in accordance with the In-Service Temperature chart, as applicable.
5. Tabulated allowable capacities must be checked against allowable steel strength of the threaded rod insert to determine the controlling allowable load.

Allowable Load Capacities for Threaded Rods and Reinforcing Bars or Rebar Dowel with AC100+ Gold Installed in Unreinforced Masonry with Stainless Steel Screen Tubes (Retrofit Bolt Anchors in URM Walls)[1,2]

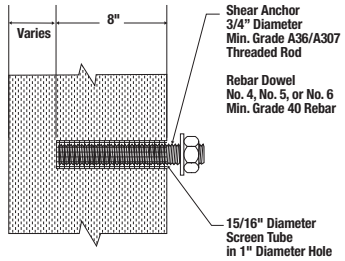


Figure 1

Shear Anchor – Configuration A (See Figure 1)

Rod Dia. or Rebar Size d in. (mm)	Minimum Embed. h_{nom} in. (mm)	Minimum Wall Thickness in. (mm)	Allowable Tension lbs. (kN)	Allowable Shear lbs. (kN)
3/4 (19.1)	8 (203.2)	13 (330.2)	-	1,000 (4.5)
No. 4	8 (203.2)	13 (330.2)	-	500 (2.3)
No. 5	8 (203.2)	13 (330.2)	-	750 (3.4)
No. 6	8 (203.2)	13 (330.2)	-	1,000 (4.5)

1. Allowable load values are applicable only where in-place shear tests indicate minimum mortar strength of 35 psi net.
2. The anchors installed in unreinforced brick walls are limited to resisting seismic or wind loads only.

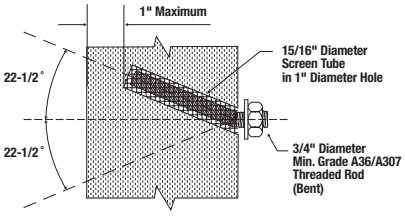


Figure 2

22-1/2° Combination Anchor – Configuration B (See Figure 2)

Rod Dia. or Rebar Size d in. (mm)	Minimum Embed. h_{nom} in. (mm)	Minimum Wall Thickness in. (mm)	Allowable Tension lbs. (kN)	Allowable Shear lbs. (kN)
3/4 (19.1)	Within 1 inch of opposite wall surface	13 (330.2)	1,200 (5.4)	1,000 (4.5)

1. Allowable load values are applicable only where in-place shear tests indicate minimum mortar strength of 35 psi net.
2. The anchors installed in unreinforced brick walls are limited to resisting seismic or wind loads only.

Anchor Description	Minimum Vertical Spacing in.	Minimum Horizontal Spacing in.	Minimum Edge Distance in.
Shear Anchor Configuration A – (See Figure 1)	16	16	16
22-1/2° Combination Anchor Configuration B – (See Figure 2)	16	16	16

STRENGTH DESIGN (SD)

CODE LISTED
ICC-ES ESR-2582

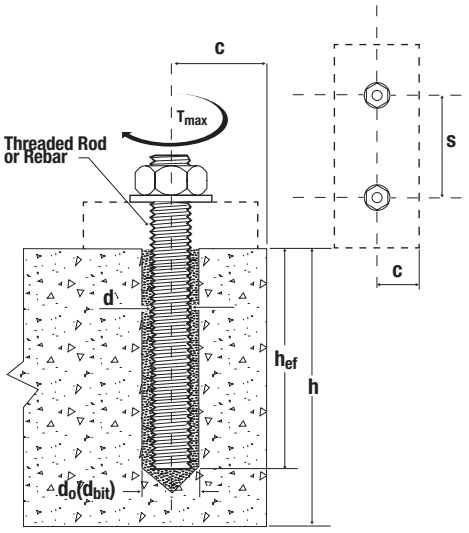
Strength Design Installation Table for AC100+ Gold[1]

Parameter	Symbol	Units	Fractional Nominal Rod Diameter (Inch) / Reinforcing Bar Size									
			3/8 or #3	1/2	#4	5/8 or #5	3/4 or #6	7/8 or #7	1 or #8	#9	1-1/4	#10
Threaded rod outside diameter	d_a	inch (mm)	0.375 (9.5)	0.500 (12.7)		0.625 (15.9)	0.750 (19.1)	0.875 (22.2)	1.000 (25.4)	-	1.250 (31.8)	-
Rebar nominal outside diameter	d_a	inch (mm)	0.375 (9.5)	0.500 (12.7)		0.625 (15.9)	0.750 (19.1)	0.875 (22.2)	1.000 (25.4)	1.125 (28.7)	-	1.250 (31.8)
Carbide drill bit nominal size	d_o (d_{bit})	inch	7/16	9/16	5/8	11/16 or 3/4	7/8	1	1-1/8	1-3/8	1-3/8	1-1/2
Minimum embedment	$h_{ef,min}$	inch (mm)	2-3/8 (60)	2-3/4 (70)		3-1/8 (79)	3-1/2 (89)	3-1/2 (89)	4 (102)	4-1/2 (114)	5 (127)	5 (127)
Maximum embedment	$h_{ef,max}$	inch (mm)	4-1/2 (114)	6 (152)		7-1/2 (191)	9 (229)	10-1/2 (267)	12 (305)	13-1/2 (343)	15 (381)	15 (381)
Minimum member thickness	h_{min}	inch (mm)	h_{ef} + 1-1/4 (h_{ef} + 30)			h_{ef} + 2d_o						
Minimum anchor spacing	s_{min}	inch (mm)	1-7/8 (48)	2-1/2 (64)		3-1/8 (79)	3-3/4 (95)	4-3/8 (111)	5 (127)	5-5/8 (143)	6-1/4 (159)	6-1/4 (159)
Minimum edge distance, reduced[5]	$c_{min,red}$	inch (mm)	1-3/4 (45)	1-3/4 (45)		1-3/4 (45)	1-3/4 (45)	1-3/4 (45)	1-3/4 (45)	2-3/4 (70)	2-3/4 (70)	2-3/4 (70)
Minimum edge distance	c_{min}	inch (mm)	1-7/8 (48)	2-1/2 (64)		3-1/8 (79)	3-3/4 (95)	4-3/8 (111)	5 (127)	5-5/8 (143)	6-1/4 (159)	6-1/4 (159)
Max. rod torque[2]	T_{max}	ft-lbs	15	33		60	105	125	165	-	280	-
Max. torque[2,3] (A36/Grade 36 rod)	T_{max}	ft-lbs	10	25		50	90	125	165	-	280	-
Max. torque[2,4] (Class 1 SS rod)	T_{max}	ft-lbs	5	20		40	60	100	165	-	280	-

For pound-inch units: 1 mm = 0.03937 inch, 1 N-m = 0.7375 ft-lbf. For SI: 1 inch = 25.4 mm, 1 ft-lbf = 1.356 N-m.

1. For use with the design provisions of ACI 318-14 Ch. 17 or ACI 318-11 Appendix D as applicable and ICC-ES AC308, Section 4.2 and ESR-2582.
2. Torque may not be applied to the anchors until the full cure time of the adhesive has been achieved.
3. These torque values apply to ASTM A 36 / F 1554 Grade 36 carbon steel threaded rods.
4. These torque values apply to ASTM A 193 Grade B8/B8M (Class 1) stainless steel threaded rods.
5. For installation between the minimum edge distance, c_{min}, and the reduced minimum edge distance, $c_{min,red}$, the maximum torque must be reduced (multiplied) by a factor of 0.45.

Detail of Steel Hardware Elements used with Injection Adhesive System



Threaded Rod and Deformed Reinforcing Bar Material Properties

Steel Description (General)	Steel Specification (ASTM)	Nominal Anchor Size (inch)	Minimum Yield Strength, f_y (ksi)	Minimum Ultimate Strength, f_u (ksi)
Carbon rod	ASTM A 36 and F 1554 Grade 36	3/8 through 1-1/4	36.0	58.0
	ASTM F 1554 Grade 55	3/8 through 1-1/4	55.0	75.0
	ASTM A 449	3/8 through 1	92.0	120.0
		1-1/4	81.0	105.0
High Strength Carbon rod	ASTM A 193 Grade B7 and F 1554 Grade 105	3/8 through 1-1/4	105.0	125.0
Stainless rod (Alloy 304/316)	ASTM F 593 Condition CW	3/8 through 5/8	65.0	100.0
		3/4 through 1-1/4	45.0	85.0
	ASTM A 193 Grade B8/B8M, Class 1	3/8 through 1-1/4	30.0	75.0
	ASTM A 193 Grade B8/B8M2, Class 2B	3/8 through 1-1/4	75.0	95.0
Reinforcing Bar	ASTM A 615, A 767, Grade 75	3/8 through 1-1/4 (#3 through #10)	75.0	100.0
	ASTM A 615, A 767, Grade 60	3/8 through 1-1/4 (#3 through #10)	60.0	90.0
	ASTM A 706, A 767, Grade 60	3/8 through 1-1/4 (#3 through #10)	60.0	80.0
	ASTM A 615, A 767, Grade 40	3/8 through 1-1/4 (#3 through #10)	40.0	60.0

Steel Tension and Shear Design for Threaded Rod in Normal Weight Concrete (For use with load combinations taken from ACI 318-14 Section 5.3)

CODE LISTED
ICC-ES ESR-2582

Design Information		Symbol	Units	Nominal Rod Diameter[1] (inch)						
				3/8	1/2	5/8	3/4	7/8	1	1-1/4
Threaded rod nominal outside diameter		d_a	inch (mm)	0.375 (9.5)	0.500 (12.7)	0.625 (15.9)	0.750 (19.1)	0.875 (22.2)	1.000 (25.4)	1.250 (31.8)
Threaded rod effective cross-sectional area		A_{se}	inch² (mm²)	0.0775 (50)	0.1419 (92)	0.2260 (146)	0.3345 (216)	0.4617 (298)	0.6057 (391)	0.9691 (625)
ASTM A 36 and ASTM F 1554 Grade 36	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	4,495 (20.0)	8,230 (36.6)	13,110 (58.3)	19,400 (86.3)	26,780 (119.1)	35,130 (156.3)	56,210 (250.0)
		V_{sa}	lbf (kN)	2,695 (12.0)	4,940 (22.0)	7,860 (35.0)	11,640 (51.8)	16,070 (71.4)	21,080 (93.8)	33,725 (150.0)
	Reduction factor for seismic shear	$\alpha V_{,seis}$	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75						
	Strength reduction factor for shear[2]	ϕ	-	0.65						
ASTM F 1554 Grade 55	Nominal strength as governed by steel strength(for a single anchor)	N_{sa}	lbf (kN)	5,810 (25.9)	10,640 (47.3)	16,950 (75.4)	25,085 (111.6)	34,625 (154.0)	45,425 (202.0)	72,680 (323.3)
		vsa	lbf (kN)	3,485 (15.5)	6,385 (28.4)	10,170 (45.2)	15,050 (67.0)	20,775 (92.4)	27,255 (121.2)	43,610 (194.0)
	Reduction factor for seismic shear	$\alpha V_{,seis}$	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75						
	Strength reduction factor for shear[2]	ϕ	-	0.65						
ASTM A 193 Grade B7 and ASTM F 1554 Grade 105	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	9,685 (43.1)	17,735 (78.9)	28,250 (125.7)	41,810 (186.0)	57,710 (256.7)	75,710 (336.8)	121,135 (538.8)
		V_{sa}	lbf (kN)	5,815 (25.9)	10,640 (7.3)	16,950 (75.4)	25,085 (111.6)	34,625 (154.0)	45,425 (202.1)	72,680 (323.3)
	Reduction factor for seismic shear	$\alpha V_{,seis}$	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75						
	Strength reduction factor for shear[2]	ϕ	-	0.65						
ASTM A 449	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	9,300 (41.4)	17,025 (75.7)	27,120 (120.6)	40,140 (178.5)	55,905 (248.7)	72,685 (323.3)	101,755 (452.6)
		V_{sa}	lbf (kN)	5,580 (24.8)	10,215 (45.4)	16,270 (72.4)	24,085 (107.1)	33,540 (149.2)	43,610 (194.0)	61,050 (271.6)
	Reduction factor for seismic shear	$\alpha V_{,seis}$	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75						
	Strength reduction factor for shear[2]	ϕ	-	0.65						
ASTM F 593 CW Stainless (Types 304 and 316)	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	7,750 (34.5)	14,190 (63.1)	22,600 (100.5)	28,430 (126.5)	39,245 (174.6)	51,485 (229.0)	82,370 (366.4)
		V_{sa}	lbf (kN)	4,650 (20.7)	8,515 (37.9)	13,560 (60.3)	17,060 (75.9)	23,545 (104.7)	30,890 (137.4)	49,425 (219.8)
	Reduction factor for seismic shear	$\alpha V_{,seis}$	-	0.70	0.70	0.80	0.80	0.80	0.80	0.80
	Strength reduction factor for tension[3]	ϕ	-	0.65						
	Strength reduction factor for shear[3]	ϕ	-	0.60						
ASTM A 193 Grade B8/B8M, Class 1 Stainless (Types 304 and 316)	Nominal strength as governed by steel strength (for a single anchor)[4]	N_{sa}	lbf (kN)	4,420 (19.7)	8,090 (36.0)	12,880 (57.3)	19,065 (84.8)	26,315 (117.1)	34,525 (153.6)	55,240 (245.7)
		V_{sa}	lbf (kN)	2,650 (11.8)	4,855 (21.6)	7,730 (34.4)	11,440 (50.9)	15,790 (70.2)	20,715 (92.1)	33,145 (147.4)
	Reduction factor for seismic shear	$\alpha V_{,seis}$	-	0.70	0.70	0.80	0.80	0.80	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75						
	Strength reduction factor for shear[2]	ϕ	-	0.65						
ASTM A 193 Grade B8/ B8M2, Class 2B Stainless (Types 304 and 316)	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	7,365 (32.8)	13,480 (60.0)	21,470 (95.5)	31,775 (141.3)	43,860 (195.1)	57,545 (256.0)	92,065 (409.5)
		V_{sa}	lbf (kN)	4,420 (19.7)	8,085 (36.0)	12,880 (57.3)	19,065 (84.8)	26,315 (117.1)	34,525 (153.6)	55,240 (245.7)
	Reduction factor for seismic shear	$\alpha V_{,seis}$	-	0.70	0.70	0.80	0.80	0.80	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75						
	Strength reduction factor for shear[2]	ϕ	-	0.65						

For SI: 1 inch = 25.4 mm, 1 lbf = 4.448 N. For pound-inch units: 1 mm = 0.03937 inches, 1 N = 0.2248 lbf.

1. Values provided for steel element material types are based on minimum specified strengths and calculated in accordance with ACI 318-14 Eq. 17.4.1.2 and Eq. 17.5.1.2b or ACI 318-11 Eq. (D-2) and Eq. (D-29), as applicable, except where noted. Nuts and washers must be appropriate for the rod. Nuts must have specified proof load stresses equal to or greater than the minimum tensile strength of the specified threaded rod.
2. The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 5.3 or ACI 318-11 9.2, as applicable, are used in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318 D.4.4. Values correspond to ductile steel elements.
3. The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 5.3 or ACI 318-11 9.2, as applicable, are used in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318 D.4.4. Values correspond to brittle steel elements
4. In accordance with ACI 318-14 17.4.1.2 and 17.5.1.2 or ACI 318-11 D.5.1.2 and D.6.1.2, as applicable, the calculated values for nominal tension and shear strength for ASTM A193 Grade B8/B8M Class 1 stainless steel threaded rods are based on limiting the specified tensile strength of the anchor steel to 1.9fy or 57,000 psi (393 MPa).

Steel Tension and Shear Design for Reinforcing Bars in Normal Weight Concrete (For use with load combinations taken from ACI 318-14 Section 5.3)

CODE LISTED ICC-ES ESR-2582

Design Information		Symbol	Units	Nominal Reinforcing Bar Size (Rebar)[1]							
				No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10
Rebar nominal outside diameter		d_a	inch (mm)	0.375 (9.5)	0.500 (12.7)	0.625 (15.9)	0.750 (19.1)	0.875 (22.2)	1.000 (25.4)	1.125 (28.7)	1.250 (32.3)
Rebar effective cross-sectional area		A_{se}	inch² (mm²)	0.110 (71.0)	0.200 (129.0)	0.310 (200.0)	0.440 (283.9)	0.600 (387.1)	0.790 (509.7)	1.000 (645.2)	1.270 (819.4)
ASTM A 615 Grade 75	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	11,000 (48.9)	20,000 (89.0)	31,000 (137.9)	44,000 (195.7)	60,000 (266.9)	79,000 (351.4)	100,000 (444.8)	127,000 (564.9)
		V_{sa}	lbf (kN)	6,600 (29.4)	12,000 (53.4)	18,600 (82.7)	26,400 (117.4)	36,000 (160.1)	47,400 (210.8)	60,000 (266.9)	76,200 (338.9)
	Reduction factor for seismic shear	$\alpha V_{,seis}$	-	0.70	0.70	0.80	0.80	0.80	0.80	0.80	0.80
	Strength reduction factor for tension[3]	ϕ	-	0.65							
	Strength reduction factor for shear[3]	ϕ	-	0.60							
ASTM A 615 Grade 60	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	9,900 (44.0)	18,000 (80.1)	27,900 (124.1)	39,600 (176.1)	54,000 (240.2)	71,100 (316.3)	90,000 (400.3)	114,300 (508.4)
		V_{sa}	lbf (kN)	5,940 (26.4)	10,800 (48.0)	16,740 (74.5)	23,760 (105.7)	32,400 (144.1)	42,660 (189.8)	54,000 (240.2)	68,580 (305.0)
	Reduction factor for seismic shear	$\alpha V_{,seis}$	-	0.70	0.70	0.80	0.80	0.80	0.80	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75							
	Strength reduction factor for shear[2]	ϕ	-	0.65							
ASTM A 706 Grade 60	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	8,800 (39.1)	16,000 (71.2)	24,800 (110.3)	35,200 (156.6)	48,000 (213.5)	63,200 (281.1)	80,000 (355.9)	101,600 (452.0)
		V_{sa}	lbf (kN)	5,280 (23.5)	9,600 (42.7)	14,880 (66.2)	21,120 (94.0)	28,800 (128.1)	37,920 (168.7)	48,000 (213.5)	60,960 (271.2)
	Reduction factor for seismic shear	$\alpha V_{,seis}$	-	0.70	0.70	0.80	0.80	0.80	0.80	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75							
	Strength reduction factor for shear[2]	ϕ	-	0.65							
ASTM A 615 Grade 40	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	6,600 (29.4)	12,000 (53.4)	18,600 (82.7)	26,400 (117.4)	In accordance with ASTM A 615, Grade 40 bars are furnished only in sizes No. 3 through No. 6			
		V_{sa}	lbf (kN)	3,960 (17.6)	7,200 (32.0)	11,160 (49.6)	15,840 (70.5)				
	Reduction factor for seismic shear	$\alpha V_{,seis}$	-	0.70	0.70	0.80	0.80				
	Strength reduction factor for tension[2]	ϕ	-	0.75							
	Strength reduction factor for shear[2]	ϕ	-	0.65							

1. Values provided for reinforcing bar material types based on minimum specified strengths and calculated in accordance with ACI 318-14 Eq. 17.4.1.2 and Eq. 17.5.1.2b or ACI 318-11 Eq. (D-2) and Eq. (D-29), as applicable.
2. The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 5.3 or ACI 318-11 9.2, as applicable, are used in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318 D.4.4. Values correspond to ductile steel elements. In accordance with ACI 318-14 17.2.3.4.3(a)(vi) or ACI 318-11 D.3.3.4.3(a)6, as applicable, deformed reinforcing bars meeting this specification used as ductile steel elements to resist earthquake effects shall be limited to reinforcing bars satisfying the requirements of ACI 318-14 20.2.2.4 and 20.2.2.5 or ACI 318-11 21.1.5.2 (a) and (b), as applicable.
3. The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 5.3 or ACI 318-11 9.2, as applicable, are used in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318 D.4.4. Values correspond to brittle steel elements.

Concrete Breakout Design Information for Threaded Rod and Reinforcing Bars (For use with loads combinations taken from ACI 318-14 Section 5.3)[1]

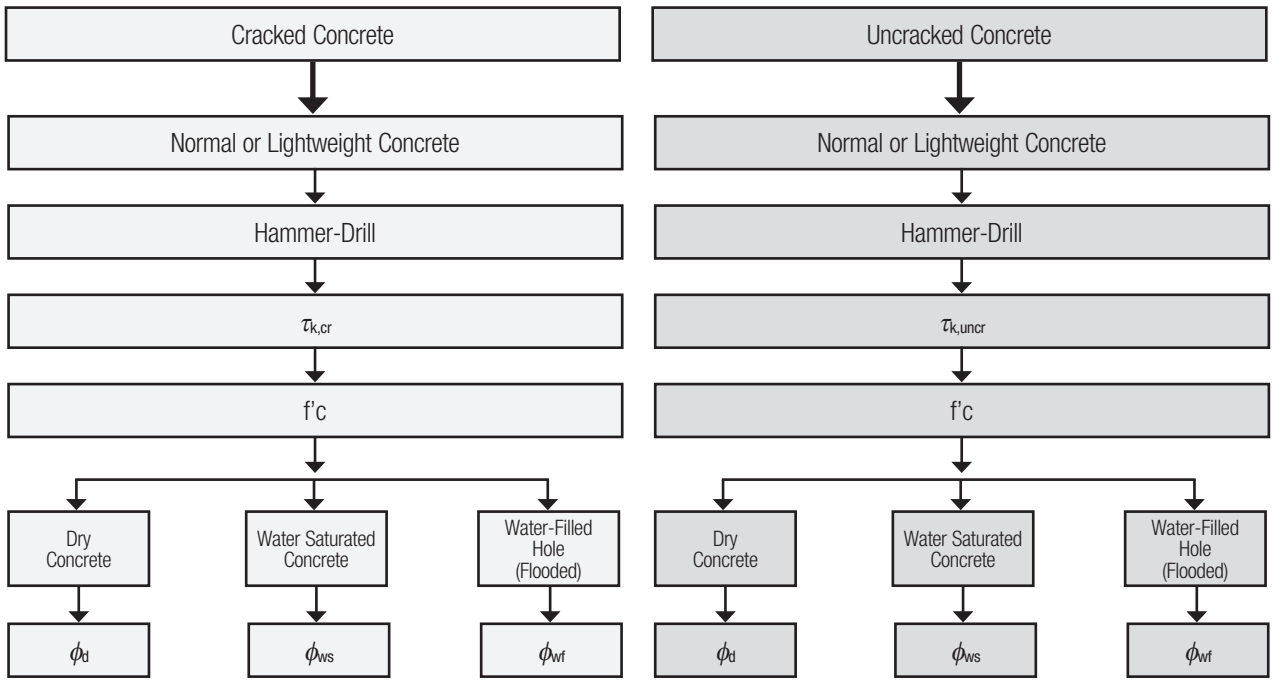
CODE LISTED ICC-ES ESR-2582

Design Information	Symbol	Units	Nominal Rod Diameter (inch) / Reinforcing Bar Size							
			3/8 or #3	1/2 or #4	5/8 or #5	3/4 or #6	7/8 or #7	1 or #8	#9	1-1/4 or #10
Effectiveness factor for cracked concrete	$k_{c,cr}$	- (SI)	Not Applicable	17 (7.1)						
Effectiveness factor for uncracked concrete	$k_{c,uncr}$	- (SI)	24 (10.0)							
Minimum embedment	$h_{ef,min}$	inch (mm)	2-3/8 (60)	2-3/4 (70)	3-1/8 (79)	3-1/2 (89)	3-1/2 (89)	4 (102)	4-1/2 (114)	5 (127)
Maximum embedment	$h_{ef,max}$	inch (mm)	4-1/2 (114)	6 (152)	7-1/2 (191)	9 (229)	10-1/2 (267)	12 (305)	13-1/2 (343)	15 (381)
Minimum anchor spacing	s_{min}	inch (mm)	1-7/8 (48)	2-1/2 (64)	3-1/8 (79)	3-3/4 (95)	4-3/8 (111)	5 (127)	5-5/8 (143)	6-1/4 (159)
Minimum edge distance[2]	c_{min}	inch (mm)	5*d* where *d* is nominal outside diameter of the anchor							
Minimum edge distance, reduced[2]	$c_{min,red}$	inch (mm)	1-3/4 (45)	1-3/4 (45)	1-3/4 (45)	1-3/4 (45)	1-3/4 (45)	1-3/4 (45)	2-3/4 (70)	2-3/4 (70)
Minimum member thickness	h_{min}	inch (mm)	h_{ef} + 1-1/4 (h_{ef} + 30)		$h_{ef} + 2d_o$ where d_o is hole diameter;					
Critical edge distance—splitting (for uncracked concrete only)[3]	c_{ac}	inch	$c_{ac} = h_{ef} \cdot (\frac{\tau_{uncr}}{1160})^{0.4} \cdot [3.1\text{-}0.7 \frac{h}{h_{ef}}]$							
		(mm)	$c_{ac} = h_{ef} \cdot (\frac{\tau_{uncr}}{8})^{0.4} \cdot [3.1\text{-}0.7 \frac{h}{h_{ef}}]$							
Strength reduction factor for tension, concrete failure modes, Condition B[4]	ϕ	-	0.65							
Strength reduction factor for shear, concrete failure modes, Condition B[4]	ϕ	-	0.70							

For SI: 1 inch = 25.4 mm, 1 lbf = 4.448 N. For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf.

1. Additional setting information is described in the installation instructions.
2. For installation between the minimum edge distance, c_{min}, and the reduced minimum edge distance, $c_{min,red}$, the maximum torque applied must be reduced (multiplied) by a factor of 0.45.
3. $\tau_{k,uncr}$ need not be taken as greater than: $\tau_{k,uncr} = \frac{k_{uncr} \cdot \sqrt{h_{ef} \cdot f'c}}{\pi \cdot d}$ and $\frac{h}{h_{ef}}$ need not be taken as larger than 2.4.
4. Condition A requires supplemental reinforcement, while Condition B applies where supplemental reinforcement is not provided or where pryout governs, as set forth in ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 5.3 or ACI 318-11 9.2, as applicable, are used in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318 D.4.4.

FLOWCHART FOR THE ESTABLISHMENT OF DESIGN BOND STRENGTH



Bond Strength Design Information for Threaded Rods (For use with load combinations taken from ACI 318-14 Section 5.3)[1,2]

Design Information		Symbol	Units	Nominal Rod Diameter (Inch) / Reinforcing Bar Size						
				3/8	1/2	5/8	3/4	7/8	1	1-1/4
Minimum embedment		$h_{ef,min}$	inch (mm)	2-3/8 (60)	2-3/4 (70)	3-1/8 (79)	3-1/2 (89)	3-1/2 (89)	4 (102)	5 (127)
Maximum embedment		$h_{ef,max}$	inch (mm)	4-1/2 (114)	6 (152)	7-1/2 (191)	9 (229)	10-1/2 (267)	12 (305)	15 (381)
122°F (50°C) Maximum Long-Term Service Temperature; 176°F (80°C) Maximum Short-Term Service Temperature[3,4]	Characteristic bond strength in cracked concrete[4,7]	$\tau_{k,cr}$	psi (N/mm²)	Not Applicable	498 (3.4)	519 (3.6)	519 (3.6)	519 (3.6)	519 (3.6)	525 (3.6)
	Characteristic bond strength in uncracked concrete[4,8]	$\tau_{k,uncr}$	psi (N/mm²)	823 (5.7)	823 (5.7)	823 (5.7)	823 (5.7)	823 (5.7)	743 (5.1)	588 (4.1)
									Not applicable in water-filled hole installation condition	
162°F (72°C) Maximum Long-Term Service Temperature; 248°F (120°C) Maximum Short-Term Service Temperature[3,4]	Characteristic bond strength in cracked concrete[4,7]	$\tau_{k,cr}$	psi (N/mm²)	Not Applicable	245 (1.7)	255 (1.8)	255 (1.8)	255 (1.8)	255 (1.8)	255 (1.8)
	Characteristic bond strength in uncracked concrete[4,8]	$\tau_{k,uncr}$	psi (N/mm²)	405 (2.8)	405 (2.8)	405 (2.8)	405 (2.8)	405 (2.8)	366 (2.5)	Not Applicable
								Not applicable in water-filled hole installation condition		
Permissible installation conditions[6]	Dry concrete	ϕ_d	-	0.65				0.65	0.65	0.65
	Water-saturated concrete	ϕ_{ws}	-	0.55				0.55	0.55	0.55
	Water-filled hole (flooded)	ϕ_{wf}	-	0.45				0.45	0.45	0.45
		κ_{wf}		0.78				0.70	0.69	0.67
Reduction factor for seismic tension		$\alpha N_{,seis}$	-	0.95						

For SI: 1 inch = 25.4 mm, 1 psi = 0.006894 MPa. For pound-inch units: 1 mm = 0.03937 inch, 1 MPa = 145.0 psi.

1. Bond strength values correspond to a normal-weight concrete compressive strength f'c = 2,500 psi (17.2 MPa). For concrete compressive strength, f'c between 2,500 psi and 8,000 psi (17.2 MPa and 55.2 MPa), the tabulated characteristic bond strength may be increased by a factor of $(f'c / 2{,}500)^{0.13}$ [For SI: $(f'c / 17.2)^{0.13}$].
2. The modification factor for bond strength of adhesive anchors in lightweight concrete shall be taken as given in ACI 318-14 17.2.6 where applicable.
3. Long-term and short-term temperatures meet the requirements of Section 8.5 of ACI 355.4 and Table 9.1, Temperature Category A.
4. Short-term base material service temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling. Long-term base material service temperatures are roughly constant over significant periods of time.
5. Characteristic bond strengths are for sustained loads including dead and live loads.
6. Permissible installation conditions include dry concrete, water-saturated concrete and water-filled holes. Water-filled holes include applications in dry or water-saturated concrete where the drilled holes contain standing water at the time of anchor installation.
7. For structures assigned to Seismic Design Categories C, D, E or F, the tabulated bond strength values for cracked concrete must be adjusted by an additional reduction factor, $\alpha_{N,seis}$, as given in this table.
8. Bond strength values for uncracked concrete are applicable for structures assigned to Seismic Design Categories A and B only.

Bond Strength Design Information for Reinforcing Bar (For use with load combinations taken from ACI 318-14 Section 5.3)[1,2]

Design Information		Symbol	Units	Nominal Rod Diameter (Inch) / Reinforcing Bar Size							
				#3	#4	#5	#6	#7	#8	#9	#10
Minimum embedment		$h_{ef,min}$	inch (mm)	2-3/8 (60)	2-3/4 (70)	3-1/8 (79)	3-1/2 (89)	3-1/2 (89)	4 (102)	4-1/2 (114)	5 (127)
Maximum embedment		$h_{ef,max}$	inch (mm)	4-1/2 (114)	6 (152)	7-1/2 (191)	9 (229)	10-1/2 (267)	12 (305)	13-1/2 (343)	15 (381)
122°F (50°C) Maximum Long-Term Service Temperature; 176°F (80°C) Maximum Short-Term Service Temperature[3,4]	Characteristic bond strength in cracked concrete[4,7]	$\tau_{k,cr}$	psi (N/mm²)	Not Applicable	331 (2.3)	345 (2.4)	345 (2.4)	345 (2.4)	345 (2.4)	349 (2.4)	349 (2.4)
	Characteristic bond strength in uncracked concrete[4,8]	$\tau_{k,uncr}$	psi (N/mm²)	823 (5.7)	823 (5.7)	823 (5.7)	823 (5.7)	823 (5.7)	743 (5.1)	655 (4.5)	588 (4.1)
									Not applicable in water-filled hole installation condition		
162°F (72°C) Maximum Long-Term Service Temperature; 248°F (120°C) Maximum Short-Term Service Temperature[3,4]	Characteristic bond strength in cracked concrete[4,7]	$\tau_{k,cr}$	psi (N/mm²)	Not Applicable	163 (1.1)	170 (1.2)	170 (1.2)	170 (1.2)	170 (1.2)	170 (1.2)	170 (1.2)
	Characteristic bond strength in uncracked concrete[4,8]	$\tau_{k,uncr}$	psi (N/mm²)	405 (2.8)	405 (2.8)	405 (2.8)	405 (2.8)	405 (2.8)	366 (2.5)	329 (2.3)	Not Applicable
								Not applicable in water-filled hole installation condition			
Permissible installation conditions[6]	Dry concrete	ϕ_d	-	0.65				0.65	0.65	0.65	0.65
	Water-saturated concrete	ϕ_{ws}	-	0.55				0.55	0.55	0.55	0.55
	Water-filled hole (flooded)	ϕ_{wf}	-	0.45				0.45	0.45	0.45	0.45
		κ_{wf}		0.78				0.70	0.69	0.68	0.67
Reduction factor for seismic tension		$\alpha N_{,seis}$	-	0.95							

For SI: 1 inch = 25.4 mm, 1 psi = 0.006894 MPa. For pound-inch units: 1 mm = 0.03937 inch, 1 MPa = 145.0 psi.

1. Bond strength values correspond to a normal-weight concrete compressive strength f'c = 2,500 psi (17.2 MPa). For concrete compressive strength, f'c between 2,500 psi and 8,000 psi (17.2 MPa and 55.2 MPa), the tabulated characteristic bond strength may be increased by a factor of $(f'c / 2{,}500)^{0.13}$ [For SI: $(f'c / 17.2)^{0.13}$].
2. The modification factor for bond strength of adhesive anchors in lightweight concrete shall be taken as given in ACI 318-14 17.2.6 where applicable.
3. Long-term and short-term temperatures meet the requirements of Section 8.5 of ACI 355.4 and Table 9.1, Temperature Category A.
4. Short-term base material service temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling. Long-term base material service temperatures are roughly constant over significant periods of time.
5. Characteristic bond strengths are for sustained loads including dead and live loads.
6. Permissible installation conditions include dry concrete, water-saturated concrete and water-filled holes. Water-filled holes include applications in dry or water-saturated concrete where the drilled holes contain standing water at the time of anchor installation.
7. For structures assigned to Seismic Design Categories C, D, E or F, the tabulated bond strength values for cracked concrete must be adjusted by an additional reduction factor, $\alpha_{N,seis}$, as given in this table.
8. Bond strength values for uncracked concrete are applicable for structures assigned to Seismic Design Categories A and B only.

Tension and Shear Design Strength for Threaded Rod and Reinforcing Bar Installed in Uncracked Concrete (Bond or Concrete Strength)
Drilled with a Hammer-Drill and Carbide Bit in a Dry Hole Condition
122°F (50°C) Maximum Long-Term Service Temperature;
176°F (80°C) Maximum Short-Term Service Temperature[1,2,3,4,5,6,7,8,9]

Nominal Rod/Rebar Size (in. or #)	Embed. Depth h_{ef} (in.)	Minimum Concrete Compressive Strength									
		f'c = 2,500 (psi)		f'c = 3,000 (psi)		f'c = 4,000 (psi)		f'c = 6,000 (psi)		f'c = 8,000 (psi)	
		ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)	ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)	ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)	ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)	ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)
3/8 or #3	2-3/8	1,495	1,610	1,535	1,650	1,590	1,715	1,675	1,805	1,740	1,875
	3	1,890	2,955	1,935	3,270	2,010	3,830	2,120	4,565	2,200	4,735
	4-1/2	2,835	5,395	2,905	5,965	3,015	6,495	3,180	6,845	3,300	7,105
1/2 or #4	2-3/4	2,310	2,780	2,365	3,075	2,455	3,605	2,590	4,505	2,690	5,280
	4	3,360	5,230	3,440	5,785	3,575	6,780	3,765	8,110	3,910	8,420
	6	5,040	9,530	5,165	10,540	5,360	11,545	5,650	12,170	5,865	12,630
5/8 or #5	3-1/8	3,280	3,695	3,360	4,085	3,490	4,785	3,680	5,990	3,820	7,020
	5	5,250	8,155	5,380	9,015	5,585	10,565	5,885	12,675	6,110	13,160
	7-1/2	7,880	14,850	8,065	16,420	8,375	18,035	8,825	19,015	9,165	19,735
3/4 or #6	3-1/2	4,285	4,730	4,380	5,230	4,535	6,130	4,760	7,670	4,925	8,990
	6	7,565	11,515	7,745	12,730	8,040	14,925	8,475	18,250	8,795	18,950
	9	11,345	20,970	11,615	23,190	12,060	25,975	12,710	27,380	13,195	28,420
7/8 or #7	3-1/2	4,370	4,930	4,475	5,470	4,635	6,410	4,865	8,020	5,040	9,400
	7	10,295	14,500	10,540	16,035	10,940	18,795	11,535	23,510	11,975	25,790
	10-1/2	15,440	26,410	15,810	29,210	16,415	34,235	17,300	37,265	17,960	38,685
1 or #8	4	5,210	6,045	5,325	6,685	5,515	7,835	5,795	9,800	6,000	11,490
	8	12,140	17,000	12,430	18,800	12,905	22,040	13,600	27,565	14,120	30,410
	12	18,205	30,965	18,645	34,245	19,355	40,140	20,400	43,940	21,180	45,615
#9	5	5,795	6,845	5,925	7,570	6,135	8,875	6,445	11,100	6,670	13,010
	10	13,545	19,320	13,865	21,365	14,395	25,045	15,175	31,325	15,755	33,930
	15	20,315	35,195	20,800	38,920	21,595	45,620	22,760	49,025	23,630	50,895
1-1/4	5	6,575	7,695	6,720	8,510	6,955	9,975	7,305	12,480	7,565	14,625
	10	15,010	21,630	15,370	23,920	15,955	28,035	16,820	35,065	17,460	37,605
	15	22,515	39,390	23,055	43,560	23,930	51,060	25,225	54,335	26,190	56,405
#10	5	6,490	7,685	6,635	8,495	6,870	9,960	7,215	12,455	7,470	14,600
	10	15,010	21,665	15,370	23,960	15,955	28,085	16,820	35,130	17,460	37,605
	15	22,515	39,465	23,055	43,640	23,930	51,155	25,225	54,335	26,190	56,405

☐ - Concrete Breakout Strength ☐ - Bond Strength/Pryout Strength

1. Tabular values are provided for illustration and are applicable for single anchors installed in uncracked normal-weight concrete with minimum slab thickness, $h_a = h_{min}$, and with the following conditions:
   - c_{a1} is greater than or equal to the critical edge distance, c_{ac}
   - c_{a2} is greater than or equal to 1.5 times c_{a1}.
2. Calculations were performed according to ACI 318-14, Ch.17 and ICC-ES AC308. The load level corresponding to the failure mode listed [Concrete breakout strength, bond strength/pryout strength] must be checked against the tabulated steel strength of the corresponding threaded rod or rebar size and type, the lowest load level controls.
3. Strength reduction factors (ϕ) for concrete breakout strength are based on ACI 318-14 Section 5.3 for load combinations. Condition B was assumed.
4. Strength reduction factors (ϕ) for bond strength are determined from reliability testing and qualification in accordance with ICC-ES AC308 and are tabulated in this product information and in ESR-2582.
5. Tabular values are permitted for static loads only, seismic loading is not considered with these tables. Periodic special inspection must be performed where required by code, see ESR-2582 for applicable information.
6. For anchors subjected to tension resulting from sustained loading a supplemental check must be performed according to ACI 318-14 17.3.1.2.
7. For designs that include combined tension and shear, the interaction of tension and shear loads must be calculated in accordance with ACI 318-14, Ch.17.
8. Interpolation is not permitted to be used with the tabular values. For intermediate base material compressive strengths, please see ACI 318-14, Ch.17, ICC-ES AC308 and information included in this product supplement. For other design conditions including seismic considerations please see ACI 318-14, Ch.17 and ICC-ES AC308 and ESR-2582.
9. Long term concrete temperatures are roughly constant over significant periods of time. Short-term elevated temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling.

Tension and Shear Design Strength for Threaded Rod Installed in Cracked Concrete (Bond or Concrete Strength) Drilled with a Hammer-Drill and Carbide Bit in a Dry Hole Condition 122°F (50°C) Maximum Long-Term ServiceTemperature; 176°F (80°C) Maximum Short-Term Service Temperature[1,2,3,4,5,6,7,8,9]

STRENGTH DESIGN SD TABLES

Nominal Rod/Rebar Size (in.)	Embed. Depth h_{ef} (in.)	Minimum Concrete Compressive Strength									
		f'c = 2,500 (psi)		f'c = 3,000 (psi)		f'c = 4,000 (psi)		f'c = 6,000 (psi)		f'c = 8,000 (psi)	
		ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)	ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)	ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)	ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)	ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)
1/2	2-3/4	1,400	1,985	1,430	2,195	1,485	2,575	1,565	3,220	1,625	3,505
	4	2,035	3,735	2,085	4,130	2,160	4,655	2,280	4,910	2,365	5,095
	6	3,050	6,570	3,125	6,730	3,245	6,985	3,420	7,365	3,550	7,645
5/8	3-1/8	2,070	2,640	2,120	2,915	2,200	3,420	2,320	4,275	2,410	5,015
	5	3,310	5,825	3,390	6,440	3,520	7,550	3,710	7,995	3,855	8,300
	7-1/2	4,970	10,605	5,085	10,955	5,280	11,375	5,565	11,990	5,780	12,445
3/4	3-1/2	2,705	3,380	2,760	3,735	2,860	4,380	3,000	5,480	3,105	6,420
	6	4,770	8,225	4,885	9,095	5,070	10,660	5,345	11,510	5,550	11,950
	9	7,155	14,980	7,325	15,780	7,605	16,380	8,015	17,265	8,320	17,925
7/8	3-1/2	2,755	3,525	2,820	3,910	2,920	4,580	3,070	5,730	3,180	6,715
	7	6,490	10,360	6,645	11,455	6,900	13,425	7,275	15,665	7,550	16,265
	10-1/2	9,735	18,865	9,970	20,865	10,350	22,295	10,910	23,500	11,325	24,395
1	4	3,640	4,320	3,720	4,775	3,855	5,595	4,045	7,000	4,190	8,205
	8	8,480	12,145	8,680	13,430	9,015	15,740	9,500	19,690	9,865	21,240
	12	12,720	22,120	13,025	24,460	13,520	28,670	14,250	30,695	14,795	31,865
1-1/4	5	5,870	5,495	6,000	6,080	6,210	7,125	6,525	8,915	6,755	10,445
	10	13,400	15,450	13,720	17,085	14,245	20,025	15,015	25,050	15,590	29,360
	15	20,100	28,135	20,585	31,115	21,370	36,470	22,525	45,620	23,385	50,365

☐ - Concrete Breakout Strength ☐ - Bond Strength/Pryout Strength

1. Tabular values are provided for illustration and are applicable for single anchors installed in cracked normal-weight concrete with minimum slab thickness, $h_a = h_{min}$, and with the following conditions:
   - c_{a1} is greater than or equal to the critical edge distance, c_{ac}
   - c_{a2} is greater than or equal to 1.5 times c_{a1}.
2. Calculations were performed according to ACI 318-14 Ch.17 and ICC-ES AC308. The load level corresponding to the failure mode listed [Concrete breakout strength, bond strength/pryout strength] must be checked against the tabulated steel strength of the corresponding threaded rod or rebar size and type, the lowest load level controls.
3. Strength reduction factors (ϕ) for concrete breakout strength are based on ACI 318-14 Section 5.3 for load combinations. Condition B was assumed.
4. Strength reduction factors (ϕ) for bond strength are determined from reliability testing and qualification in accordance with ICC-ES AC308 and are tabulated in this product information and in ESR-2582.
5. Tabular values are permitted for static loads only, seismic loading is not considered with these tables. Periodic special inspection must be performed where required by code, see ESR-2582 for applicable information.
6. For anchors subjected to tension resulting from sustained loading a supplemental check must be performed according to ACI 318-14 17.3.1.2.
7. For designs that include combined tension and shear, the interaction of tension and shear loads must be calculated in accordance with ACI 318-14 Ch.17.
8. Interpolation is not permitted to be used with the tabular values. For intermediate base material compressive strengths, please see ACI 318-14 Ch.17, ICC-ES AC308 and information included in this product supplement. For other design conditions including seismic considerations please see ACI 318-14 Ch.17 and ICC-ES AC308 and ESR-2582.
9. Long term concrete temperatures are roughly constant over significant periods of time. Short-term elevated temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling.

Tension and Shear Design Strength for Reinforcing Bar Installed in Cracked Concrete (Bond or Concrete Strength) Drilled with a Hammer-Drill and Carbide Bit in a Dry Hole Condition 122°F (50°C) Maximum Long-Term Service Temperature; 176°F (80°C) Maximum Short-Term Service Temperature[1,2,3,4,5,6,7,8,9]

STRENGTH DESIGN SD TABLES

Nominal Rod/Rebar Size (#)	Embed. Depth h_{ef} (in.)	Minimum Concrete Compressive Strength									
		f'c = 2,500 (psi)		f'c = 3,000 (psi)		f'c = 4,000 (psi)		f'c = 6,000 (psi)		f'c = 8,000 (psi)	
		ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)	ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)	ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)	ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)	ϕN_{cb} or ϕN_a Tension (lbs.)	ϕV_{cb} or ϕV_{cp} Shear (lbs.)
#4	2-3/4	930	1,985	950	2,050	990	2,130	1,040	2,245	1,080	2,330
	4	1,350	2,910	1,385	2,980	1,435	3,095	1,515	3,265	1,575	3,385
	6	2,030	4,365	2,075	4,470	2,155	4,645	2,270	4,895	2,360	5,080
#5	3-1/8	1,375	2,640	1,410	2,915	1,465	3,150	1,540	3,320	1,600	3,445
	5	2,200	4,740	2,255	4,855	2,340	5,040	2,465	5,315	2,560	5,515
	7-1/2	3,300	7,115	3,380	7,285	3,510	7,560	3,700	7,970	3,840	8,275
#6	3-1/2	1,795	3,380	1,835	3,735	1,900	4,095	1,995	4,300	2,065	4,450
	6	3,170	6,830	3,245	6,990	3,370	7,260	3,550	7,650	3,690	7,945
	9	4,755	10,240	4,870	10,490	5,055	10,890	5,330	11,475	5,530	11,915
#7	3-1/2	1,830	3,525	1,875	3,910	1,945	4,185	2,040	4,395	2,110	4,550
	7	4,315	9,295	4,420	9,515	4,585	9,880	4,835	10,415	5,020	10,810
	10-1/2	6,475	13,940	6,630	14,275	6,880	14,820	7,255	15,620	7,530	16,215
#8	4	2,420	4,320	2,475	4,775	2,560	5,515	2,690	5,795	2,785	6,000
	8	5,635	12,140	5,770	12,430	5,990	12,905	6,315	13,600	6,555	14,120
	12	8,455	18,210	8,655	18,645	8,985	19,355	9,475	20,405	9,835	21,180
#9	5	3,090	4,890	3,155	5,410	3,270	6,340	3,435	7,395	3,555	7,655
	10	7,215	13,800	7,390	15,260	7,670	16,520	8,085	17,415	8,395	18,080
	15	10,825	23,315	11,085	23,870	11,505	24,780	12,130	26,125	12,590	27,120
#10	5	3,855	5,490	3,940	6,070	4,080	7,115	4,280	8,900	4,435	9,550
	10	8,910	15,475	9,120	17,115	9,470	20,060	9,980	21,500	10,365	22,320
	15	13,365	28,190	13,685	29,470	14,205	30,595	14,975	32,250	15,545	33,480

■ - Concrete Breakout Strength ■ - Bond Strength/Pryout Strength

1. Tabular values are provided for illustration and are applicable for single anchors installed in cracked normal-weight concrete with minimum slab thickness, $h_a = h_{min}$, and with the following conditions:
   - c_{a1} is greater than or equal to the critical edge distance, c_{ac}
   - c_{a2} is greater than or equal to 1.5 times c_{a1}.
2. Calculations were performed according to ACI 318-14 Ch.17 and ICC-ES AC308. The load level corresponding to the failure mode listed [Concrete breakout strength, bond strength/pryout strength] must be checked against the tabulated steel strength of the corresponding threaded rod or rebar size and type, the lowest load level controls.
3. Strength reduction factors (ϕ) for concrete breakout strength are based on ACI 318-14 Section 5.3 for load combinations. Condition B was assumed.
4. Strength reduction factors (ϕ) for bond strength are determined from reliability testing and qualification in accordance with ICC-ES AC308 and are tabulated in this product information and in ESR-2582.
5. Tabular values are permitted for static loads only, seismic loading is not considered with these tables. Periodic special inspection must be performed where required by code, see ESR-2582 for applicable information.
6. For anchors subjected to tension resulting from sustained loading a supplemental check must be performed according to ACI 318-14 17.3.1.2.
7. For designs that include combined tension and shear, the interaction of tension and shear loads must be calculated in accordance with ACI 318-14 Ch.17.
8. Interpolation is not permitted to be used with the tabular values. For intermediate base material compressive strengths, please see ACI 318-14 Ch.17, ICC-ES AC308 and information included in this product supplement. For other design conditions including seismic considerations please see ACI 318-14 Ch.17 and ICC-ES AC308 and ESR-2582.
9. Long term concrete temperatures are roughly constant over significant periods of time. Short-term elevated temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling.

Tension Design of Steel Elements (Steel Strength)[1,2]

Steel Elements - Threaded Rod and Reinforcing Bar										
Nominal Rod/Rebar Size (in. or No.)	ASTM A36 and ASTM F1554 Grade 36	ASTM F1554 Grade 55	ASTM A193 Grade B7 and ASTM F1554 Grade 105	ASTM F593 CW Stainless (Types 304 and 316)	ASTM A193 Grade B8/ B8M, Class 1 Stainless (Types 304 and 316)	ASTM A193 Grade B8/ B8M2, Class 2B Stainless (Types 304 and 316)	ASTM A615 Grade 75 Rebar	ASTM A615 Grade 60 Rebar	ASTM A706 Grade 60 Rebar	ASTM A615 Grade 40 Rebar
	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)
3/8 or #3	3,370	4,360	7,265	5,040	3,315	5,525	7,150	7,425	6,600	4,950
1/2 or #4	6,175	7,980	13,300	9,225	6,070	10,110	13,000	13,500	12,000	9,000
5/8 or #5	9,835	12,715	21,190	14,690	9,660	16,105	20,150	20,925	18,600	13,950
3/4 or #6	14,550	18,815	31,360	18,480	14,300	23,830	28,600	29,700	26,400	19,800
7/8 or #7	20,085	25,970	43,285	25,510	19,735	32,895	39,000	40,500	36,000	-
1 or #8	26,350	34,070	56,785	33,465	25,895	43,160	51,350	53,325	47,400	-
#9	-	-	-	-	-	-	65,000	67,500	60,000	-
1-1/4 or #10	42,160	54,510	90,850	53,540	41,430	69,050	82,550	85,725	76,200	-

■ - Steel Strength

1. Steel tensile design strength according to ACI 318-14 Ch.17 Appendix D, $\phi N_{sa} = \phi \bullet A_{se,N} \bullet f_{uta}$
2. The tabulated steel design strength in tension must be checked against the bond strength/concrete capacity design strength to determine the controlling failure mode, the lowest load level controls.

Shear Design of Steel Elements (Steel Strength)[1,2]

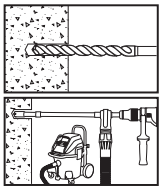
Steel Elements - Threaded Rod and Reinforcing Bar										
Nominal Rod/Rebar Size (in. or No.)	ASTM A36 and ASTM F1554 Grade 36	ASTM F1554 Grade 55	ASTM A193 Grade B7 and ASTM F1554 Grade 105	ASTM F593 CW Stainless (Types 304 and 316)	ASTM A193 Grade B8/ B8M, Class 1 Stainless (Types 304 and 316)	ASTM A193 Grade B8/ B8M2, Class 2B Stainless (Types 304 and 316)	ASTM A615 Grade 75 Rebar	ASTM A615 Grade 60 Rebar	ASTM A706 Grade 60 Rebar	ASTM A615 Grade 40 Rebar
	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)	ØNsa Tension (lbs.)
3/8 or #3	1,755	2,265	3,775	2,790	1,725	2,870	3,960	3,860	3,430	2,575
1/2 or #4	3,210	4,150	6,915	5,110	3,155	5,255	7,200	7,020	6,240	4,680
5/8 or #5	5,115	6,610	11,020	8,135	5,025	8,375	11,160	10,880	9,670	7,255
3/4 or #6	7,565	9,785	16,305	10,235	7,435	12,390	15,840	15,445	13,730	10,295
7/8 or #7	10,445	13,505	22,505	14,130	10,265	17,105	21,600	21,060	18,720	-
1 or #8	13,700	17,715	29,525	18,535	13,465	22,445	28,440	27,730	24,650	-
#9	-	-	-	-	-	-	36,000	35,100	31,200	-
1-1/4 or #10	21,920	28,345	47,240	29,655	21,545	35,905	45,720	44,575	39,625	-

■ - Steel Strength

1. Steel shear design strength according to ACI 318-14 Ch.17 Appendix D, $\phi V_{sa} = \phi \bullet 0.60 \bullet A_{se,V} \bullet f_{uta}$
2. The tabulated steel design strength in shear must be checked against the bond strength/concrete capacity design strength to determine the controlling failure mode, the lowest load level controls.

INSTALLATION INSTRUCTIONS (SOLID BASE MATERIALS)

DRILLING



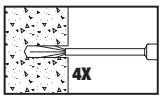
1- Drill a hole into the base material with rotary hammer drill (i.e. percussion drill) and a carbide drill bit to the size and embedment required by the selected steel hardware element (reference installation specifications for threaded rod and reinforcing bar). The tolerances of the carbide drill bits, including hollow bits, must meet ANSI Standard B212.15.

- Precaution: Use suitable eye and skin protection. Avoid inhalation of dust during drilling and/or removal (see dust extraction equipment by DEWALT to minimize dust emission).
- Note! In case of standing water in the drilled hole (flooded hole condition), all the water has to be removed from the hole (e.g. vacuum, compressed air, etc.) prior to cleaning.

Drilling in dry base material is recommended when using hollow drill bits (vacuum must be on).

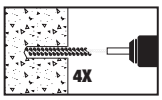
GO TO STEP 3 FOR HOLES DRILLED WITH DUSTX+™ DRILLING AND CLEANING SYSTEM; OTHERWISE GO TO STEP 2A.

HOLE CLEANING DRY (BLOW 4X, BRUSH 4X, BLOW 4X)



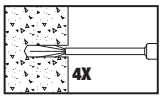
2a- Starting from the bottom or back of the anchor hole, blow the hole clean using a compressed air nozzle (min. 90 psi) or a hand pump (supplied by DEWALT) a minimum of four times (4x).

- Use a compressed air nozzle (min. 90 psi) or a hand pump (min. volume 25 fl. oz.) for anchor rod 3/8" to 3/4" diameter or reinforcing bar (rebar) sizes #3 to #6.
- Use a compressed air nozzle (min. 90 psi) for anchor rod 7/8" to 1-1/4" diameter and rebar sizes #7 to #10. A hand pump shall not be used with these anchor sizes.



2b- Determine wire brush diameter (see installation specifications) and attach the brush with adaptor to a rotary drill tool or battery screwgun. Brush the hole with the selected wire brush a minimum of four times (4x). A brush extension (supplied by DEWALT, Cat. #08282) should be used for holes drilled deeper than the listed brush length.

- The wire brush diameter should be checked periodically during use. The brush should resist insertion into the drilled hole and come into contact with the sides of the drilled hole. If not the brush is too small and must be replaced.



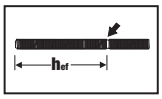
2c- Finally, blow the hole clean again a minimum of four times (4x).

- Use a compressed air nozzle (min. 90 psi) or a hand pump (min. volume 25 fl. oz.) for anchor rod 3/8" to 3/4" diameter or reinforcing bar (rebar) sizes #3 to #6.
- Use a compressed air nozzle (min. 90 psi) for anchor rod 7/8" to 1-1/4" diameter and rebar sizes #7 to #10. A hand pump shall not be used with these anchor sizes.
- When finished the hole should be clean and free of dust, debris, ice, grease, oil or other foreign material.

PREPARING

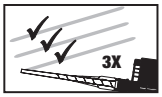
3- Check adhesive expiration date on cartridge label. Do not use expired product. Review Safety Data Sheet (SDS) before use. Cartridge temperature must be between 23°F - 95°F (-5°C - 35°C) when in use unless otherwise noted. Review gel (working) and cure time table. Consideration should be given to the reduced gel time of the adhesive in warm temperatures.

- Attach a supplied mixing nozzle to the cartridge. Unless otherwise noted do not modify the mixer in any way and make sure the mixing element is inside the nozzle. Load the cartridge into the correct dispensing tool.
- Note: Always use a new mixing nozzle with new cartridges of adhesive and also for all work interruptions exceeding the published working time of the adhesive.



4- Prior to inserting the anchor rod or rebar into the filled bore hole, the position of the embedment depth has to be marked on the anchor

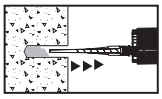
- Verify anchor element is straight and free of surface damage.



5- Adhesive must be properly mixed to achieve published properties. For new cartridges and nozzles, prior to dispensing adhesive into the drilled hole, separately dispense at least three full strokes of adhesive through the mixing nozzle until the adhesive is a consistent **GRAY** color. Do not attach a used nozzle when changing to a new cartridge.

- Review and note the published working and cure times (see gel time and curing time table) prior to injection of the mixed adhesive into the cleaned anchor hole.

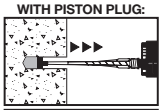
INSTALLATION

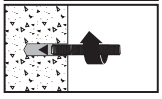


6- Fill the cleaned hole approximately to two-thirds full with mixed adhesive starting from the bottom or back of the anchor hole. Slowly withdraw the mixing nozzle as the hole fills to avoid creating air pockets or voids. If the bottom or back of the anchor hole is not reached with the mixing nozzle only, a plastic extension tube must be used with the mixing nozzle (see reference tables for installation).

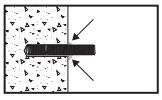
- Piston plugs (see installation specifications) must be used with and attached to the mixing nozzle and extension tube for horizontal and overhead installations in concrete with anchor rod 5/8" to 1-1/4" diameter and rebar size #5 to #10. Insert piston plug to the back of the drilled hole and inject as described in the method above. During installation the piston plug will be naturally extruded from the drilled hole by the adhesive pressure.
- **Attention!** Do not install anchors overhead without proper training and installation hardware provided by DEWALT. Contact DEWALT for details prior to use.

WITH PISTON PLUG:



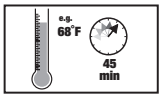


7- The anchor should be free of dirt, grease, oil or other foreign material. Push clean threaded rod or reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. Observe the gel (working) time.



8- Be sure that the anchor is fully seated at the bottom of the hole to the specified embedment. Adhesive must completely fill the annular gap between the anchor and the base material. Protect the anchor element threads from fouling with adhesive. For all installations the rebar must be restrained from movement throughout the specified curing period (as necessary) where necessary through the use of temporary wedges, external supports, or other methods. Minor adjustments to the position of the anchor element may be performed during the gel (working) time only.

CURING AND LOADING



9- Allow the adhesive anchor to cure to the specified full curing time prior to applying any load (reference gel time and curing time table).

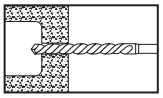
- Do not disturb, torque or load the anchor until it is fully cured.

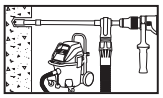
10- After full curing of the adhesive anchor, a fixture can be installed to the anchor and tightened up to the maximum torque (reference gel time and curing table) by using a calibrated torque wrench.

- Take care not to exceed the maximum torque for the selected anchor.

INSTALLATION INSTRUCTIONS (UNREINFORCED MASONRY [URM] AND HOLLOW BASE MATERIALS)

DRILLING





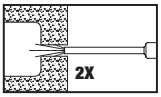
1- Drill a hole into the base material with a rotary drill tool to the size and embedment required by the selected screen tube size and steel anchor element (see installation specifications for threaded rod in hollow base material with screen tube supplied by DEWALT). Holes drilled in hollow concrete masonry units may be drilled with a rotary hammer-drill. The tolerances of the drill bit, including hollow drill bits, must meet the requirements of ANSI B212.15.

- Precaution: Wear suitable eye and skin protection. Avoid inhalation of dust during drilling and/or removal (see dust extraction by DEWALT to minimize dust emission).

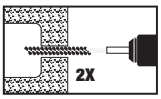
Drilling in dry base materials is recommended when using hollow drill bits (vacuum must be on).

GO TO STEP 3 FOR HOLES DRILLED WITH DUSTX+™ DRILLING AND CLEANING SYSTEM; OTHERWISE GO TO STEP 2A.

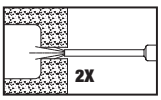
HOLE CLEANING (BLOW 2X, BRUSH 2X, BLOW 2X)



2- Starting from the bottom or back of the anchor hole, blow the hole clean with a hand pump (min. volume 25 fl.oz. supplied by DEWALT) or compressed air nozzle a minimum of two times (2x).



- Determine the wire brush diameter (see installation specifications) and attach the brush with adaptor to a rotary drill tool or battery screw gun. Brush the hole with the selected wire brush a minimum of two times (2x). A brush extension (supplied by DEWALT, Cat #08282) should be used for holes drilled deeper than the listed brush length.
- The wire brush should be checked periodically during use. The brush should resist insertion into the drilled hole and come into contact with the sides of the drilled hole. If not the brush is too small and must be replaced.

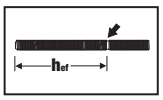


- Finally, blow the hole clean again a minimum of two times (2x)
- When finished the hole should be clean and free of dust, debris, ice, grease, oil or other foreign material.

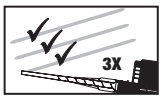
PREPARING

3- Check adhesive expiration date on cartridge label. Do not use expired product. Review Safety Data Sheet (SDS) before use. Cartridge temperature must be between 23°F - 95°F (-5°C - 35°C) when in use unless otherwise noted. Review gel (working) time and curing time table. Consideration should be given to the reduced gel (working) time of the adhesive in warm temperatures.

- Attach a supplied mixing nozzle to the cartridge. Unless otherwise noted do not modify the mixer in any way and make sure the mixing element is inside the nozzle. Load the cartridge into the correct dispensing tool.
- Note: Always use a new mixing nozzle with new cartridges of adhesive and also for all work interruptions exceeding the published working time of the adhesive.



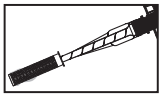
4- Prior to inserting the anchor into the filled screen tube, the position of the embedment depth has to be marked on the anchor. Verify anchor element is straight and free of surface damage.



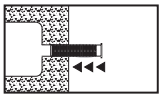
5- Adhesive must be properly mixed to achieve published properties. Prior to dispensing adhesive into the drilled hole, separately dispense at least three full strokes of adhesive through the mixing nozzle until the adhesive is a consistent **GRAY** color. Do not attach a used nozzle when changing to a new cartridge.

- Review and note the published working and cure times (see gel time and curing time table) prior to injection of the mixed adhesive into the screen tube.

INSTALLATION

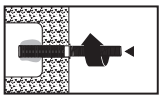


6- Select a screen tube of suitable length (supplied by DEWALT). Fill the screen tube full with adhesive starting from the bottom or back of the tube. Slowly withdraw the mixing nozzle as the screen fills to avoid creating air pockets or voids. A plastic extension tube must be used with the mixing nozzle if the back of the screen tube cannot be reached (see reference tables for installation).



7- Insert the screen tube filled with adhesive into the cleaned anchor hole. Inject additional adhesive into the screen tube as necessary to ensure the screen tube is completely filled.

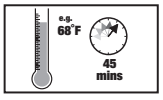
- Note: Overfilling the screen tube is acceptable but not required.



8- Prior to inserting the anchor rod into the screen tube inspect it to ensure that it is free of dirt, grease, oil or other foreign material.

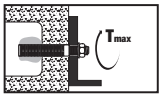
- Push the threaded rod into the screen tube while turning slightly to ensure positive distribution of the adhesive until back of the tube is reached.
- Note: In cases where the drilled hole size is larger than specified due to rotary drilling (e.g. an elongated opening), the annular space between the screen tube and the hole at the base material surface must be filled with adhesive.

CURING AND FIXTURE



9- Allow the adhesive anchor to cure to the specified full curing time prior to applying any load.

- Do not disturb, torque or load the anchor until it is fully cured (see gel time and curing time table).



10- After full curing of the adhesive anchor, a fixture can be installed to the anchor and tightened up to the maximum torque (see installation specifications for threaded rod in hollow base material) by using a calibrated torque wrench.

- Take care not to exceed the maximum torque for the selected anchor.

REFERENCE TABLES FOR INSTALLATION

Gel (working) Time and Curing Table

Temperature of Base Material		Gel (working) Time	Full Curing Time
°F	°C		
14	-10	90 minutes	24 hours
23	-5	90 minutes	14 hours
32	0	45 minutes	7 hours
41	5	25 minutes	2 hours
50	10	15 minutes	90 minutes
68	20	6 minutes	45 minutes
86	30	4 minutes	25 minutes
95	35	2 minutes	20 minutes
104	40	1.5 minutes	15 minutes

The gel (working) times listed for 32°F to 95°F are also applicable for the temperature of the adhesive and use of mixing nozzes during installation.
For installations in base material temperatures between 14°F and 23°F (-10ºC and -5ºC) the cartridge temperature must be conditioned to between 68°F and 95°F (20°C - 35°C).

Hole Cleaning Equipment Selection Table for AC100+ Gold[1,2,3,4]

Threaded Rod Diameter (inch)	Rebar Size (no.)	ANSI Drill Bit Diameter (inch)	Brush Length, L (inches)	Steel Wire Brush (Cat. #)	Blowout Tool	Number of Cleaning Actions
Solid Base Material						
3/8	#3	7/16	6-3/4	08284	Hand-pump (Cat #08280) or compressed air nozzle	4x blowing 4x brushing 4x blowing
1/2	-	9/16	6-3/4	08285		
-	#4	5/8	6-3/4	08275		
5/8	#5	11/16	7-7/8	08286		
5/8	#5	3/4	7-7/8	08278		
3/4	#6	7/8	7-7/8	08287		
7/8	#7	1	11-7/8	08288	Compressed air nozzle only	
1	#8	1-1/8	11-7/8	08289		
1-1/4	#9	1-3/8	11-7/8	08290		
-	#10	1-1/2	11-7/8	08291		
Hollow Base Material						
1/4	-	3/8	6-3/4	08284	Hand pump (Cat# 08280) or compressed air nozzle	2x blowing 2x brushing 2x blowing
1/4	-	1/2	6-3/4	08284		
3/8	-	1/2	6-3/4	08284		
3/8	-	9/16	6-3/4	08285		
1/2	-	5/8	6-3/4	08275		
1/2	-	3/4	7-7/8	08278		
5/8	-	3/4	7-7/8	08278		
5/8	-	7/8	7-7/8	08287		
3/4	-	7/8	7-7/8	08287		

1. An SDS-plus adaptor (Cat. #08283) or Jacobs chuck style adaptor (Cat. #08296) is required to attach a steel wire brush to the drill tool.
2. A brush extension (Cat. #08282) must be used for holes drilled deeper than the listed brush length.
3. See ordering information for selection of piston plugs (where applicable).
4. For any case, it must be possible for the steel anchor element to be inserted into the cleaned hole without resistance.

PERMISSIBLE INSTALLATION CONDITIONS (ADHESIVE)

Dry Concrete: cured concrete that, at the time of adhesive anchor installation, has not been exposed to water for the preceding 14 days.
Water-Saturated Concrete (wet): cured concrete that, at the time of adhesive anchor installation, has been exposed to water over a sufficient length of time to have the maximum possible amount of absorbed water into the concrete pore structure to a depth equal to the anchor embedment depth.
Water-Filled Holes (flooded): cured concrete that is water-saturated and where the drilled hole contains standing water at the time of anchor installation.

ORDERING INFORMATION

AC100+ Gold Cartridges

Cat No.	Description	Std. Box	Std. Carton	Pallet
8478SD	AC100+ Gold 9.5 fl. oz. Quik-Shot	12	36	648
8486SD	AC100+ Gold 11.5 fl. oz. dual cartridge	-	12	540
8490SD	AC100+ Gold 28 fl. oz. dual cartridge	-	8	240

One AC100+ Gold mixing nozzle is packaged with each cartridge.
AC100+ Gold mixing nozzles must be used to ensure complete and proper mixing of the adhesive.

Cartridge System Mixing Nozzles

Cat No.	Description	Std. Pack/ Box	Std. Carton
08293	Extra mixing nozzle for AC100+ Gold (10 oz. & 12 oz.)	2	24
08294	Extra mixing nozzle (with an 8" extension) for AC100+ Gold 28 oz.	2	24
08281	Mixing nozzle extension, 8" minimum	2	24
08297	Mixing nozzle extension, 20" long		

Dispensing Tools for Injection Adhesive

Cat No.	Description	Std. Box	Std. Ctn.
08437	Manual caulking gun for Quik-Shot	1	12
08479	High performance caulking gun for Quik-Shot	1	6
08485	AC100+ Gold high performance manual tool	1	20
08494	AC100+ Gold 28 oz. standard all metal manual tool	1	-
08496	AC100+ Gold 28 oz. pneumatic tool	1	-
DCE595D1	AC100+ Gold 28 oz. 20v battery powered dispensing tool	1	-

Piston Plugs for Adhesive Anchors

Cat. No.	Description	ANSI Drill Bit Dia.	Std. Bag	Std. Ctn.
08304	5/8" Plug	5/8"	10	100
08258	11/16" Plug	11/16"	10	100
08259	3/4" Plug	3/4"	10	100
08300	7/8" Plug	7/8"	10	100
08301	1" Plug	1"	10	100
08303	1-1/8" Plug	1-1/8"	10	100
08305	1-3/8" Plug	1-3/8"	10	100
08307	1-1/4" Plug	1-1/4"	10	100
08309	1-1/2" Plug	1-1/2"	10	100

A plastic extension tube (Cat# 08281 or 08297) or equivalent approved by DEWALT must be used with piston plugs.

Hole Cleaning Tools and Accessories

Cat No.	Description	Std. Box
08284	Wire brush for 7/16" or 1/2" ANSI hole, 6-3/4" length	1
08285	Wire brush for 9/16" ANSI hole, 6-3/4" length	1
08275	Wire brush for 5/8" ANSI hole, 6-3/4" length	1
08286	Wire brush for 11/16" ANSI hole, 7-7/8" length	1
08278	Wire brush for 3/4" ANSI hole, 7-7/8" length	1
08287	Wire brush for 7/8" ANSI hole, 7-7/8" length	1
08288	Wire brush for 1" ANSI hole, 11-7/8" length	1
08289	Wire brush for 1-1/8" ANSI hole, 11-7/8" length	1
08276	Wire brush for 1-1/4" ANSI hole, 11-7/8" length	1
08290	Wire brush for 1-3/8" ANSI hole, 11-7/8" length	1
08291	Wire brush for 1-1/2" ANSI hole, 11-7/8" length	1
08283	SDS-plus adapter for steel brushes	1
08296	Standard drill adapter for steel brushes (e.g. Jacobs Chuck)	1
08282	Steel brush extension, 12" length	1
08280	Hand pump/dust blower (25 ft. oz. clylinder volume)	1
08292	Air compressor nozzle with extension, 18" length	1
52073	Adhesive cleaning kit, includes 4 wire brushes (08284, 08285, 08286, 08287), steel brush extension (08282), SDS-plus adapter (08283), standard drill adapter (08296), hand pump/dust blower (08280), gloves and safety glasses	1

Stainless Steel Screen Tubes

Cat. No.	Description	Drill Diameter	Std. Ctn.
07960	1/4" x 2" Screen Tube	3/8"	25
07862	1/4" x 6" Screen Tube*	3/8"	25
07864	1/4" x 8"Screen Tube*	3/8"	25
07856	3/8" x 2" Screen Tube	1/2"	25
07961	3/8" x 3-1/2" Screen Tube	1/2"	25
07962	3/8" x 6" Screen Tube*	1/2"	25
07963	3/8" x 8" Screen Tube*	1/2"	25
07964	3/8" x 10" Screen Tube*	1/2"	25
07959	3/8" x 12" Screen Tube*	1/2"	25
07857	1/2" x 2" Screen Tube	5/8"	25
07965	1/2" x 3-1/2" Screen Tube	5/8"	25
07966	1/2" x 6" Screen Tube*	5/8"	25
07967	1/2" x 8" Screen Tube*	5/8"	25
07968	1/2" x 10" Screen Tube*	5/8"	25
07858	5/8" x 2" Screen Tube	3/4"	25
07969	5/8" x 4-1/2" Screen Tube	3/4"	20
07970	5/8" x 6" Screen Tube	3/4"	20
07971	5/8" x 8" Screen Tube*	3/4"	20
07972	5/8" x 10" Screen Tube*	3/4"	20
07859	3/4" x 2" Screen Tube	7/8"	25
07855	15/16" x 2" Screen Tube	1"	25
07865	15/16" x 8" Screen Tube	1"	10
07867	15/16" x 13" Screen Tube	1"	10

Screen tubes are made from a 300 series stainless steel. The nominal diameter of the screen listed indicates the matching rod diameter.
*Includes extension tubing.

Plastic Screen Tubes

Cat. No.	Description	ANSI Drill Diameter	Standard Carton
08310	3/8" x 3-1/2" Plastic Screen	9/16"	25
08311	3/8" x 6" Plastic Screen	9/16"	25
08313	3/8" x 8" Plastic Screen	9/16"	25
08315	1/2" x 3-1/2" Plastic Screen	3/4"	25
08317	1/2" x 6" Plastic Screen	3/4"	25
08321	5/8" x 6" Plastic Screen	7/8"	25
08323	3/4" x 6" Plastic Screen	1"	10
For availability of stainless steel screen tubes, Contact DEWALT			

SDS Max 4-Cutter Carbide Drill Bits

Cat. No.	Diameter	Usable Length	Overall Length
DW5806	5/8"	8"	13-1/2"
DW5809	5/8"	16"	21-1/2"
DW5807	5/8"	31"	36"
DW5808	11/16"	16"	21-1/2"
DW5810	3/4"	8"	13-1/2"
DW5812	3/4"	16"	21-1/2"
DW5813	3/4"	31"	36"
DW5814	13/16"	16"	21-1/2"
DW5815	7/8"	8"	13-1/2"
DW5816	7/8"	16"	21-1/2"
DW5851	7/8"	31"	36"
DW5817	27/32"	16"	21-1/2"
DW5818	1"	8"	13-1/2"
DW5819	1"	16"	22-1/2"
DW5852	1"	24"	29"
DW5820	1"	31"	36"
DW5821	1-1/8"	10"	15"
DW5822	1-1/8"	18"	22-1/2"
DW5853	1-1/8"	24"	29"
DW5854	1-1/8"	31"	36"
DW5824	1-1/4"	10"	15"
DW5825	1-1/4"	18"	22-1/2"

SDS+ Full Head Carbide Drill Bits

Cat. No.	Diameter	Usable Length	Overall Length
DW5502	3/16"	2"	4-1/2"
DW5503	3/16"	4"	6-1/2"
DW5504	3/16"	5"	8-1/2"
DW5506	3/16"	10"	12"
DW5512	7/32"	8"	10"
DW5517	1/4"	4"	6"
DW5518	1/4"	6"	8-1/2"
DW55200	1/4"	10"	12"
DW5521	1/4"	12"	14"
DW5524	5/16"	4"	6"
DW5526	5916"	10"	12"
DW5527	3/8"	4"	6-1/2"
DW5529	3/8"	8"	10"
DW55300	3/8"	10"	12"
DW5531	3/8"	16"	18"
DW5537	1/2"	4"	6"
DW5538	1/2"	8"	10-1/2"
DW5539	1/2"	10"	12"
DW5540	1/2"	16"	18"

SDS+ 4-Cutter Carbide Drill Bits

Cat. No.	Diameter	Usable Length	Overall Length
DW5471	5/8"	8"	10"
DW5472	5/8"	16"	18"
DW5474	3/4"	8"	10"
DW5475	3/4"	16"	18"
DW5477	7/8"	8"	10"
DW5478	7/8"	16"	18"
DW5479	1"	8"	10"
DW5480	1"	16"	18"
DW5481	1-1/8"	8"	10"
DW5482	1-1/8"	6"	18"

Dust Extraction

Cat. No.	Description
DWV012	10 Gallon Wet/Dry Hepa/Rrp Dust Extractor DWV9402 Fleece bag (5 pack) for DEWALT dust extractors DWV9316 Replacement Anti-Static Hose DWV9320 Replacement HEPA Filter Set (Type 1)
DWH050K	Dust Extraction with two interchangeable drilling heads
DCB1800B	1800 Watt Portable Power Station & Parallel Battery Charger Bare Unit

Hollow Drill Bits

	Cat. No.	Diameter	Overall Length	Usable Length	Recommended Hammer
SDS+	DWA54012	1/2"	14-1/2"	9-3/4"	DCH133 / DCH273 / DCH293
	DWA54916	9/16"	14-1/2"	9-3/4"	DCH133 / DCH273 / DCH293
	DWA54058	5/8"	14-1/2"	9-3/4"	DCH133 / DCH273 / DCH293
	DWA54034	3/4"	14-1/2"	9-3/4"	DCH133 / DCH273 / DCH293
SDS Max	DWA58058	5/8"	23-5/8"	15-3/4"	DCH481 / D25603K
	DWA58958	5/8"	47-1/4"	39-3/8"	DCH481 / D25603K
	DWA58116	11/16"	24-3/4"	15-3/4"	DCH481 / D25603K
	DWA58034	3/4"	23-5/8"	15-3/4"	DCH481 / D25603K
	DWA58934	3/4"	47-1/4"	39-3/8"	DCH481 / D25603K
	DWA58078	7/8"	23-5/8"	15-3/4"	DCH481 / D25603K
	DWA58001	1"	23-5/8"	15-3/4"	DCH481 / D25603K
	DWA58901	1"	47-1/4"	39-3/8"	DCH481 / D25603K
	DWA58118	1-1/8"	23-5/8"	15-3/4"	DCH481 / D25603K
	DWA58918	1-1/8"	47-1/4"	39-3/8"	DCH481 / D25603K
	DWA58114	1-1/4"	47-1/4"	39-3/8"	DCH481 / D25603K
	DWA58138	1-3/8"	47-1/4"	39-3/8"	DCH481 / D25603K
	DWA58112	1-1/2"	47-1/4"	39-3/8"	DCH481 / D25603K

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DIVISION: 03 00 00—CONCRETE
SECTION: 03 16 00—CONCRETE ANCHORS
DIVISION: 05 00 00—METALS
SECTION: 05 05 19—POST-INSTALLED CONCRETE ANCHORS

REPORT HOLDER:

DEWALT

EVALUATION SUBJECT:

AC100+ GOLD® ADHESIVE ANCHOR SYSTEM IN CRACKED AND UNCRACKED CONCRETE (DEWALT / POWERS)

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DIVISION: 03 00 00—CONCRETE
Section: 03 16 00—Concrete Anchors

DIVISION: 05 00 00—METALS
Section: 05 05 19—Post-installed Concrete Anchors

REPORT HOLDER:

DEWALT

ADDITIONAL LISTEE:

POWERS FASTENERS

EVALUATION SUBJECT:

AC100+ GOLD® ADHESIVE ANCHOR SYSTEM IN CRACKED AND UNCRACKED CONCRETE (DEWALT / POWERS)

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012, and 2009 *International Building Code*® (IBC)
- 2018, 2015, 2012, and 2009 *International Residential Code*® (IRC)

For evaluation for compliance with codes adopted by Los Angeles Department of Building and Safety (LADBS), see ESR-2582 LABC and LARC Supplement.

For evaluation for compliance with the *National Building Code of Canada*® (NBCC), see listing report ELC-2582.

Property evaluated:

Structural

2.0 USES

The AC100+ Gold adhesive anchor system is used as anchorage in cracked and uncracked normal weight concrete or lightweight concrete having a specified compressive strength, f'_c, of 2,500 psi to 8,500 psi (17.2 MPa to 58.6 MPa) to resist static, wind, or earthquake (Seismic Design Categories A through F) tension and shear loads in $^1/_2$-, $^5/_8$-, $^3/_4$-, $^7/_8$-, 1- and $1^1/_4$-inch-diameter (12.7, 15.9, 19.1, 22.2, 25.4 and 31.8 mm) threaded steel rods and No. 4 through No. 10 steel reinforcing bars; and used as anchorage in uncracked normal weight concrete only having a specified compressive strength, f'_c, of 2,500 psi to 8,500 psi (17.2 MPa to 58.6 MPa) to resist static, wind and earthquake (IBC Seismic Design Categories A and B only) tension and shear loads in $^3/_8$-inch-diameter (9.5 mm) threaded steel rods and No. 3 steel reinforcing bars in hammer-drilled holes.

The anchor system complies with anchors as described in Section 1901.3 of the 2018 and 2015 IBC, Section 1909 of the 2012 IBC and is an alternative to anchors described in Sections 1908 of the 2012 IBC; and Sections 1911 and 1912 of the 2009 IBC. The anchor systems may also be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 General:

The AC100+ Gold Adhesive is comprised of AC100+ Gold two-component adhesive filled in cartridges, static mixing nozzles, manual or powered dispensing tools, hole cleaning equipment, and adhesive injection accessories. Product names for the report holder and the additional listee are presented in the following table of this report.

COMPANY NAME	PRODUCT NAME
DEWALT	AC100+ Gold®
	(AC100-PRO outside North America)
Powers Fasteners	AC100+ Gold®
	(AC100-PRO outside North America)

The AC100+ Gold adhesive may be used with continuously threaded steel rods or deformed steel reinforcing bars. The primary components of the AC100+ Gold Adhesive Anchor System, including the AC100+ Gold adhesive cartridge, static mixing nozzle, the nozzle extension tube and steel anchor elements, are shown in Figure 3 of this report. Manufacturer's printed installation instructions (MPII) and parameters, included with each adhesive unit package, are shown in Figure 4 of this report.

3.2 Materials:

3.2.1 AC100+ Gold Adhesive: The AC100+ Gold adhesive is an injectable two-component vinylester adhesive. The two components are kept separate by means of a labeled dual-cylinder cartridge. The two components combine and react when dispensed through a static mixing nozzle, supplied by DEWALT, which is attached to the cartridge. AC100+ Gold is available in 9.5-ounce (280 mL), 11.5-ounce (345 mL), and 28-ounce (825 mL) cartridges. Each cartridge label is marked with the adhesive expiration date. The shelf life, as indicated by

the expiration date, applies to an unopened cartridge stored in a dry, dark, and cool environment.

3.2.2 Hole Cleaning Equipment: Hole cleaning equipment is comprised of steel wire brushes supplied by DEWALT, and air blowers which are shown in Figure 5 of this report.

3.2.3 Dispensers: AC100+ Gold adhesive must be dispensed with manual dispensers, pneumatic dispensers, or electric powered dispensers supplied by DEWALT.

3.2.4 Steel Anchor Elements:

3.2.4.1 Threaded Steel Rods: Threaded steel rods must be clean and continuously threaded (all-thread) in diameters described in Table 1 of this report. Specifications for grades of threaded rod, including the mechanical properties, and corresponding nuts, are included in Table 2. Carbon steel threaded rods must be furnished with a minimum 0.0002-inch-thick (0.005 mm) zinc electroplated coating complying with ASTM B633 SC 1 or a minimum 0.0021-inch-thick (0.053 mm) mechanically deposited zinc coating complying with ASTM B695, Class 55; or hot dip galvanized zinc coating complying with ASTM A153, Class C or D. The stainless steel threaded rods must comply with Table 2 of this report. Steel grades and types of material (carbon, stainless) for the washers and nuts must match the threaded rods. Threaded steel rods must be clean, straight and free of indentations or other defects along their length. The embedded end may be flat cut or cut on the bias to a chisel point.

3.2.4.2 Steel Reinforcing Bars: Steel reinforcing bars must be deformed reinforcing bars (rebar) in sizes as described in Table 1 of this report. The embedded portions of reinforcing bars must be clean, straight, and free of mill scale, rust and other coatings (other than zinc) that may impair the bond with the adhesive. Reinforcing bars must not be bent after installation except as set forth in ACI 318-14 26.6.3.1 (b) or ACI 318-11 7.3.2, as applicable, with the additional condition that the bars must be bent cold, and heating of reinforcing bars to facilitate field bending is not permitted.

3.2.4.3 Ductility: In accordance with ACI 318-14 2.3 or ACI 318-11 D.1, as applicable, in order for a steel anchor element to be considered ductile, the tested elongation must be at least 14 percent and reduction of area must be at least 30 percent. Steel elements with a tested elongation of less than 14 percent or a reduction of area less than 30 percent, or both, are considered brittle. Values for various steel materials are provided in Table 2 of this report. Where values are nonconforming or unstated, the steel must be considered brittle.

3.3 Concrete:

Normal weight concrete and lightweight concrete must comply with Sections 1903 and 1905 of the IBC, as applicable. The specified compressive strength of the concrete must be from 2,500 psi to 8,500 psi (17.2 MPa to 58.6 MPa).

4.0 DESIGN AND INSTALLATION

4.1 Strength Design:

4.1.1 General: The design strength of anchors under the 2018 and 2015 IBC, as well as the 2018 and 2015 IRC, must be determined in accordance with ACI 318-14 and this report. The design strength of anchors under the 2012 and 2009 IBC, as well as the 2012 and 2009 IRC must be determined in accordance with ACI 318-11 and this report.

The strength design of anchors must comply with ACI 318-14 17.3.1 or ACI 318-11 D.4.1, as applicable, except as required in ACI 318-14 17.2.3 or ACI 318-11 D.3.3, as applicable.

Design parameters are provided in Table 4 through Table 8 of this report. Strength reduction factors, ϕ, as given in ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, must be used for load combinations calculated in accordance with Section 1605.2 of the IBC, ACI 318-14 5.3 or ACI 318-11 9.2, as applicable. Strength reduction factors, ϕ, as described in ACI 318-11 D.4.4 must be used for load combinations calculated in accordance with ACI 318-11 Appendix C.

4.1.2 Static Steel Strength in Tension: The nominal static steel strength of a single anchor in tension, N_{sa}, in accordance with ACI 318-14 17.4.1.2 or ACI 318-11 D.5.1.2, as applicable, and the associated strength reduction factors, ϕ, in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, are provided in Table 4 and Table 5 of this report for the anchor element types included in this report. See Table 1 for design use and table index.

4.1.3 Static Concrete Breakout Strength in Tension: The nominal concrete breakout strength of a single anchor or group of anchors in tension, N_{cb} or N_{cbg}, must be calculated in accordance with ACI 318-14 17.4.2 or ACI 318-11 D.5.2, as applicable, with the following addition:

The basic concrete breakout strength of a single anchor in tension, N_b, must be calculated in accordance with ACI 318-14 17.4.2.2 or ACI 318-11 D.5.2.2, as applicable using the selected values of $k_{c,cr}$ and $k_{c,uncr}$ as provided in the tables of this report. Where analysis indicates no cracking in accordance with ACI 318-14 17.4.2.6 or ACI 318-11 D.5.2.6, as applicable, N_b must be calculated using $k_{c,uncr}$ and $\Psi_{c,N}$ = 1.0. See Table 1 for additional design information. See ACI 318-14 17.2.6 or ACI 318-11 D.3.6, as applicable, for modification factor, λ_a, for lightweight concrete. The value of f'_c used for calculation must be limited to 8,000 psi (55 MPa) in accordance with ACI 318-14 17.2.7 or ACI 318-11 D.3.7, as applicable. Additional information for the determination of nominal bond strength in tension is given in Section 4.1.4 of this report.

4.1.4 Static Bond Strength in Tension: The nominal static bond strength of a single adhesive anchor or group of adhesive anchors in tension, N_a or N_{ag}, must be calculated in accordance with ACI 318-14 17.4.5 or ACI 318-11 D.5.5, as applicable. Bond strength values ($\tau_{k,cr}$, $\tau_{k,uncr}$) are a function of concrete compressive strength (f'_c), concrete state (cracked, uncracked), concrete type (normal weight, lightweight), and installation conditions (dry concrete, water-saturated concrete, water-filled holes). Bond strength values must further be modified with the factor κ_{nn} for cases the holes are water-filled at the time of anchor installation (κ_{wf}). Special inspection level is qualified as periodic for all anchors except as noted in Section 4.4 of this report (the selection of continuous special inspection level does not provide an increase in anchor category or associated strength reduction factors for design). The following table summarizes the requirements:

CONCRETE STATE	CONCRETE TYPE	DRILLING METHOD	BOND STRENGTH	CONCRETE COMPRESSIVE STRENGTH	PERMISSIBLE INSTALLATION CONDITIONS	ASSOCIATED STRENGTH REDUCTION FACTOR
Cracked	Normal weight or lightweight	Hammer-drill	$\tau_{k,cr}$	f'_c	Dry concrete	ϕ_d
					Water-saturated concrete	ϕ_{ws}
					Water-filled hole (flooded)	ϕ_{wf}
Uncracked	Normal weight or lightweight	Hammer-drill	$\tau_{k,uncr}$	f'_c	Dry concrete	ϕ_d
					Water-saturated concrete	ϕ_{ws}
					Water-filled hole (flooded)	ϕ_{wf}

The bond strength values in Table 7 and Table 8 for hammer-drilled holes, correspond to concrete compressive strength f'_c equal to 2,500 psi (17.2 MPa) in normal weight concrete. See ACI 318-14 17.2.6 or ACI 318-11 D.3.6, as applicable, for modification factor, λ_a, for lightweight concrete. For concrete compressive strength, f'_c between 2,500 psi and 8,000 psi (17.2 MPa and 55.2 MPa), the tabulated characteristic bond strength may be increased by a factor of $(f'_c / 2{,}500)^{0.13}$ [For **SI:** $(f'_c / 17.2)^{0.13}$]. Where applicable, the modified bond strength values must be used in lieu of $\tau_{k,cr}$ and $\tau_{k,uncr}$ in ACI 318-14 Equations (17.4.5.1d) and (17.4.5.2) or ACI 318-11 Equations (D-21) and (D-22), as applicable. The resulting nominal bond strength must be multiplied by the associated strength reduction factor ϕ_d, ϕ_{ws} or ϕ_{wf}, as applicable.

Figure 2 of this report presents a bond strength design selection flowchart. Strength reduction factors for determination of the bond strength are given in Table 7 and Table 8 of this report. See Table 1 for index of design tables. Adjustments to the bond strength may also be made for increased concrete compressive strength as noted above and in the footnotes to the corresponding tables.

4.1.5 Static Steel Strength in Shear: The nominal static strength of a single anchor in shear, as governed by the steel, V_{sa}, in accordance with ACI 318-14 17.5.1.2 or ACI 318-11 D.6.1.2, as applicable, and the strength reduction factors, ϕ, in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, are given in Table 4 and Table 5 of this report for the anchor element types included in this report. See Table 1 for index of design tables.

4.1.6 Static Concrete Breakout Strength in Shear: The nominal concrete breakout strength of a single anchor or group of anchors in shear, V_{cb} or V_{cbg}, must be calculated in accordance with ACI 318-14 17.5.2 or ACI 318-11 D.6.2, as applicable, based on information given in Table 6 of this report. The basic concrete breakout strength of a single anchor in shear, V_b, must be calculated in accordance with ACI 318-14 17.5.2.2 or ACI 318-11 D.6.2.2, as applicable, using the values of d given in Table 6 for the corresponding anchor steel in lieu of d_a (2018, 2015, 2012 and 2009 IBC). In addition, h_{ef} must be substituted for ℓ_e. In no case must ℓ_e exceed 8d. See ACI 318-14 17.2.6 or ACI 318-11 D.3.6, as applicable, for modification factor, λ_a, for lightweight concrete. The value of f'_c must be limited to a maximum of 8,000 psi (55 MPa) in accordance with ACI 318-14 17.2.7 or D.3.7 ACI 318-11 D.3.7, as applicable.

4.1.7 Static Concrete Pryout Strength in Shear: The nominal static pryout strength of a single anchor or group of anchors in shear, V_{cp} or V_{cpg}, shall be calculated in accordance with ACI 318-14 17.5.3 or ACI 318-11 D.6.3, as applicable.

4.1.8 Interaction of Tensile and Shear Forces: For designs that include combined tension and shear, the interaction of tension and shear loads must be calculated in accordance with ACI 318-14 17.6 or ACI 318-11 D.7, as applicable.

4.1.9 Minimum Member Thickness h_{min}, Anchor Spacing s_{min}, Edge Distance c_{min}: In lieu of ACI 318-14 17.7.1 and 17.7.3 or ACI 318-11 D.8.1 and D.8.3, as applicable, values of s_{min} and c_{min} described in this report must be observed for anchor design and installation. The minimum member thicknesses, h_{min}, described in this report must be observed for anchor design and installation. For adhesive anchors that will remain untorqued, ACI 318-14 17.7.4 or ACI 318-11 D.8.4, as applicable, applies.

For anchors that will be torqued during installation, the maximum torque, T_{max}, must be reduced for edge distances less than five anchor diameters (5d). T_{max} is subject to the edge distance, c_{min}, and anchor spacing, s_{min}, and shall comply with the following requirements:

MAXIMUM TORQUE SUBJECT TO EDGE DISTANCE			
NOMINAL ANCHOR SIZE, d	MIN. EDGE DISTANCE, c_{min}	MIN. ANCHOR SPACING, s_{min}	MAXIMUM TORQUE, T_{max}
all sizes	5d	5d	$1.0 \cdot T_{max}$
$^3/_8$ in. to 1 in. (9.5 mm to 25.4 mm)	1.75 in. (45 mm)	5d	$0.45 \cdot T_{max}$
$1^1/_4$ in. (31.8 mm)	2.75 in. (70 mm)		

For values of T_{max}, see Table 9 and Figure 4 of this report.

4.1.10 Critical Edge Distance c_{ac} and $\psi_{cp,Na}$: The modification factor $\psi_{cp,Na}$, must be determined in accordance with ACI 318-14 17.4.5.5 or ACI 318-11 D.5.5.5, as applicable, except as noted below:

For all cases where $c_{Na}/c_{ac}<1.0$, $\psi_{cp,Na}$ determined from ACI 318-14 Eq. 17.4.5.5b or ACI 318-11 Eq. D-27, as applicable, need not be taken less than c_{Na}/c_{ac}. For all other cases, $\psi_{cp,Na}$ shall be taken as 1.0.

The critical edge distance, c_{ac} must be calculated according to Eq. 17.4.5.5c for ACI 318-14 or Eq. D-27a for ACI 318-11, in lieu of ACI 318-14 17.7.6 or ACI 318-11 D.8.6, as applicable.

$$c_{ac} = h_{ef} \cdot \left(\frac{\tau_{k,uncr}}{1160}\right)^{0.4} \cdot \left[3.1 - 0.7\frac{h}{h_{ef}}\right]$$

(Eq. 17.4.5.5c for ACI 318-14 or Eq. D-27a for ACI 318-11)

where

$\left[\frac{h}{h_{ef}}\right]$ need not be taken as larger than 2.4; and

$\tau_{k,uncr}$ = the characteristic bond strength stated in the tables of this report whereby $\tau_{k,uncr}$ need not be taken as larger than:

$$\tau_{k,uncr} = \frac{k_{uncr}\sqrt{h_{ef} f'_c}}{\pi \cdot d_a} \qquad \text{Eq. (4-1)}$$

4.1.11 Design Strength in Seismic Design Categories C, D, E and F: In structures assigned to Seismic Design Category C, D, E or F under the IBC or IRC, anchors must be designed in accordance with ACI 318-14 17.2.3 or ACI 318-11 D.3.3, as applicable, except as described below.

The nominal steel shear strength, V_{sa}, must be adjusted by $\alpha_{V,seis}$ as given in Tables 4 and 5 for the corresponding

anchor steel. The nominal bond strength $\tau_{k,cr}$ must be adjusted by $\alpha_{N,seis}$ as given in Table 7 for threaded rods. An adjustment to the nominal bond strength $\tau_{k,cr}$ is not required for reinforcing bars ($\alpha_{N,seis}$ = 1.0.)

As an exception to ACI 318-11 D.3.3.4.2: Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 shall be deemed to satisfy ACI 318-11 D.3.3.4.3(d).

Under ACI 318-11 D.3.3.4.3(d), in lieu of requiring the anchor design tensile strength to satisfy the tensile strength requirements of ACI 318-11 D.4.1.1, the anchor design tensile strength shall be calculated from ACI 318-11 D.3.3.4.4.

The following exceptions apply to ACI 318-11 D.3.3.5.2:

1. For the calculation of the in-plane shear strength of anchor bolts attaching wood sill plates of bearing or non-bearing walls of light-frame wood structures to foundations or foundation stem walls, the in-plane shear strength in accordance with ACI 318-11 D.6.2 and D.6.3 need not be computed and ACI 318-11 D.3.3.5.3 need not apply provided all of the following are satisfied:

1.1. The allowable in-plane shear strength of the anchor is determined in accordance with AF&PA NDS Table 11E for lateral design values parallel to grain.

1.2. The maximum anchor nominal diameter is $^5/_8$ inch (16 mm).

1.3. Anchor bolts are embedded into concrete a minimum of 7 inches (178 mm).

1.4. Anchor bolts are located a minimum of $1^3/_4$ inches (45 mm) from the edge of the concrete parallel to the length of the wood sill plate.

1.5. Anchor bolts are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the wood sill plate.

1.6. The sill plate is 2-inch or 3-inch nominal thickness.

2. For the calculation of the in-plane shear strength of anchor bolts attaching cold-formed steel track of bearing or non-bearing walls of light-frame construction to foundations or foundation stem walls, the in-plane shear strength in accordance with ACI 318-11 D.6.2 and D.6.3 need not be computed and ACI 318-11 D.3.3.5.3 need not apply provided all of the following are satisfied:

2.1. The maximum anchor nominal diameter is $^5/_8$ inch (16 mm).

2.2. Anchors are embedded into concrete a minimum of 7 inches (178 mm).

2.3. Anchors are located a minimum of $1^3/_4$ inches (45 mm) from the edge of the concrete parallel to the length of the track.

2.4. Anchors are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the track.

2.5. The track is 33 to 68 mil designation thickness. Allowable in-plane shear strength of exempt anchors, parallel to the edge of concrete shall be permitted to be determined in accordance with AISI S100 Section E3.3.1.

3. In light-frame construction, bearing or nonbearing walls, shear strength of concrete anchors less than or equal to 1 inch [25 mm] in diameter attaching a sill plate or track to foundation or foundation stem wall need not satisfy ACI 318-11 D.3.3.5.3(a) through (c) when the design strength of the anchors is determined in accordance with ACI 318-11 D.6.2.1(c).

4.2 Allowable Stress Design (ASD):

4.2.1 General: For anchors designed using load combinations in accordance with IBC Section 1605.3 (Allowable Stress Design) loads must be established using the equations below:

$$T_{allowable,ASD} = \phi N_n / \alpha \quad \text{(Eq. 4-2)}$$

and

$$V_{allowable,ASD} = \phi V_n / \alpha \quad \text{(Eq. 4-3)}$$

where

$T_{allowable,ASD}$ = Allowable tension load (lbf or kN).

$V_{allowable,ASD}$ = Allowable shear load (lbf or kN).

ϕN_n = Lowest design strength of an anchor or anchor group in tension as determined in accordance with ACI 318-14 Chapter 17 and 2018 or 2015 IBC Section 1905.1.8; ACI 318-11 Appendix D, ACI 318-08 Appendix D and 2009 IBC Sections 1908.1.9 and Section 4.1 of this report, as applicable (lbf or kN).

ϕV_n = Lowest design strength of an anchor or anchor group in shear as determined in accordance with ACI 318-14 Chapter 17 and 2018 or 2015 IBC Section 1905.1.8; ACI 318-11 Appendix D, ACI 318-08 Appendix D and 2009 Sections 1908.1.9 and Section 4.1 of this report, as applicable (lbf or kN).

α = Conversion factor calculated as a weighted average of the load factors for the controlling load combination. In addition, α must include all applicable factors to account for non-ductile failure modes and required over-strength.

4.2.2 Interaction of Tensile and Shear Forces: Interaction must be calculated in accordance with ACI 318-14 17.6 or ACI 318 (-11,-08) D.7, as applicable, as follows:

For shear loads $V \le 0.2\ V_{allowable,ASD}$, the full allowable load in tension shall be permitted.

For tension loads $T \le 0.2\ T_{allowable,ASD}$, the full allowable load in shear shall be permitted.

For all other cases:

$$\frac{T}{T_{allowable,ASD}} + \frac{V}{V_{allowable,ASD}} \le 1.2 \quad \text{Eq. (4-4)}$$

4.3 Installation:

Installation parameters are illustrated in Figure 4 of this report. Installation must be in accordance with ACI 318-14 17.8.1 and 17.8.2 or ACI 318-11 D.9.1 and D.9.2, as applicable. Anchor locations must comply with this report and the plans and specifications approved by the code official. Installation of the AC100+ Gold Adhesive Anchor System must conform to the manufacturer's printed installation instructions (MPII) as reproduced in each unit package as described in Figure 4. The injection tools, mixing nozzles, wire brushes, air blowers, and piston plugs along with the adhesive cartridges must be supplied by the manufacturer, as described in Figure 4 of this report.

The adhesive anchor system may be used for upwardly inclined orientation applications (e.g. overhead). Upwardly inclined and horizontal orientation applications are to

be installed using piston plugs for the $^5/_8$-inch through $1^1/_4$-inch diameter threaded steel rods and No. 5 through No. 10 steel reinforcing bars, installed in the specified hole diameter, and attached to the mixing nozzle and extension tube supplied by DEWALT as described in Figure 4 in this report. Upwardly inclined and horizontal orientation installation for the $^3/_8$-inch and $^1/_2$-inch diameter threaded steel rods, and No. 3 and No. 4 steel reinforcing bars may be injected directly to the end of the hole using a mixing nozzle with a hole depth $h_0 \leq 10$" (250 mm).

Installation of anchors in horizontal or upwardly inclined orientations shall be fully restrained from movement throughout the specified curing period through the use of temporary wedges, external supports, or other methods. Where temporary restraint devices are used, their use shall not result in impairment of the anchor shear resistance.

4.4 Special Inspection:

Periodic special inspection must be performed where required in accordance with Section 1705.1.1 and Table 1705.3 of the 2018, 2015 and 2012 IBC or 1704.4 and 1704.15 of the 2009 IBC or Sections 1704.4 and 1704.15 of the 2009 IBC, and this report. The special inspector must be on the jobsite initially during anchor installation to verify the anchor type, anchor dimensions, concrete type, concrete compressive strength, adhesive identification and expiration date, hole dimensions, hole cleaning procedures, anchor spacing, edge distances, concrete thickness, anchor embedment, tightening torque and adherence to the manufacturer's printed installation instructions (MPII). The special inspector must verify the initial installations of each type and size of adhesive anchor by construction personnel on site. Subsequent installations of the same anchor type and size by the same construction personnel are permitted to be performed in the absence of the special inspector. Any change in the anchor product being installed or the personnel performing the installation requires an initial inspection. For ongoing installations over an extended period, the special inspector must make regular inspections to confirm correct handling and installation of the product.

Continuous special inspection of adhesive anchors installed in horizontal or upwardly inclined orientations to resist sustained tension loads shall be performed in accordance with ACI 318-14 17.8.2.4, 26.7.1(h) and 26.13.3.2(c) or ACI 318-11 D.9.2.4, as applicable.

Under the IBC, additional requirements as set forth in Sections 1705, 1706 or 1707 must be observed, where applicable.

4.5 Compliance with NSF/ANSI Standard 61:

The AC100+ Gold Adhesive Anchor System complies with the requirements of NSF/ANSI Standard 61, as referenced in Section 605 of the 2018, 2015, 2012 and 2009 *International Plumbing Code*® (IPC), and is certified for use as an anchoring adhesive for installing threaded rods less than or equal to 1.3 inches (33 mm) in diameter in concrete for water treatment applications. An NSF/ANSI Standard 61 listing is provided by NSF International.

5.0 CONDITIONS OF USE

The AC100+ Gold Adhesive Anchor System described in this report complies with or is a suitable alternative to what is specified in the codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The AC100+ Gold adhesive anchors must be installed in accordance with this report and the manufacturer's printed installation instructions (MPII) as included with each cartridge and described in Figure 4 of this report.

5.2 The anchors described in this report must be installed in cracked or uncracked normal-weight concrete or lightweight concrete having a specified compressive strength, f'_c = 2,500 psi to 8,500 psi (17.2 MPa to 58.6 MPa).

5.3 The values of f'_c used for calculation purposes must not exceed 8,000 psi (55 MPa).

5.4 The concrete shall have attained its minimum design strength prior to installation of the anchors.

5.5 Anchors must be installed in concrete base materials in holes predrilled in accordance with the instructions provided in Figure 4 of this report.

5.6 Loads applied to the anchors must be adjusted in accordance with Section 1605.2 of the IBC for strength design and in accordance with Section 1605.3 of the IBC for allowable stress design.

5.7 The AC100+ Gold adhesive anchors are recognized for use to resist short- and long-term loads, including wind and earthquake, subject to the conditions of this report.

5.8 In structures assigned to Seismic Design Categories C, D, E, and F under the IBC or IRC, anchor strength must be adjusted in accordance with Section 4.1.11 of this report.

5.9 The AC100+ Gold Adhesive Anchor System is permitted to be installed in concrete that is cracked or that may be expected to crack during the service life of the anchor, subject to the conditions of this report.

5.10 Strength design values are established in accordance with Section 4.1 of this report.

5.11 Allowable stress design values are established in accordance with Section 4.2 of this report.

5.12 Minimum anchor spacing and edge distance, as well as minimum member thickness, must comply with the values described in this report.

5.13 Prior to installation, calculations and details demonstrating compliance with this report must be submitted to the code official. The calculations and details must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.14 Anchors are not permitted to support fire-resistive construction. Where not otherwise prohibited by the code, AC100+ Gold adhesive anchors are permitted for installation in fire-resistive construction provided that at least one of the following conditions is fulfilled:

- Anchors are used to resist wind or seismic forces only.
- Anchors that support gravity load-bearing structural elements are within a fire-resistive envelope or a fire-resistive membrane, are protected by approved fire-resistive materials, or have been evaluated for resistance to fire exposure in accordance with recognized standards.
- Anchors are used to support nonstructural elements.

5.15 Since an ICC-ES acceptance criteria for evaluating data to determine the performance of adhesive anchors subjected to fatigue or shock loading is unavailable at this time, the use of these anchors under such conditions is beyond the scope of this report.

5.16 Use of zinc-plated carbon steel threaded rods or steel reinforcing bars is limited to dry, interior locations.

5.17 Use of hot-dipped galvanized carbon steel and stainless steel rods is permitted for exterior exposure or damp environments.

5.18 Steel anchoring materials in contact with preservative-treated wood and fire-retardant-treated wood must be of zinc-coated carbon steel or stainless steel. The minimum coating weights for zinc-coated steel must comply with ASTM A153.

5.19 Periodic special inspection must be provided in accordance with Section 4.4 in this report. Continuous special inspection for anchors installed in horizontal or upwardly inclined orientations to resist sustained tension loads must be provided in accordance with Section 4.4 of this report.

5.20 Installation of anchors in horizontal or upwardly inclined orientations to resist sustained tension loads shall be performed by personnel certified by an applicable certification program in accordance with ACI 318-14 17.8.2.2 or 17.8.2.3 or ACI 318-11 D.9.2.2 or D.9.2.3, as applicable.

5.21 Anchors shall not be used for installations where the in-service concrete temperature can vary from 40°F (5°C) or less to 80°F (27°C) or higher within a 12-hour period. Such applications may include but are not limited to anchorage of building facade systems and other applications subject to direct sun exposure.

5.22 AC100+ Gold adhesive is manufactured, under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Post-installed Adhesive Anchors in Concrete (AC308), dated October 2017 (Editorially revised March 2018), which incorporates requirements in ACI 355.4-11 for use in cracked and uncracked concrete; including, but not limited to, tests under freeze/thaw conditions, tests under sustained load, tests for installation direction, tests at elevated temperatures, tests for resistance to alkalinity, tests for resistance to sulfur and tests for seismic tension and shear.

7.0 IDENTIFICATION

AC100+ Gold adhesive and additional listee product name described in Section 3.1 of this report are identified by packaging labeled with the lot number; expiration date; company name (DEWALT); and the evaluation report number (ESR-2582). Steel anchor elements including threaded rods, nuts, washers, and deformed reinforcing bars must conform to applicable national specifications as set forth in Section 3.2.4 and Tables 2 and 3 of this evaluation report or equivalent.

7.1 The report holder's contact information is the following:

DEWALT
701 EAST JOPPA ROAD
TOWSON, MARYLAND 21286
(800) 524-3244
www.DEWALT.com
anchors@DEWALT.com

7.2 The Additional Listee's contact information is the following:

POWERS FASTENERS
701 EAST JOPPA ROAD
TOWSON, MARYLAND 21286
(800) 524-3244
www.powers.com
anchors@dewalt.com

TABLE 1—DESIGN USE AND TABLE INDEX

DESIGN STRENGTH[1]		THREADED ROD (FRACTIONAL)[5]	DEFORMED REINFORCING BAR[5]
Steel	N_{sa}, V_{sa}	Table 4	Table 5
Concrete	N_{cb}, N_{cbg}, V_{cb}, V_{cbg}, V_{cp}, V_{cpg}	Table 6	Table 6
Bond[2]	N_a, N_{ag}	Table 7	Table 8

CONCRETE TYPE	CONCRETE STATE	THREADED ROD DIAMETER (inch)	REINFORCING BAR SIZE (No.)	DRILLING METHOD[4]	MINIMUM EMBEDMENT	MAXIMUM EMBEDMENT	SEISMIC DESIGN CATEGORIES[3]
Normal-weight and lightweight	Cracked	$^1/_2$, $^5/_8$, $^3/_4$, $^7/_8$, 1 and $1^1/_4$	4, 5, 6, 7, 8, 9, 10	Hammer-drill	See Table 7 and Table 8	See Table 7 and Table 8	A through F
	Uncracked	$^3/_8$, $^1/_2$, $^5/_8$, $^3/_4$, $^7/_8$, 1 and $1^1/_4$	3, 4, 5, 6, 7, 8, 9, 10	Hammer-drill	See Table 7 and Table 8	See Table 7 and Table 8	A and B

For **SI:** 1 inch = 25.4 mm. For **pound-inch** units: 1 mm = 0.03937 inch.

[1]Reference ACI 318-14 17.3.1.1 or ACI 318-11 D.4.1.1, as applicable. The controlling strength is decisive from all appropriate failure modes (i.e. steel, concrete, bond) and design assumptions.
[2]See Section 4.1.4 of this report for bond strength determination of post-installed adhesive anchors.
[3]See Section 4.1.11 for requirements for seismic design where applicable.
[4]Hammer-drill, i.e. rotary impact drills or rock drills with a carbide bit (including hollow drill bits).
[5]Anchors with $^1/_2$-, $^5/_8$-, $^3/_4$-, $^7/_8$- 1- and $1^1/_4$-inch-diameter (12.7, 15.9, 19.1, 22.2, 25.4 and 31.8 mm) threaded steel rods and No. 4 through No. 10 steel reinforcing bars may be installed in normal-weight concrete that is cracked or that may be expected to crack during the service life of the anchor when installed in hammer-drilled holes. Anchors with $^3/_8$-inch-diameter (9.5 mm) threaded steel rods and No. 3 steel reinforcing bars are limited to installation in uncracked concrete when installed in hammer-drilled holes.

The DEWALT drilling systems shown below collect and remove dust with a HEPA dust extractor during the hole drilling operation in dry base materials using hammer-drills (see step 1 of the manufacturer's published installation instructions).

FIGURE 1—EXAMPLES DEWALT DUST REMOVAL DRILLING SYSTEMS WITH HEPA DUST EXTRACTORS FOR ILLUSTRATION

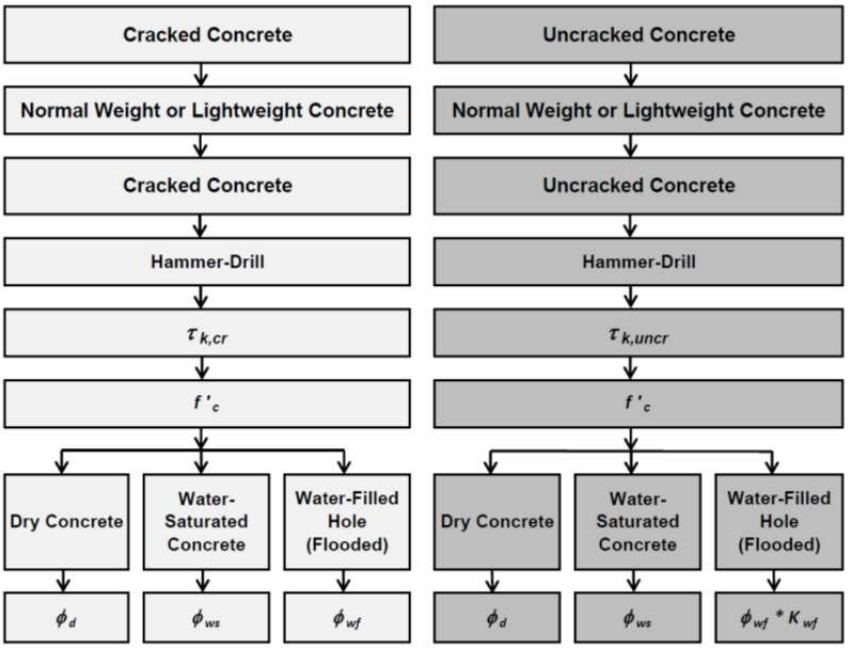


FIGURE 2—FLOW CHART FOR THE ESTABLISHMENT OF DESIGN BOND STRENGTH

TABLE 2—SPECIFICATIONS AND PHYSICAL PROPERTIES OF COMMON FRACTIONAL THREADED CARBON AND STAINLESS STEEL ROD MATERIALS[1]

THREADED ROD SPECIFICATION		UNITS	MIN. SPECIFIED ULTIMATE STRENGTH, f_{uta}	MIN. SPECIFIED YIELD STRENGTH 0.2 PERCENT OFFSET, f_{ya}	$\frac{f_{uta}}{f_{ya}}$	ELONGATION MINIMUM PERCENT[8]	REDUCTION OF AREA MINIMUM PERCENT	NUT SPECIFICATION[9]
Carbon Steel	ASTM A36[2] and F1554[3] Grade 36	psi (MPa)	58,000 (400)	36,000 (248)	1.61	23	40[10]	ASTM A194 / A563 Grade A
	ASTM F1554[3] Grade 55	psi (MPa)	75,000 (517)	55,000 (380)	1.36	23	40	
	ASTM F1554[3] Grade 105	psi (MPa)	125,000 (862)	105,000 (724)	1.19	15	45	ASTM A194 / A563 Grade DH
	ASTM A193[4] Grade B7	psi (MPa)	125,000 (860)	105,000 (720)	1.19	16	50	
	ASTM A449[5] ($^3/_8$ to 1 inch dia.)	psi (MPa)	120,000 (828)	92,000 (635)	1.30	14	35	ASTM A194 / A563 Grade DH
	ASTM A449[5] ($1^1/_4$ inch dia.)	psi (MPa)	105,000 (720)	81,000 (559)	1.30	14	35	
Stainless Steel (Types 304 and 316)	ASTM F593[6] CW1 ($^3/_8$ to $^5/_8$ inch dia.)	psi (MPa)	100,000 (690)	65,000 (450)	1.54	20	-[11]	ASTM F594 Alloy Group 1, 2 or 3
	ASTM F593[6] CW2 ($^3/_4$ to $1^1/_4$ inch dia.	psi (MPa)	85,000 (590)	45,000 (310)	1.89	25	-[11]	
	ASTM A193[7] Grade B8/B8M, Class 1	psi (MPa)	75,000 (517)	30,000 (207)	2.50	30	50	ASTM F594 Alloy Group 1, 2 or 3
	ASTM A193[7] Grade B8/B8M2, Class 2B	psi (MPa)	95,000 (655)	75,000 (517)	1.27	25	40	

For **SI:** 1 inch = 25.4 mm, 1 psi = 0.006897 MPa. For **pound-inch** units: 1 mm = 0.03937 inch, 1 MPa = 145.0 psi.

[1]Adhesive must be used with continuously threaded carbon or stainless steels (all-thread) that have thread characteristics comparable with ANSI B1.1 UNC Coarse Thread Series. Tabulated values correspond to anchor diameters included in this report. See Section 3.2.4.3 of this report for ductility of steel anchor elements.
[2]*Standard Specification for Carbon Structural Steel.*
[3]*Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.*
[4]*Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.*
[5]*Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use.*
[6]*Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.*
[7]*Standard Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.*
[8]Based on 2-inch (50 mm) gauge length except ASTM A193, which are based on a gauge length of 4d.
[9]Nuts of other grades and style having specified proof load stress greater than the specified grade and style are also suitable. Nuts must have specified proof load stresses equal to or greater than the minimum tensile strength of the specified threaded rod. Material types of the nuts and washers must be matched to the threaded rods.
[10]Minimum percent reduction of area reported in ASTM A36 is 50 percent.
[11]Minimum percent reduction of area not reported in the referenced ASTM standard.

TABLE 3—SPECIFICATIONS AND PHYSICAL PROPERTIES OF COMMON STEEL REINFORCING BARS[1]

REINFORCING SPECIFICATION	UNITS	MINIMUM SPECIFIED ULTIMATE STRENGTH, f_{uta}	MINIMUM SPECIFIED YIELD STRENGTH, f_{ya}
ASTM A615[2], A767[4], Grade 75	psi (MPa)	100,000 (690)	75,000 (520)
ASTM A615[2], A767[4], Grade 60	psi (MPa)	90,000 (620)	60,000 (414)
ASTM A706[3], A767[4], Grade 60	psi (MPa)	80,000 (550)	60,000 (414)
ASTM A615[2], A767[4], Grade 40	psi (MPa)	60,000 (415)	40,000 (275)

For **SI:** 1 psi = 0.006897 MPa. For **pound-inch** units: 1 MPa = 145.0 psi.

[1]Adhesive must be used with specified deformed reinforcing bars. Tabulated values correspond to bar sizes included in this report.
[2]*Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.* Grade 60 and Grade 40 bars may be considered ductile elements. In accordance with ACI 318-14 17.2.3.4.3(a)vi or ACI 318-11 D.3.3.4.3(a)6, as applicable, deformed reinforcing bars meeting this specification used as ductile steel elements to resist earthquake effects shall be limited to reinforcing bars satisfying the requirements of 21.1.5.2(a) and (b). Grade 75 bars furnished to specification are considered brittle elements unless evidence is otherwise shown to the satisfaction of the registered design professional and code official in accordance with Section 3.2.4.3 of this report.
[3]*Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.* Bars furnished to specification are considered ductile elements.
[4]*Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.* Bars furnished to specification are considered brittle elements unless evidence is otherwise shown to the satisfaction of the registered design professional and code official in accordance with Section 3.2.4.3 of this report.

TABLE 4—STEEL DESIGN INFORMATION FOR FRACTIONAL THREADED ROD

DESIGN INFORMATION		SYMBOL	UNITS	NOMINAL ROD DIAMETER (inch)[1]						
				$^3/_8$	$^1/_2$	$^5/_8$	$^3/_4$	$^7/_8$	1	$1^1/_4$
Threaded rod nominal outside diameter		d	inch (mm)	0.375 (9.5)	0.500 (12.7)	0.625 (15.9)	0.750 (19.1)	0.875 (22.2)	1.000 (25.4)	1.250 (31.8)
Threaded rod effective cross-sectional area		A_{se}	inch² (mm²)	0.0775 (50)	0.1419 (92)	0.2260 (146)	0.3345 (216)	0.4617 (298)	0.6057 (391)	0.9691 (625)
ASTM A36 and F1554, Grade 36	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	4,495 (20.0)	8,230 (36.6)	13,110 (58.3)	19,400 (86.3)	26,780 (119.1)	35,130 (156.3)	56,210 (250.0)
		V_{sa}	lbf (kN)	2,695 (12.0)	4,940 (22.0)	7,860 (35.0)	11,640 (51.8)	16,070 (71.4)	21,080 (93.8)	33,725 (150.0)
	Reduction factor for seismic shear	$\alpha_{V,seis}$	-	Not applicable	0.85	0.85	0.85	0.85	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75						
	Strength reduction factor for shear[2]	ϕ	-	0.65						
ASTM F1554, Grade 55	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	5,810 (25.9)	10,640 (47.3)	16,950 (75.4)	25,085 (111.6)	34,625 (154.0)	45,425 (202.0)	72,680 (323.3)
		V_{sa}	lbf (kN)	3,485 (15.5)	6,385 (28.4)	10,170 (45.2)	15,050 (67.0)	20,775 (92.4)	27,255 (121.2)	43,610 (194.0)
	Reduction factor for seismic shear	$\alpha_{V,seis}$	-	Not applicable	0.85	0.85	0.85	0.85	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75						
	Strength reduction factor for shear[2]	ϕ	-	0.65						
ASTM A193 Grade B7 and F1554, Grade 105	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	9,685 (43.1)	17,735 (78.9)	28,250 (125.7)	41,810 (186.0)	57,710 (256.7)	75,710 (336.8)	121,135 (538.8)
		V_{sa}	lbf (kN)	5,815 (25.9)	10,640 (7.3)	16,950 (75.4)	25,085 (111.6)	34,625 (154.0)	45,425 (202.1)	72,680 (323.3)
	Reduction factor for seismic shear	$\alpha_{V,seis}$	-	Not applicable	0.85	0.85	0.85	0.85	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75						
	Strength reduction factor for shear[2]	ϕ	-	0.65						
ASTM A449	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	9,300 (41.4)	17,025 (75.7)	27,120 (120.6)	40,140 (178.5)	55,905 (248.7)	63,600 (282.9)	101,755 (452.6)
		V_{sa}	lbf (kN)	5,580 (24.8)	10,215 (45.4)	16,270 (72.4)	24,085 (107.1)	33,540 (149.2)	38,160 (169.7)	61,050 (271.6)
	Reduction factor for seismic shear	$\alpha_{V,seis}$	-	Not applicable	0.80	0.80	0.80	0.80	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75						
	Strength reduction factor for shear[2]	ϕ	-	0.65						
ASTM F593 CW Stainless (Types 304 and 316)	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	7,750 (34.5)	14,190 (63.1)	22,600 (100.5)	28,430 (126.5)	39,245 (174.6)	51,485 (229.0)	82,370 (366.4)
		V_{sa}	lbf (kN)	4,650 (20.7)	8,515 (37.9)	13,560 (60.3)	17,060 (75.9)	23,545 (104.7)	30,890 (137.4)	49,425 (219.8)
	Reduction factor for seismic shear	$\alpha_{V,seis}$	-	Not applicable	0.85	0.85	0.85	0.85	0.80	0.80
	Strength reduction factor for tension[3]	ϕ	-	0.65						
	Strength reduction factor for shear[3]	ϕ	-	0.60						
ASTM A193 Grade B8/B8M, Class 1 Stainless (Types 304 and 316)	Nominal strength as governed by steel strength (for a single anchor)[4]	N_{sa}	lbf (kN)	4,420 (19.7)	8,090 (36.0)	12,880 (57.3)	19,065 (84.8)	26,315 (117.1)	34,525 (153.6)	55,240 (245.7)
		V_{sa}	lbf (kN)	2,650 (11.8)	4,855 (21.6)	7,730 (34.4)	11,440 (50.9)	15,790 (70.2)	20715 (92.1)	33,145 (147.4)
	Reduction factor for seismic shear	$\alpha_{V,seis}$	-	Not applicable	0.85	0.85	0.85	0.85	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75						
	Strength reduction factor for shear[2]	ϕ	-	0.65						
ASTM A193 Grade B8/B8M2, Class 2B Stainless (Types 304 and 316)	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	7,365 (32.8)	13,480 (60.0)	21,470 (95.5)	31,775 (141.3)	43,860 (195.1)	57,545 (256.0)	92,065 (409.5)
		V_{sa}	lbf (kN)	4,470 (19.7)	8,085 (36.0)	12,880 (57.3)	19,065 (84.8)	26,315 (117.1)	34,525 (153.6)	55,240 (245.7)
	Reduction factor for seismic shear	$\alpha_{V,seis}$	-	Not applicable	0.85	0.85	0.85	0.85	0.80	0.80
	Strength reduction factor for tension[2]	ϕ	-	0.75						
	Strength reduction factor for shear[2]	ϕ	-	0.65						

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.448 N. For **pound-inch** units: 1 mm = 0.03937 inches, 1 N = 0.2248 lbf.

[1]Values provided for reinforcing bar material types based on minimum specified strengths and calculated in accordance with ACI 318-14 Eq. 17.4.1.2 and Eq. 17.5.1.2b or ACI 318-11 Eq. D-2 and Eq. D-29, as applicable. Nuts must be appropriate for the rod, as listed in Table 2 of this report.

[2]The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 5.3 or ACI 318-11 9.2, as applicable are used in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318-11 D.4.4. Values correspond to ductile steel elements.

[3]The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 5.3 or ACI 318-11 9.2, as applicable are used in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318-11 D.4.4. Values correspond to brittle steel elements.

[4]In accordance with ACI 318-14 26.12.3.1(a) and 26.11.1.2(c) or ACI 318-11 D.5.1.2 and D.6.1.2, as applicable the calculated values for nominal tension and shear strength for ASTM A193 Grade B8/B8M Class 1 stainless steel threaded rods are based on limiting the specified tensile strength of the anchor steel to $1.9f_y$ or 57,000 psi (393 MPa).

TABLE 5—STEEL DESIGN INFORMATION FOR REINFORCING BARS

DESIGN INFORMATION		SYMBOL	UNITS	NOMINAL REINFORCING BAR SIZE (REBAR)[1]							
				No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10
Rebar nominal outside diameter		d	inch (mm)	0.375 (9.5)	0.500 (12.7)	0.625 (15.9)	0.750 (19.1)	0.875 (22.2)	1.000 (25.4)	1.125 (28.7)	1.250 (32.3)
Rebar effective cross-sectional area		A_{se}	inch^2 (mm^2)	0.110 (71)	0.200 (129)	0.310 (200)	0.440 (284)	0.600 (387)	0.790 (510)	1.000 (645)	1.270 (819)
ASTM A615, Grade 75	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	11,000 (48.9)	20,000 (89.0)	31,000 (137.9)	44,000 (195.7)	60,000 (266.9)	79,000 (351.4)	100,000 (444.8)	127,000 (564.9)
		V_{sa}	lbf (kN)	6,600 (29.4)	12,000 (53.4)	18,600 (82.7)	26,400 (117.4)	36,000 (160.1)	47,400 (210.8)	60,000 (266.9)	76,200 (338.9)
	Reduction factor for seismic shear	$\alpha_{V,seis}$	-	Not applicable	0.70	0.70	0.70	0.70	0.70	0.70	0.70
	Strength reduction factor for tension[3]	ϕ	-	0.65							
	Strength reduction factor for shear[3]	ϕ	-	0.60							
ASTM A615, Grade 60	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	9,900 (44.0)	18,000 (80.1)	27,900 (124.1)	39,600 (176.1)	54,000 (240.2)	71,100 (316.3)	90,000 (400.3)	114,300 (508.4)
		V_{sa}	lbf (kN)	5,940 (26.4)	10,800 (48.0)	16,740 (74.5)	23,760 (105.7)	32,400 (144.1)	42,660 (189.8)	54,000 (240.2)	68,580 (305.0)
	Reduction factor for seismic shear	$\alpha_{V,seis}$	-	Not applicable	0.70	0.70	0.70	0.70	0.70	0.70	0.70
	Strength reduction factor for tension[2]	ϕ	-	0.75							
	Strength reduction factor for shear[2]	ϕ	-	0.65							
ASTM A706, Grade 60	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	8,800 (39.1)	16,000 (71.2)	24,800 (110.3)	35,200 (156.6)	48,000 (213.5)	63,200 (281.1)	80,000 (355.9)	101,600 (452.0)
		V_{sa}	lbf (kN)	5,280 (23.5)	9,600 (42.7)	14,880 (66.2)	21,120 (94.0)	28,800 (128.1)	37,920 (168.7)	48,000 (213.5)	60,960 (271.2)
	Reduction factor for seismic shear	$\alpha_{V,seis}$	-	Not applicable	0.70	0.70	0.70	0.70	0.70	0.70	0.70
	Strength reduction factor for tension[2]	ϕ	-	0.75							
	Strength reduction factor for shear[2]	ϕ	-	0.65							
ASTM A615, Grade 40	Nominal strength as governed by steel strength (for a single anchor)	N_{sa}	lbf (kN)	6,600 (29.4)	12,000 (53.4)	18,600 (82.7)	26,400 (117.4)	In accordance with ASTM A615, Grade 40 bars are furnished only in sizes No. 3 through No. 6			
		V_{sa}	lbf (kN)	3,960 (17.6)	7,200 (32.0)	11,160 (49.6)	15,840 (70.5)				
	Reduction factor for seismic shear	$\alpha_{V,seis}$	-	Not applicable	0.70	0.70	0.70				
	Strength reduction factor for tension[2]	ϕ	-	0.75							
	Strength reduction factor for shear[2]	ϕ	-	0.65							

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.448 N. For **pound-inch** units: 1 mm = 0.03937 inches, 1 N = 0.2248 lbf.

[1]Values provided for reinforcing bar material types based on minimum specified strengths and calculated in accordance with ACI 318-14 Eq. 17.4.1.2 and Eq. 17.5.1.2b or ACI 318-11 Eq. D-2) and Eq. D-29, as applicable.

[2]The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318 D.4.4. Values correspond to ductile steel elements. In accordance with ACI 318-14 17.2.3.4.3(a)6 or ACI 318-11 D.3.3.4.3 (a) 6, as applicable, deformed reinforcing bars meeting this specification used as ductile steel elements to resist earthquake effects shall be limited to reinforcing bars satisfying the requirements of ACI 318-14 20.2.2.4 and 20.2.2.5 or ACI 318-11 21.1.5.2 (a) and (b) as applicable.

[3]The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 5.3 or ACI 318-11 9.2 are used in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318-11 D.4.4. Values correspond to brittle steel elements.

TABLE 6—CONCRETE BREAKOUT AND PRYOUT DESIGN INFORMATION FOR FRACTIONAL THREADED ROD AND REINFORCING BARS IN HOLES DRILLED WITH A HAMMER DRILL AND CARBIDE BIT[1]

DESIGN INFORMATION	SYMBOL	UNITS	NOMINAL ROD DIAMETER (inch) / REINFORCING BAR SIZE							
			$^3/_8$ or #3	$^1/_2$ or #4	$^5/_8$ or #5	$^3/_4$ or #6	$^7/_8$ or #7	1 or #8	#9	$1^1/_4$ or #10
Effectiveness factor for cracked concrete	$k_{c,cr}$	- (SI)	Not Applicable	17 (7.1)						
Effectiveness factor for uncracked concrete	$k_{c,uncr}$	- (SI)	24 (10.0)							
Minimum embedment	$h_{ef,min}$	inch (mm)	$2^3/_8$ (60)	$2^3/_4$ (70)	$3^1/_8$ (79)	$3^1/_2$ (89)	$3^1/_2$ (89)	4 (102)	$4^1/_2$ (114)	5 (127)
Maximum embedment	$h_{ef,max}$	inch (mm)	$4^1/_2$ (114)	6 (152)	$7^1/_2$ (191)	9 (229)	$10^1/_2$ (267)	12 (305)	$13^1/_2$ (343)	15 (381)
Minimum anchor spacing	s_{min}	inch (mm)	$1^7/_8$ (48)	$2^1/_2$ (64)	$3^1/_8$ (79)	$3^3/_4$ (95)	$4^3/_8$ (111)	5 (127)	$5^5/_8$ (143)	$6^1/_4$ (159)
Minimum edge distance	c_{min}	inch (mm)	5*d* where *d* is nominal outside diameter of the anchor; see Section 4.1.9 of this report for design with reduced minimum edge distances (with reduced torque)							
Minimum member thickness	h_{min}	inch (mm)	$h_{ef} + 1^1/_4$ (h_{ef} + 30)		$h_{ef} + 2d_o$ where d_o is hole diameter; for installation parameters see Table 9 of this report					
Critical edge distance—splitting (for uncracked concrete only)	c_{ac}	inch (mm)	See Section 4.1.10 of this report							
Strength reduction factor for tension, concrete failure modes, Condition B[2]	ϕ	-	0.65							
Strength reduction factor for shear, concrete failure modes, Condition B[2]	ϕ	-	0.70							

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.448 N. For **pound-inch** units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf.

[1]Additional setting information is described in the installation instructions, Figure 4 of this report.
[2]Condition A requires supplemental reinforcement, while Condition B applies where supplemental reinforcement is not provided or where pryout governs, as set forth in ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 5.3 or ACI 318-11 9.2 are used in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318-11 D.4.4.

TABLE 7—BOND STRENGTH DESIGN INFORMATION FOR FRACTIONAL THREADED RODS IN HOLES DRILLED WITH A HAMMER DRILL AND CARBIDE BIT[1]

DESIGN INFORMATION		SYMBOL	UNITS	NOMINAL ROD DIAMETER (inch)						
				3/8	1/2	5/8	3/4	7/8	1	1 1/4
Minimum embedment		$h_{ef,min}$	inch (mm)	2 3/8 (60)	2 3/4 (70)	3 1/8 (79)	3 1/2 (89)	3 1/2 (89)	4 (102)	5 (127)
Maximum embedment		$h_{ef,max}$	inch (mm)	4 1/2 (114)	6 (152)	7 1/2 (191)	9 (229)	10 1/2 (267)	12 (305)	15 (381)
122°F (50°C) Maximum long-term service temperature; 176°F (80°C) maximum short-term service temperature[2,3]	Characteristic bond strength in cracked concrete[4,6]	$\tau_{k,cr}$	psi (N/mm²)	Not applicable	498 (3.4)	519 (3.6)	519 (3.6)	519 (3.6)	519 (3.6)	525 (3.6)
	Characteristic bond strength in cracked concrete, short-term loads only[6]	$\tau_{k,cr}$	psi (N/mm²)	Not applicable	712 (4.9)	742 (5.1)	742 (5.1)	742 (5.1)	742 (5.1)	751 (5.2)
	Characteristic bond strength in uncracked concrete[4,7]	$\tau_{k,uncr}$	psi (N/mm²)	823 (5.7)	823 (5.7)	823 (5.7)	823 (5.7)	823 (5.7)	743 (5.1)	588 (4.1)
									Not applicable in water-filled hole installation condition	
	Characteristic bond strength in uncracked concrete, short-term loads only[7]	$\tau_{k,uncr}$	psi (N/mm²)	1,177 (8.1)	1,177 (8.1)	1,177 (8.1)	1,177 (8.1)	1,177 (8.1)	1,062 (7.3)	841 (5.8)
									Not applicable in water-filled hole installation condition	
162°F (72°C) Maximum long-term service temperature; 248°F (120°C) maximum short-term service temperature[2,3]	Characteristic bond strength in cracked concrete[4,6]	$\tau_{k,cr}$	psi (N/mm²)	Not applicable	245 (1.7)	255 (1.8)	255 (1.8)	255 (1.8)	255 (1.8)	255 (1.8)
	Characteristic bond strength in cracked concrete, short-term loads only[6]	$\tau_{k,cr}$	psi (N/mm²)	Not applicable	544 (3.7)	566 (3.9)	566 (3.9)	566 (3.9)	566 (3.9)	566 (3.9)
	Characteristic bond strength in uncracked concrete[4,7]	$\tau_{k,uncr}$	psi (N/mm²	405 (2.8)	405 (2.8)	405 (2.8)	405 (2.8)	405 (2.8)	366 (2.5)	Not applicable
								Not applicable in water-filled hole installation condition		
	Characteristic bond strength in uncracked concrete, short term loads only[7]	$\tau_{k,uncr}$	psi (N/mm²	899 (6.2)	899 (6.2)	899 (6.2)	899 (6.2)	899 (6.2)	813 (5.6)	Not applicable
								Not applicable in water-filled hole installation condition		
Permissible installation conditions[5]	Dry concrete	ϕ_d	-	0.65				0.65	0.65	0.65
	Water-saturated concrete	ϕ_{ws}	-	0.55				0.55	0.55	0.55
	Water-filled hole (flooded)	ϕ_{wf}	-	0.45				0.45	0.45	0.45
		κ_{wf}	-	0.78				0.70	0.69	0.67
Reduction factor for seismic tension		$\alpha_{N,seis}$	-	0.95						

For **SI:** 1 inch = 25.4 mm, 1 psi = 0.006894 MPa. For **pound-inch** units: 1 mm = 0.03937 inch, 1 MPa = 145.0 psi.

[1]Bond strength values correspond to concrete compressive strength f'_c = 2,500 psi. For concrete compressive strength, f'_c between 2,500 psi and 8,000 psi, the tabulated characteristic bond strength may be increased by a factor of $(f'_c / 2{,}500)^{0.13}$ [For **SI:** $(f'_c / 17.2)^{0.13}$]. See Section 4.1.4 of this report.
[2]Long-term and short-term temperatures meet and exceed the requirements of Section 8.5 of ACI 355.4 and Table 9.1, Temperature Category A.
[3]Short-term elevated concrete temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling. Long-term concrete temperatures are roughly constant over significant periods of time.
[4]Characteristic bond strengths are for sustained loads including dead and live loads.
[5]Permissible installation conditions include dry concrete, water-saturated concrete and water-filled holes. Water-filled holes include applications in dry or water-saturated concrete where the drilled holes contain standing water at the time of anchor installation. For installation instructions see Figure 4 of this report.
[6]For structures assigned to Seismic Design Categories C, D, E or F, bond strength values for cracked concrete must be adjusted by an additional reduction factor, $\alpha_{N,seis}$, as given in the table. See Section 4.1.11 of this report.
[7]Bond strength values for uncracked concrete are applicable for structures assigned to Seismic Design Categories A and B only.

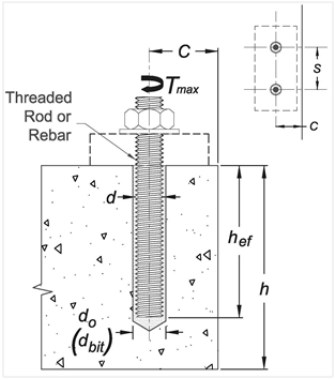
TABLE 8—BOND STRENGTH DESIGN INFORMATION FOR REINFORCING BARS IN HOLES DRILLED WITH A HAMMER DRILL AND CARBIDE BIT[1]

DESIGN INFORMATION		SYMBOL	UNITS	REINFORCING BAR SIZE							
				#3	#4	#5	#6	#7	#8	#9	#10
Minimum embedment		$h_{ef,min}$	inch (mm)	$2^3/_8$ (60)	$2^3/_4$ (70)	$3^1/_8$ (79)	$3^1/_2$ (89)	$3^1/_2$ (89)	4 (102)	$4^1/_2$ (114)	5 (127)
Maximum embedment		$h_{ef,max}$	inch (mm)	$4^1/_2$ (114)	6 (152)	$7^1/_2$ (191)	9 (229)	$10^1/_2$ (267)	12 (305)	$13^1/_2$ (343)	15 (381)
122°F (50°C) Maximum long-term service temperature; 176°F (80°C) maximum short-term service temperature[2,3]	Characteristic bond strength in cracked concrete[4,6]	$\tau_{k,cr}$	psi (N/mm^2)	Not applicable	331 (2.3)	345 (2.4)	345 (2.4)	345 (2.4)	345 (2.4)	349 (2.4)	349 (2.4)
	Characteristic bond strength in cracked concrete, short-term loads only[6]	$\tau_{k,cr}$	psi (N/mm^2)	Not applicable	473 (3.3)	493 (3.4)	493 (3.4)	493 (3.4)	493 (3.4)	499 (3.4)	499 (3.4)
	Characteristic bond strength in uncracked concrete[4,7]	$\tau_{k,uncr}$	psi (N/mm^2)	823 (5.7)	823 (5.7)	823 (5.7)	823 (5.7)	823 (5.7)	743 (5.1)	655 (5.1)	588 (4.1)
									Not applicable in water-filled hole installation condition		
	Characteristic bond strength in uncracked concrete, short-term loads only[7]	$\tau_{k,uncr}$	psi (N/mm^2)	1,117 (8.1)	1,117 (8.1)	1,117 (8.1)	1,117 (8.1)	1,117 (8.1)	1,062 (7.3)	951 (6.6)	841 (5.8)
									Not applicable in water-filled hole installation condition		
162°F (72°C) Maximum long-term service temperature; 248°F (120°C) maximum short-term service temperature[2,3]	Characteristic bond strength in cracked concrete[4,6]	$\tau_{k,cr}$	psi (N/mm^2	Not applicable	163 (1.1)	170 (1.2)	170 (1.2)	170 (1.2)	170 (1.2)	170 (1.2)	170 (1.2)
	Characteristic bond strength in cracked concrete, short-term loads only[6]	$\tau_{k,cr}$	psi (N/mm^2	Not applicable	362 (2.5)	377 (2.6)	377 (2.6)	377 (2.6)	377 (2.6)	382 (2.6)	382 (2.6)
	Characteristic bond strength in uncracked concrete[4,7]	$\tau_{k,uncr}$	psi (N/mm^2	405 (2.8)	405 (2.8)	405 (2.8)	405 (2.8)	405 (2.8)	366 (2.5)	329 (2.3)	Not applicable
								Not applicable in water-filled hole installation condition			
	Characteristic bond strength in uncracked concrete, short-term loads only[7]	$\tau_{k,uncr}$	psi (N/mm^2	899 (6.2)	899 (6.2)	899 (6.2)	899 (6.2)	899 (6.2)	813 (5.6)	730 (5.0)	Not applicable
								Not applicable in water-filled hole installation condition			
Permissible installation conditions[5]	Dry concrete	ϕ_d	-	0.65				0.65	0.65	0.65	0.65
	Water-saturated concrete	ϕ_{ws}	-	0.55				0.55	0.55	0.55	0.55
	Water-filled hole (flooded)	ϕ_{wf}	-	0.45				0.45	0.45	0.45	0.45
		κ_{wf}	-	0.78				0.70	0.69	0.68	0.67
Reduction factor for seismic tension		$\alpha_{N,seis}$	-	1.0							

For **SI:** 1 inch = 25.4 mm, 1 psi = 0.006894 MPa. For **pound-inch** units: 1 mm = 0.03937 inch, 1 MPa = 145.0 psi.

[1]Bond strength values correspond to concrete compressive strength f'_c = 2,500 psi. For concrete compressive strength, f'_c between 2,500 psi and 8,000 psi, the tabulated characteristic bond strength may be increased by a factor of $(f'_c / 2{,}500)^{0.13}$ [For **SI:** $(f'_c / 17.2)^{0.13}$]. See Section 4.1.4 of this report.
[2]Long-term and short-term temperatures meet and exceed the requirements of Section 8.5 of ACI 355.4 and Table 9.1, Temperature Category A.
[3]Short-term elevated concrete temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling. Long-term concrete temperatures are roughly constant over significant periods of time.
[4]Characteristic bond strengths are for sustained loads including dead and live loads.
[5]Permissible installation conditions include dry concrete, water-saturated concrete and water-filled holes. Water-filled holes include applications in dry or water-saturated concrete where the drilled holes contain standing water at the time of anchor installation. For installation instructions see Figure 4 of this report.
[6]For structures assigned to Seismic Design Categories C, D, E or F, the tabulated bond strength values for cracked concrete do not require an additional reduction factor applied for seismic tension ($\alpha_{N,seis}$ = 1.0), where seismic design is applicable. See Section 4.1.11 of this report for requirements for seismic design.
[7]Bond strength values for uncracked concrete are applicable for structures assigned to Seismic Design Categories A and B only.

TABLE 9—INSTALLATION PARAMETERS FOR FRACTIONAL THREADED ROD AND REINFORCING BARS



PARAMETER	SYMBOL	UNITS	NOMINAL ROD DIAMETER (inch) / REINFORCING BAR SIZE									
			$^3/_8$ or #3	$^1/_2$	#4	$^5/_8$ or #5	$^3/_4$ or #6	$^7/_8$ or #7	1 or #8	#9	$1^1/_4$	#10
Threaded rod outside diameter	d	inch (mm)	0.375 (9.5)	0.500 (12.7)		0.625 (15.9)	0.750 (19.1)	0.875 (22.2)	1.000 (25.4)	N/A[1]	1.250 (31.8)	N/A[1]
Rebar nominal outside diameter	d	inch (mm)	0.375 (9.5)	0.500 (12.7)		0.625 (15.9)	0.750 (19.1)	0.875 (22.2)	1.000 (25.4)	1.125 (28.7)	N/A[1]	1.250 (31.8)
Carbide drill bit nominal size	d_o (d_{bit})	inch	$^7/_{16}$	$^9/_{16}$	$^5/_8$	$^{11}/_{16}$ or $^3/_4$	$^7/_8$	1	$1^1/_8$	$1^3/_8$	$1^3/_8$	$1^1/_2$
Minimum embedment	$h_{ef,min}$	inch (mm)	$2^3/_8$ (60)	$2^3/_4$ (70)		$3^1/_8$ (79)	$3^1/_2$ (89)	$3^1/_2$ (89)	4 (102)	$4^1/_2$ (114)	5 (127)	5 (127)
Maximum embedment	$h_{ef,max}$	inch (mm)	$4^1/_2$ (114)	6 (152)		$7^1/_2$ (191)	9 (229)	$10^1/_2$ (267)	12 (305)	$13^1/_2$ (343)	15 (381)	15 (381)
Max. rod torque	T_{max}	ft-lbs	15	33		60	105	125	165	N/A[1]	280	N/A[1]
Max. torque[2] (A36/Grade 36 rod)	T_{max}	ft-lbs	10	25		50	90	125	165	N/A[1]	280	N/A[1]
Max. torque[3] (Class 1 SS rod)	T_{max}	ft-lbs	5	20		40	60	100	165	N/A[1]	280	N/A[1]
Minimum anchor spacing	s_{min}	inch (mm)	$1^7/_8$ (48)	$2^1/_2$ (64)		$3^1/_8$ (79)	$3^3/_4$ (95)	$4^3/_8$ (111)	5 (127)	$5^5/_8$ (143)	$6^1/_4$ (159)	$6^1/_4$ (159)
Minimum edge distance	c_{min}	inch (mm)	5d;or see Section 4.1.9 of this report for installation parameters with reduced minimum edge distances (with reduced torque)									
Minimum member thickness	h_{min}	inch (mm)	$h_{ef} + 1^1/_4$ (h_{ef} + 30)			$h_{ef} + 2d_o$						

For **SI:** 1 inch = 25.4 mm, 1 ft-lbf = 1.356 N-m. For **pound-inch** units: 1 mm = 0.03937 inch, 1 N-m = 0.7375 ft-lbf.

[1]N/A = Not Applicable.
[2]These values apply to ASTM A36 / F1554 Grade 36 carbon steel threaded rods.
[3]These values apply to ASTM A193 Grade B8/B8M (Class 1) stainless steel threaded rods.

FIGURE 3—AC100+ GOLD ADHESIVE ANCHOR SYSTEM INCLUDING TYPICAL STEEL ANCHOR ELEMENTS

TABLE 10—EXAMPLE OF AC100+ GOLD ADHESIVE ANCHOR ALLOWABLE STRESS DESIGN (ASD) VALUES FOR ILLUSTRATIVE PURPOSES[1,2,3,4,6,9,10,13,14,16,17]

NOMINAL ANCHOR ROD DIAMETER OR REBAR SIZE d (inch) / (No.)	EFFECTIVE EMBED.[5] h_{ef} (inches)	CONCRETE STRENGTH[12] f'_c (psi)	EFFECTIVE-NESS FACTOR FOR UNCRACKED CONCRETE k_{uncr}	CHARACTERISTIC BOND STRENGTH $\tau_{k,uncr}$ (psi)		NOMINAL STRENGTH IN TENSION N_n (pounds)		STRENGTH REDUCTON FACTOR ϕ[15]		ALLOWABLE TENSION LOAD[11] $\phi N_n / \alpha$ (pounds)	
				122°F LT, 176°F ST[7]	162°F LT, 248°F ST[8]	122°F LT, 176°F ST[7]	162°F LT, 248°F ST[8]	122°F LT, 176°F ST[7]	162°F LT, 248°F ST[8]	122°F LT, 176°F ST[7]	162°F LT, 248°F ST[8]
ASTM A193 Grade B7 Threaded Rod											
3/8	2 3/8	2,500	24	823	405	2,303	1,133	0.65 (bond)	0.65 (bond)	1,010	495
	4 1/2	2,500	24	823	405	4,363	2,147	0.65 (bond)	0.65 (bond)	1,915	945
1/2	2 3/4	2,500	24	823	405	3,555	1,749	0.65 (bond)	0.65 (bond)	1,560	765
	10	2,500	24	823	405	7,757	3,817	0.65 (bond)	0.65 (bond)	3,405	1,675
5/8	3 1/8	2,500	24	823	405	5,050	2,485	0.65 (bond)	0.65 (bond)	2,215	1,090
	12 1/2	2,500	24	823	405	12,120	5,964	0.65 (bond)	0.65 (bond)	5,325	2,620
3/4	3 1/2	2,500	24	823	405	6,787	3,340	0.65 (bond)	0.65 (bond)	2,980	1,465
	15	2,500	24	823	405	17,452	8,588	0.65 (bond)	0.65 (bond)	7,665	3,770
7/8	3 1/2	2,500	24	823	405	7,857	3,897	0.65 (conc)	0.65 (bond)	3,450	1,715
	17 1/2	2,500	24	823	405	23,755	11,690	0.65 (bond)	0.65 (bond)	10,430	5,135
1	4	2,500	24	743	366	9,337	4,599	0.65 (bond)	0.65 (bond)	4,100	2,020
	20	2,500	24	743	366	28,010	13,798	0.65 (bond)	0.65 (bond)	12,300	6,060
1 1/4	5	2,500	24	588	N/A	11,545	N/A	0.65 (bond)	N/A	5,070	N/A
	25	2,500	24	588	N/A	34,636	N/A	0.65 (bond)	N/A	15,215	N/A
ASTM A706 Grade 60 Reinforcing Bar											
3	2 3/8	2,500	24	823	405	2,303	1,133	0.65 (bond)	0.65 (bond)	1,010	495
	4 1/2	2,500	24	823	405	4,363	2,147	0.65 (bond)	0.65 (bond)	1,915	945
4	2 3/4	2,500	24	823	405	3,555	1,749	0.65 (bond)	0.65 (bond)	1,560	765
	10	2,500	24	823	405	7,757	3,817	0.65 (bond)	0.65 (bond)	3,405	1,675
5	3 1/8	2,500	24	823	405	5,050	2,485	0.65 (bond)	0.65 (bond)	2,215	1,090
	12 1/2	2,500	24	823	405	12,120	5,964	0.65 (bond)	0.65 (bond)	5,325	2,620
6	3 1/2	2,500	24	823	405	6,787	3,340	0.65 (bond)	0.65 (bond)	2,980	1,465
	15	2,500	24	823	405	17,452	8,588	0.65 (bond)	0.65 (bond)	7,665	3,770
7	3 1/2	2,500	24	823	405	7,857	3,897	0.65 (conc)	0.65 (bond)	3,450	1,715
	17 1/2	2,500	24	823	405	23,755	11,690	0.65 (bond)	0.65 (bond)	10,430	5,135
8	4	2,500	24	743	366	9,337	4,599	0.65 (bond)	0.65 (bond)	4,100	2,020
	20	2,500	24	743	366	28,010	13,798	0.65 (bond)	0.65 (bond)	12,300	6,060
9	4 1/2	2,500	24	665	329	11,545	5,233	0.65 (bond)	0.65 (bond)	5,070	2,295
	22 1/2	2,500	24	665	329	34,636	15,698	0.65 (bond)	0.65 (bond)	15,215	6,895
10	5	2,500	24	588	N/A	11,545	N/A	0.65 (bond)	N/A	5,070	N/A
	25	2,500	24	588	N/A	34,636	N/A	0.65 (bond)	N/A	15,215	N/A

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.448 N, 1 psi = 0.006894 MPa. For **pound-inch** units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1 MPa = 145.0 psi.

[1]Single anchor with static tension load only; ASTM A193 Grade B7 threaded rod and ASTM A706 Grade 60 reinforcing bar.
[2]Vertical downward installation direction.
[3]Special inspection interval = Periodic.
[4]Installation temperature = 23°F (-5°C) to 104°F (40°C) for base material; 23°F (-5°C) to 95°F (35°C) for cartridge adhesive.
[5]Embedment = $h_{ef,min}$ and $h_{ef,max}$ for each diameter.
[6]Concrete determined to remain uncracked for the life of the anchorage.
[7]Long-term service temperature = 122°F (50°C), short-term service temperature = 176°F (80°C).
[8]Long-term service temperature = 162°F (72°C), short-term service temperature = 248F (120°C).
[9]Load combinations are based on ACI 318-14 5.3 or ACI 318-11 9.2, as applicable, with no seismic loading considered.
[10]Thirty percent (30%) dead load and seventy percent (70%) live load; controlling load combination 1.2*D* + 1.6*L*.
[11]Calculation of weighted average for the conversion factor, α = 1.2(0.3) + 1.6(0.7) = 1.48.
[12]f'_c = 2,500 psi compressive strength (normal-weight concrete).
[13]$c_{a1} = c_{a2} \geq c_{ac}$.
[14]$h \geq h_{min}$.
[15]Strength reduction factor from controlling nominal strength in tension [i.e. steel, concrete (conc), bond] decisive from design assumptions.
[16]Hammer-drilled holes in dry concrete.
[17]N/A = not applicable

AC100+ Gold Instruction Card

DESCRIPTION:
AC100+ Gold is an easy dispensing, rapid-curing, anchoring adhesive which is formulated for use in anchoring applications by trained professionals. Please refer to installation instructions and SDS for additional detailed information.

PRECAUTION:
Safety glasses and dust masks should be used when drilling holes into concrete, stone and masonry. Wear gloves and safety glasses when handling and dispensing adhesive. Do not sand the adhesive and create silica dust which could be inhaled. Avoid skin and eye contact. Use a NIOSH-approved chemical mask to avoid respiratory discomfort if working indoors or in a confined area, or if sensitive to adhesive odors. Wash hands or other affected body parts with soap and water if skin contact occurs. Flush eyes with plenty of water and seek immediate medical attention if eye contact occurs. Move to fresh air if adhesive odor begins to cause discomfort.

IMPORTANT! Before using, read and review Safety Data Sheet (SDS).
This product contains crystalline silica and as supplied does not pose a dust hazard. IARC classifies crystalline silica (quartz sand) as a Group I carcinogen based upon evidence among workers in industries where there has been long-term and chronic exposure (via inhalation) to silica dust; e.g. mining, quarry, stone crushing, refractory brick and pottery workers. This product does not pose a dust hazard; therefore, this classification is not relevant. However, if reacted (fully cured) product is further processed (e.g. sanded, drilled) be sure to wear proper respiratory and eye protection to avoid health risk.

HANDLING AND STORAGE:
Store in a cool, dry, well ventilated area at temperatures between 32°F (0°C) and 86°F (30°C). Do not freeze. Store and keep away from flame, heat and light. Keep partially used containers closed when not in use. Protect from damage.

Note expiration date on product label before use. Do not use expired product. Partially used cartridges may be stored with hardened adhesive in the attached mixing nozzle. **Note:** If the cartridge is reused, attach a new mixing nozzle and discard the initial quantity of the anchor adhesive as described in the setting instructions.

DEWALT
701 East Joppa Road
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[V.] Adhesive piston plugs

Threaded rod diameter (inch)	Rebar size (no.)	Drill bit diameter (inch)	Plug Size (inch)	Piston Plug (Cat. #)	Horizontal and overhead installations[1,2]
5/8	#5	11/16	11/16	08258	
		3/4	3/4	08259	
3/4	#6	7/8	7/8	08300	
7/8	#7	1	1	08301	
1	#8	1 1/8	1 1/8	08303	
1 1/4	#9	1 3/8	1 3/8	08305	
-	#10	1 1/2	1 1/2	08309	

[1]A plastic extension tube (Cat# 08281) or equivalent approved by DEWALT must be used with piston plugs.
[2] All listed overhead anchor installations require piston plugs; horizontal installations with embedments greater than 8 inches require piston plugs.

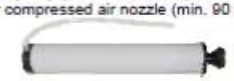
[I.] Hole cleaning tools - wire brushes and air blowers

Threaded rod diameter (inch)	Rebar size (No.)	Drill bit size[1] (inch)	Brush length (inches)	Steel wire brush (Cat. #)
3/8	#3	7/16	6 3/4	08284
1/2	-	9/16	6 3/4	08285
-	#4	5/8	6 3/4	08275
5/8	#5	11/16	7 7/8	08286
		3/4	7 7/8	08278
3/4	#6	7/8	7 7/8	08287
7/8	#7	1	11 7/8	08288
1	#8	1 1/8	11 7/8	08289
1 1/4	#9	1 3/8	11 7/8	08290
-	#10	1 1/2	11 7/8	08291

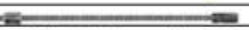
A brush extension (Cat. #08282) must be used with brushes for holes drilled deeper than the listed brush length.

Air blowers

Hand pump (volume 25 fl. oz.), Cat #8280 or compressed air nozzle (min. 90 psi)



Compressed air nozzle only, Cat #8292 (min. 90 psi)



[1]For installations with 5/8-inch threaded rod and #5 rebar size, the preferred ANSI drill bit diameter is 3/4-inch. If an 11/16-inch ANSI drill bit is used the user must check before injecting the adhesive to verify that the steel anchor element can be inserted into the cleaned hole without resistance.

[II.] Gel (working) times and curing times

Temperature of base material		Gel (working) time	Full curing time
14°F	-10°C	90 minutes	24 hours
23°F	-5°C	90 minutes	14 hours
32°F	0°C	45 minutes	7 hours
41°F	5°C	25 minutes	2 hours
68°F	20°C	6 minutes	45 minutes
86°F	30°C	4 minutes	25 minutes
104°F	40°C	1.5 minutes	15 minutes

Linear interpolation for intermediate base material temperatures is possible. For installations in base material temperature between 14°F and 23°F the cartridge temperature must be conditioned to between 68°F and 95°F (20°C - 35°C).

[III.] Installation parameters - Specifications for installation of threaded rods and reinforcing bars

Anchor property / Setting information	Threaded rod (inch) / reinforcing bar size (rebar)								
	3/8 or #3	1/2	#4	5/8 or #5	3/4 or #6	7/8 or #7	1 or #8	#9	1 1/4	#10
d = Threaded rod outside diameter (in.)	0.375	0.500		0.625	0.750	0.875	1.000	-	1.250	-
d = Nominal rebar diameter (in.)	0.375	0.500		0.625	0.750	0.875	1.000	1.125	-	1.250
d_o (d_{bit}) = Nominal ANSI drill bit size (in.)	7/16	9/16	5/8	11/16 or 3/4	7/8	1	1 1/8	1 3/8	1 3/8	1 1/2
$h_{ef,min}$ = Minimum embedment (inches)	2 3/8	2 3/4		3 1/8	3 1/2	3 1/2	4	4 1/2	5	5
$h_{ef,max}$ = Maximum embedment (inches)	4 1/2	6		7 1/2	9	10 1/2	12	13 1/2	15	15
c_{min} = Minimum spacing (inches)	1 7/8	2 1/2		3 1/8	3 3/4	4 3/8	5	5 5/8	6 1/4	6 1/4
c_{min} = Minimum edge distance (inches)	1 3/4	1 3/4		1 3/4	1 3/4	1 3/4	1 3/4	2 3/4	2 3/4	2 3/4
h_{min} = Minimum member thickness (inches)	h_{ef} + 1 1/4			h_{ef} + $2d_o$						
T_{max} = Maximum rod torque (ft.-lb.)	15	33		60	105	125	165	-	280	-
T_{max} = Maximum torque (ft.-lb.) for A36/Grade 36 rod	10	25		50	90	125	165	-	280	-
T_{max} = Maximum torque (ft.-lb.) for Grade B8/B8M Class 1 rod	5	20		40	60	100	165	-	280	-

For installations between the minimum edge distance and 5d, the tabulated maximum torque must be reduced (multiplied) by a factor of 0.45.

[IV.] AC100+ Gold adhesive anchor system selection table

Injection tool		Plastic cartridge system	Extra mixing nozzle
Quik-Shot dispensers (caulking guns)	Cat. #08437 - Standard all-metal tool Cat. #DCE560D1 – Cordless battery tool	AC100+ Gold 9.5 fl.oz. Quik-Shot w/nozzle Cat. #8478SD	Mixing nozzle and extension tube Cat. #08293
Manual dispenser	Cat. #08485 - HP plastic tool	AC100+ Gold 11.5 fl.oz. dual cart. w/nozzle Cat. #8486SD	Mixing nozzle and extension tube Cat. #08293 or 08294
Manual and powered dispensers	Cat. #08495 - HP plastic tool Cat. #08496 - Pneumatic tool Cat. #DCE595D1 - Cordless battery tool	AC100+ Gold 28 fl.oz. dual cart. w/nozzle and ext. tube Cat. #8490SD	Long mixing nozzle and extension tube Cat. #08294

A plastic extension tube (Cat# 08281 or 8297) or flexible extension hose (Cat.# PFC1640600) or equivalent approved by DEWALT must be used if the bottom or back of the anchor hole is not reached with the mixing nozzle only.

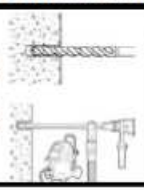
FIGURE 4—MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS (MPII)

AC100+ Gold - Instruction Card (continued)

Installation instructions for Adhesive Anchors in solid base material – For any application not covered by this document please contact DEWALT

SELECT HAMMER DRILLING AS SUITABLE FOR APPLICATION

HAMMER DRILLING



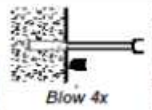
1. Drill a hole into the base material with rotary hammer drill (i.e. percussion drill) and a carbide drill bit to the size and embedment required by the selected steel hardware element (see Table III). Tolerances of carbide drill bits including hollow drill bits must meet ANSI Standard B212.15.

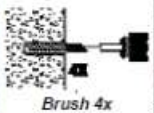
Precaution: Wear suitable eye and skin protection. Avoid inhalation of dusts during drilling and/or removal (*see dust extraction equipment by DEWALT to minimize dust emissions*).

Notes: In case of standing water in the drilled hole (flooded hole condition), all the water has to be removed from the hole (e.g. vacuum, compressed air, etc.) prior to cleaning.

Drilling in dry concrete is recommended when using hollow drill bits (vacuum must be on).

HOLE CLEANING DRY OR WET HOLES





Repeat Blowing 4x

2a. Starting from the bottom or back of the drilled anchor hole, blow the hole clean a minimum of *four* times (**4x**).

Use a compressed air nozzle (min. 90 psi) for all sizes of anchor rod and reinforcing bar (rebar). Alternatively a hand pump (min. volume 25 fl. oz. supplied by DEWALT) may be used for anchor rods 3/8" to 3/4" diameter or reinforcing bar (rebar) sizes #3 to #6 for embedments not more than 8 inches (a hand pump must not be used with larger anchor sizes).

2b. Determine brush diameter (see Table I) for the drilled hole and attach the brush with adaptor to a rotary drill tool or battery screw gun. Brush the hole with the selected wire brush a minimum of *four* times (**4x**).

A brush extension (supplied by DEWALT) must be used for holes drilled deeper than the listed brush length. The wire brush diameter must be checked periodically during use; the brush should resist insertion into the drilled hole, if not the brush is too small and must be replaced with the proper brush diameter (i.e. new wire brush).

2c. Repeat Step **2a** again by blowing the hole clean a minimum of *four* times (**4x**).

When finished the hole should be clean and free of dust, debris, ice, grease, oil or other foreign material. → **Next go to Step 3.**

This section is intentionally left blank.

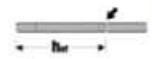
FOLLOW STEPS #1 THROUGH #10 FOR RECOMMENDED INSTALLATION

PREPARING

3. Check adhesive expiration date on cartridge label. Do not use expired product. Review Safety Data Sheet (SDS) before use. Cartridge temperature must be between 23°F - 104°F (-5°C - 40°C) when in use except as noted in Table II. Review published working and cure times. Consideration should be given to the reduced gel (working) time of the adhesive in warm temperatures. For the permitted range of the base material temperature see Table II.

Attach a supplied mixing nozzle to the cartridge. Do not modify the mixer in any way and make sure the mixing element is inside the nozzle. Load the cartridge into the correct dispensing tool.

Note: Always use a new mixing nozzle with new cartridges of adhesive and also for all work interruptions exceeding the published gel (working) time of the adhesive.

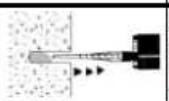


4. Prior to inserting the anchor rod or rebar into the filled hole, the position of the embedment depth has to be marked on the anchor. Verify anchor element is straight and free of surface damage.

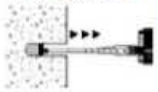
5. Adhesive must be properly mixed to achieve published properties. Prior to dispensing adhesive into the drilled hole, separately dispense at least three full strokes of adhesive through the mixing nozzle until the adhesive is a consistent *gray* color.

Review and note the published working and cure times (see Table II) prior to injection of the mixed adhesive into the cleaned anchor hole.

INSTALLATION



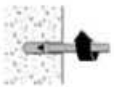
with piston plug:



6. Fill the cleaned hole approximately two-thirds full with mixed adhesive starting from the bottom or back of the anchor hole. If the bottom or back of the anchor hole is not reached with the mixing nozzle only, a plastic extension tube must be used (see Table IV). Slowly withdraw the mixing nozzle as the hole fills to avoid creating air pockets or voids.

Note: Piston plugs (see Table V) must be used with and attached to mixing nozzle and extension tube for overhead and horizontal installations with anchor rod 5/8" to 1-1/4" diameter and rebar size #5 to #10. Insert piston plug to the back of the drilled hole and inject as described in the method above. During installation the piston plug will be naturally extruded from the drilled hole by the adhesive pressure.

Attention! *Do not install anchors overhead without proper training and installation hardware provided by DEWALT; contact DEWALT prior to use.*



7. The anchor should be free of dirt, grease, oil or other foreign material. Push clean threaded rod or reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. Observe the gel (working) time.

8. Ensure that the anchor element is installed to the specified embedment depth. Adhesive must completely fill the annular gap at the concrete surface. Following installation of the anchor element, remove excess adhesive. Protect the anchor element threads from fouling with adhesive.

For all installations the anchor element must be restrained from movement throughout the specified curing period (where necessary) through the use of temporary wedges, external supports, or other methods. Minor adjustments to the position of the anchor element may be performed during the gel time only.

CURING AND FIXTURE

9. Allow the adhesive anchor to cure to the specified full curing time prior to applying any load (see Table II).

Do not disturb, torque or load the anchor until it is fully cured.

10. After full curing of the adhesive anchor, a fixture can be installed to the anchor and tightened up to the maximum torque (shown in Table III) by using a calibrated torque wrench.

Note: Take care not to exceed the maximum torque for the selected anchor.

FIGURE 4—MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS (MPII) (continued)

ICC-ES Evaluation Report

ESR-2582 LABC and LARC Supplement

Reissued February 2018
Revised October 2018
This report is subject to renewal February 2019.

www.icc-es.org | (800) 423-6587 | (562) 699-0543 *A Subsidiary of the International Code Council®*

DIVISION: 03 00 00—CONCRETE
Section: 03 16 00—Concrete Anchors

DIVISION: 05 00 00—METALS
Section: 05 05 19—Post-installed Concrete Anchors

REPORT HOLDER:

DEWALT

EVALUATION SUBJECT:

AC100+ GOLD® ADHESIVE ANCHOR SYSTEM IN CRACKED AND UNCRACKED CONCRETE (DEWALT / POWERS)

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that AC100+ Gold adhesive anchor system in cracked and uncracked concrete, described in ICC-ES master evaluation report ESR-2582, has also been evaluated for compliance with the codes noted below as adopted by Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2017 *City of Los Angeles Building Code* (LABC)
- 2017 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The AC100+ Gold adhesive anchor system in cracked and uncracked concrete, described in Sections 2.0 through 7.0 of the master evaluation report ESR-2582, complies with LABC Chapter 19, and LARC, and is subject to the conditions of use described in this report.

3.0 CONDITIONS OF USE

The AC100+ Gold adhesive anchor system described in this evaluation report must comply with all of the following conditions:

- All applicable sections in the master evaluation report ESR-2582.
- The design, installation, conditions of use and labeling of the anchor system are in accordance with the 2015 *International Building Code®* (2015 IBC) provisions noted in the master evaluation report ESR-2582.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.
- The allowable and strength design values listed in the master evaluation report and tables are for the connection of the anchor system to the concrete. The connection between the anchor system and the connected members shall be checked for capacity (which may govern).

This supplement expires concurrently with the master report, reissued February 2018 and revised October 2018.

ICC-ES Evaluation Report

ESR-2582 FBC Supplement

Reissued February 2018
Revised October 2018
This report is subject to renewal February 2019.

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DIVISION: 03 00 00—CONCRETE
Section: 03 16 00—Concrete Anchors

DIVISION: 05 00 00—METALS
Section: 05 05 19—Post-Installed Concrete Anchors

REPORT HOLDER:

DEWALT

EVALUATION SUBJECT:

AC100+ GOLD® ADHESIVE ANCHOR SYSTEM IN CRACKED AND UNCRACKED CONCRETE (DEWALT / POWERS)

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the AC100+ Gold Adhesive Anchor System in cracked and uncracked concrete, recognized in ICC-ES master evaluation report ESR-2582, has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2017 *Florida Building Code—Building*
- 2017 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The AC100+ Gold® Adhesive Anchor System in cracked and uncracked concrete, described in Sections 2.0 through 7.0 of the master evaluation report ESR-2582, complies with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, provided the design and installation are in accordance with the 2015 *International* Building *Code*® (IBC) provisions noted in the master report.

Use of the AC100+ Gold® adhesive anchors with stainless steel threaded rod materials and reinforcing bars has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and *Florida Building Code—Residential.*

For products falling under Florida Rule 9N-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the master report, reissued February 2018 and revised October 2018.

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DIVISION: 04 00 00—MASONRY
SECTION: 04 05 19.16—MASONRY ANCHORS

REPORT HOLDER:

DEWALT

EVALUATION SUBJECT:

AC100+ GOLD® ADHESIVE ANCHOR SYSTEM IN MASONRY (DEWALT / POWERS)

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ICC-ES Evaluation Report

ESR-3200

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DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:

DEWALT

ADDITIONAL LISTEES:

POWERS FASTENERS

EVALUATION SUBJECT:

AC100+ GOLD® ADHESIVE ANCHOR SYSTEM IN MASONRY (DEWALT / POWERS)

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012, and 2009 *International Building Code*® (IBC)
- 2018, 2015, 2012, and 2009 *International Residential Code*® (IRC)

For evaluation for compliance with codes adopted by Los Angeles Department of Building and Safety (LADBS), see ESR-3200 LABC and LARC Supplement.

Property evaluated:

Structural

2.0 USES

The AC100+ Gold adhesive anchor system is used to anchor building components to hollow (ungrouted) and fully grouted concrete masonry walls to resist static, wind and earthquake loads, as noted in Section 4.0 of this report.

The anchor system is an alternative to Section 8.1.3 (2016 or 2013 edition), or Section 2.1.4 (2011 or 2008 editions) of TMS 402/ACI 530/ASCE 5 as referenced in Section 2107.1 of the IBC. The anchor system may also be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 General:

The AC100+ Gold Adhesive is comprised of a two-component epoxy adhesive filled in cartridges, static mixing nozzles, dispensing tools, hole cleaning equipment and plastic or stainless steel mesh screen tubes (screen tubes are for use in hollow masonry block).

Product names for the report holder and the additional listee are presented in the following table of this report.

Company Name	Product Name
DEWALT	AC100+ Gold®
	AC100-PRO (outside North America)
Powers Fasteners	AC100+ Gold®
	AC100-PRO (outside North America)

The adhesive is used with continuously threaded steel rods. The AC100+ Gold Adhesive Anchor System consists of AC100+ Gold Adhesive described in the first paragraph of Section 3.1, steel threaded rods and matching washers and nuts; the anchor system is installed in pre-drilled holes into concrete masonry walls.

3.2 Materials:

3.2.1 AC100+ Gold Adhesive: AC100+ Gold is an injectable two-component adhesive. The two components are separated by means of a labeled dual-cylinder cartridge. The two components combine and react when dispensed through a static mixing nozzle, supplied by DEWALT / Powers, which is attached to the cartridge. The AC100+ Gold adhesive is available in 9.5-ounce (280 mL), 11.5-ounce (345 mL) and 28-ounce (825 mL) cartridges. Each cartridge label is marked with the adhesive expiration date. A shelf life of eighteen months, as indicated by the expiration date, applies to an unopened cartridge when stored in accordance with the manufacturer's recommendations.

3.2.2 Hole Cleaning Equipment: Hole cleaning equipment is comprised of steel wire brushes supplied by DEWALT / Powers, and a compressed air nozzle or hand pump.

3.2.3 Dispensers: AC100+ Gold adhesive must be dispensed with manual, pneumatic dispensers, or electric powered dispensers supplied by DEWALT / Powers.

3.2.4 Threaded Steel Rods, Washers and Nuts: Threaded steel rods must be clean and continuously threaded (all-thread). Carbon standard steel threaded rods must be in accordance with standard ASTM A36, ASTM F1554 Grade 36, ASTM A307, ISO 898 Class 5.8 and carbon high-strength threaded rods must be in accordance with ASTM A193 Grade B7. Stainless steel threaded rods must conform to ASTM F593 (AISI 304 / 316).

Carbon steel threaded rods must be furnished with a minimum of 0.0002-inch-thick (0.005 mm) zinc

electroplated coating complying with ASTM B633, SC1; or a minimum 0.0021-inch-thick (0.053 mm) mechanically deposited zinc coating complying with ASTM B695, Class 55; or a hot dip galvanized zinc coating complying with ASTM A153, Class C or D. The stainless steel threaded rods must comply with Table 5 of this report. Steel grades and material types (carbon, stainless) of the washers and nuts must be matched to the threaded rods. Threaded steel rods must be straight and free of indentations or other defects along their length. The embedded end may be either flat cut or cut on the bias to a chisel point. Material types of the nuts and washers must be matched to the threaded rods.

3.2.5 Screen Tubes: Plastic and stainless steel mesh screen tubes are used in hollow masonry with the adhesive and threaded steel rods. The screen tubes hold the adhesive in position in the masonry wall face during the installation of the steel threaded rods.

3.3 Masonry:

3.3.1 Grout-filled Concrete Masonry: The compressive strength of masonry, f'_m, at 28 days must be a minimum of 1,500 psi (10.3 MPa). Fully grouted masonry walls must comply with Chapter 21 of the IBC and must be constructed from the following materials:

3.3.1.1 Concrete Masonry Units (CMUs): Concrete masonry walls must be constructed from minimum light-, medium-, or normal weight closed end, concrete masonry units (CMUs) conforming to ASTM C90. The nominal CMU size is 8 inches unless noted in this report.

3.3.1.2 Grout (for Grout-filled Concrete Masonry): Grout-filled concrete masonry units must be fully grouted with grout complying with Section 2103.3 of the 2018 and 2015 IBC, Section 2103.13 of the 2012 IBC, Section 2103.12 of the 2009 IBC, or Section R606 of the 2018, and 2015 IRC; Section R609.1.1 of the 2012, and 2009 IRC, as applicable. Alternatively, the grout must have a minimum compressive strength, when tested in accordance with ASTM C1019, equal to its specified strength, but not less than 2,000 psi (13.8 MPa).

3.3.1.3 Mortar: Mortar must be Types M, S or N prepared in accordance with Section 2103 of the IBC or Section R606.2.11 of the 2018, and 2015 IRC, Section R607.1 of the 2012, and 2009 IRC, as applicable.

3.3.2 Hollow (Ungrouted) concrete masonry: The compressive strength of masonry, f'_m, at 28 days must be a minimum of 1,500 psi (10.3 MPa). Fully grouted masonry walls must comply with Chapter 21 of the IBC and must be constructed from the following materials:

3.3.2.1 Concrete Masonry Units (CMUs): Concrete masonry walls must be constructed from minimum light-, medium-, or normal weight closed end, concrete masonry units (CMUs) conforming to ASTM C90. The nominal CMU size is 8 inches unless noted in this report.

3.3.2.2 Mortar: Mortar must be Types M, S or N prepared in accordance with Section 2103.2.1 of the 2018 and 2015 IBC, Section 2103.9 of the 2012 IBC, Section 2103.8 of the 2009 IBC, or R606.2.7 of the 2018 and 2015 IRC, R607.1 of the 2012, and 2009 IRC, as applicable.

4.0 DESIGN AND INSTALLATION

4.1 Allowable Stress Design:

General: The design load values for anchors described in this report are based on allowable stress design (ASD), as an alternative to Section 8.1.3 (2016 and 2013 edition), or Section 2.1.4 of TMS 402/ACI 530/ASCE 5 (2011 and 2008 editions) as referenced in Section 2107.1 of the IBC. For use under the IRC, an engineered design in accordance with R301.1.3 must be submitted to the code official. Allowable tension and shear loads for installation in grout-filled and hollow masonry walls are noted in Tables 5 through 9 of this report. The allowable tension and shear values in this report must be adjusted in accordance with Figure 1 for in-service base material temperatures in excess of 70°F (21°C). Allowable tension and shear loads based on steel strength for threaded rods are described in Table 5.

Allowable stress design tension and shear load values given in Tables 6 and 7 in grout-filled concrete masonry may be used to resist long-term loads, such as gravity loads, and short-term loads, such as wind and seismic. Use of the tension and shear load values in hollow masonry given in Tables 8 and 9 may be used to resist long-term loads, such as gravity loads. The use of anchors for seismic loads in hollow masonry is beyond the scope of this report; the values may be used for short-term loading due to wind forces, however, the allowable loads may not be increased.

Critical and minimum spacing and edge distance values, with appropriate reduction values, where applicable, are given in Tables 6 and 7 for fully grouted concrete masonry and Tables 8 and 9 for hollow concrete masonry.

The allowable loads for anchors installed in fully grout-filled concrete masonry or hollow masonry subjected to combined tension and shear forces must be determined by the following equation:

$$\left(\frac{P_s}{P_t}\right)+\left(\frac{V_s}{V_t}\right)\le 1$$

where:

P_s = Applied service tension load (lbf or kN).

P_t = Allowable service tension load (lbf or kN).

V_s = Applied service shear load (lbf or kN).

V_t = Allowable service shear load (lbf or kN).

4.2 Installation:

Anchors must be installed in accordance with this report and the manufacturer's published installation instructions (MPII) represented in Figures 6 and 7. The anchors must not be installed until the base material has reached its minimum designated compressive strength. The drill bit size, hole diameter, embedment depth, spacing, edge distance and base material must comply with the requirements of this report. Installation procedures and locations must be in accordance with Tables 1, 2, 6, 7, 8 and 9 as well as Figures 2, 3, 4, 5, 6 and 7 of this report, as applicable.

4.3 Special Inspection:

Periodic special inspections are required in accordance with IBC Section 1704, and are also applicable for installations under the IRC.

The special inspector must be on the jobsite initially during anchor installation to verify anchor type, anchor dimensions, masonry type, masonry dimensions and compressive strength, drill bit size, anchor spacing, edge distances, embedment, and adherence to the manufacturer's printed installation instructions (MPII).

The special inspector must verify that anchor installation is in compliance with this evaluation report and in accordance with the MPII.

Subsequent installations of the same anchor type and size by the same construction personnel are permitted to

be performed in the absence of the special inspector. Any change in the anchor product being installed or the personnel performing the installation requires an initial inspection. For ongoing installations over an extended period, the special inspector must make regular inspections to confirm correct handling and installation of the product.

5.0 CONDITIONS OF USE

The AC100+ Gold® Adhesive Anchor System described in this report complies with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The anchors must be identified and installed in accordance with this report and the MPII. In the event of a conflict between the instructions in this report and the manufacturer's instructions, this report must govern.

5.2 Anchor sizes, dimensions, and minimum embedment depths are as set forth in this report.

5.3 Anchors resisting static and wind tension and shear loads in concrete masonry must be designed in accordance with Section 4.1 of this report.

5.4 For installations in grouted concrete masonry, anchors are recognized to dead, live, seismic and wind tension and shear load applications. When using the basic load combinations in accordance with IBC Section 1605.3.1.1, allowable loads are not permitted to be increased for wind or seismic loading. When using the alternative basic load combinations in 2009 IBC Section 1605.3.2 that include wind or seismic loads, the allowable loads for anchors are permitted to be increased in accordance with Table 4, as applicable. For the 2018, 2015 and 2012 IBC, the allowable loads or load combinations for these anchors must not be adjusted.

5.5 For installations in hollow concrete masonry, anchors are recognized to dead, live, and wind tension and shear load applications. For installations in hollow concrete masonry under the IBC or the IRC, the use of adhesive anchors for resistance to seismic loads is beyond the scope of this report. The allowable loads or load combinations for these anchors must not be adjusted for applications subjected to wind loads.

5.6 Anchors must be installed in holes predrilled in substrates described in this report, using carbide-tipped drill bits complying with ANSI B212.15-1994.

5.7 Prior to installation, calculations demonstrating that the applied loads are less than the allowable loads described in this report must be submitted to the code official for approval. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is being constructed.

5.8 Since an ICC-ES acceptance criteria for evaluating data to determine the performance of adhesive anchors subjected to fatigue and shock loading is unavailable at this time, the use of these anchors under these conditions is beyond the scope of this report.

5.9 Where not otherwise prohibited by the code, anchors are permitted for installation in fire-resistance-rated construction provided at least one of the following conditions is fulfilled:

- Anchors are used to resist wind or seismic forces only.
- Anchors that support fire-resistance-rated construction or gravity load–bearing structural elements are within a fire-resistance-rated envelope or a fire-resistance-rated membrane, are protected by approved fire-resistance-rated materials, or have been evaluated for resistance to fire exposure in accordance with recognized standards.
- Anchors are used to support nonstructural elements.

5.10 Since an ICC-ES acceptance criteria for evaluating data to determine the performance of adhesive anchors in cracked masonry is unavailable at this time, the use of adhesive anchors is limited to installation in uncracked masonry. Cracking occurs when $f_t > f_r$ due to service loads or deformations.

5.11 The anchors may be installed in base materials having internal temperatures between 14°F (-10°C) and 104°F (40°C) at the time of installation. Installation of AC100+ Gold adhesive in base materials having temperatures beyond this range is outside the scope of this report.

5.12 When anchors are located where the internal base material temperature may exceed 70°F (21°C), allowable tension and shear loads indicated in this report must be adjusted for in-service temperatures in accordance with Figure 1. The use of AC100+ Gold adhesive in base materials having internal temperatures exceeding 180°F (82°C) during service life is beyond the scope of this report.

5.13 Use of AC100+ Gold in conjunction with uncoated or zinc electroplated carbon steel threaded rods must be limited to interior exposure. Use of stainless steel (AISI 304 or Type 316) anchors or hot-dipped galvanized anchors with zinc coating conforming to ASTM A153, Class C or D, is permitted for exterior or damp environments during service life.

5.14 Steel anchoring elements in contact with preservative-treated wood or fire-retardant-treated wood must be stainless steel, hot-dipped galvanized in accordance with ASTM A153, Class C or D, or mechanically galvanized in accordance with ASTM B633, Class 55.

5.15 Special inspection, when required, must be provided in accordance with Section 4.3 of this report.

5.16 During installation, the pre-drilled holes must be dry.

5.17 The AC100+ Gold adhesive is manufactured under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Adhesive anchors in Masonry Elements (AC58), dated March 2018, including the following

suitability requirements: sustained load (Test Series 17); in-service temperature (Test Series 18); freezing and thawing (Test Series 20); and seismic testing (Test Series 21).

6.2 Evidence of compliance with NSF/ANSI Standard 61, Drinking Water System Components–Health Effects, for the AC100+ Gold adhesive.

6.3 A quality control manual.

7.0 IDENTIFICATION

7.1 The AC100+ Gold cartridges and additional listee names described in Section 3.1 of this report are

identified by a label displaying the company name (DEWALT), the product name, lot number, expiration date and the evaluation report number (ESR-3200). The static mixing nozzles, dispensing tools, hole cleaning equipment, plastic and stainless steel screen tubes are identified by packaging label displaying the company name and the product name. Threaded rods, washers and nuts are standard elements and must conform to applicable national or international specifications as prescribed in Section 3.2.4.

7.2 The report holder's contact information is the following:

DEWALT
701 EAST JOPPA ROAD
TOWSON, MARYLAND 21286
(800) 524-3244
www.DEWALT.com
anchors@DEWALT.com

7.3 The Additional Listee's contact information is the following:

POWERS FASTENERS
701 EAST JOPPA ROAD
TOWSON, MARYLAND 21286
(800) 524-3244
www.powers.com
engineering@powers.com

The DEWALT drilling systems shown below collect and remove dust with a HEPA dust extractor during the hole drilling operation in dry base materials using hammer-drills (see step 1 of the manufacturer's published installation instructions).

FIGURE A—EXAMPLES OF DEWALT DUST REMOVAL DRILLING SYSTEMS WITH HEPA DUST EXTRACTORS FOR ILLUSTRATION

TABLE 1—AC100+ GOLD ADHESIVE ANCHOR INSTALLATION SPECIFICATIONS IN MASONRY[1]

Grout-filled Concrete Masonry Walls						
Anchor Property / Setting Information	**Notation**	**Units**	**Nominal Anchor Size (inch)**			
			3/8	1/2	5/8	3/4
Nominal outside anchor diameter	d	in.	0.375	0.500	0.625	0.750
Nominal carbide drill bit diameter	d_{bit}	in.	7/16	9/16	11/16	7/8
Nominal steel brush size	-	in.	1/2	5/8	3/4	15/16
Hex head wrench / socket size[2]	in.	in.	9/16	3/4	15/16	1 1/8
Maximum torque[4]	T_{max}	ft.-lb.	10	15	15	20

Hollow Concrete Masonry Walls									
Anchor Property / Setting Information	**Notation**	**Units**	**Nominal Anchor Size (inch)**						
			1/4	3/8		1/2		5/8	3/4
Nominal outside anchor diameter	d	in.	0.250	0.375		0.500		0.625	0.750
Screen tube material type	-	-	Stainless	Stainless	Plastic	Stainless	Plastic	Stainless	Plastic	Stainless
Nominal screen tube diameter[3]	-	in.	1/4	3/8	3/8	1/2	1/2	5/8	5/8	3/4
Nominal carbide drill bit diameter	d_{bit}	in.	3/8	1/2	9/16	5/8	3/4	3/4	7/8	7/8
Nominal steel brush size	-	in.	3/8	1/2	9/16	5/8	3/4	3/4	7/8	7/8
Hex head wrench / socket size[2]	-	in.	7/16	9/16		3/4		15/16		1 1/8
Maximum torque[4]	T_{max}	ft.-lb.	4	6		10		10		10

For **SI**: 1 inch = 25.4 mm, 1 ft-lb = 1.356 N-m.

[1]See allowable tension and shear load tables in this report for applicable embedment depths for each nominal anchor size.
[2]Wrench/socket size based on nuts that conform to applicable national or international specifications matched with threaded rods.
[3]Minimum nominal screen tube length is the masonry face shell thickness plus one-half-inch. See Figure 5 for illustration of face shell thickness.
[4]Torque may not be applied to the adhesive anchors until the full cure time has elapsed. See Table 2 for adhesive curing times.

TABLE 2—GEL AND CURING TIMES FOR AC100+ GOLD ADHESIVE[1]

Temperature of base material		Approximate gel (working) time	Full curing time
14°F	-10°C	90 minutes	24 hours
23°F	-5°C	90 minutes	14 hours
32°F	0°C	45 minutes	7 hours
41°F	5°C	25 minutes	2 hours
68°F	20°C	6 minutes	45 minutes
86°F	30°C	4 minutes	25 minutes
104°F	40°C	1.5 minutes	15 minutes

[1]Linear interpolation to determine approximate gel and full curing times for intermediate base material temperatures is allowed.

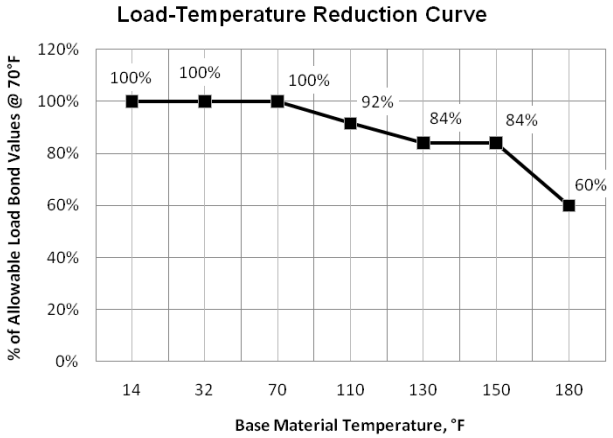


FIGURE 1—INFLUENCE OF BASE MATERIAL TEMPERATURE ON ALLOWABLE ADHESIVE BOND TENSION AND SHEAR LOADS FOR AC100+ GOLD ADHESIVE ANCHORS IN CONCRETE MASONRY

TABLE 3—DESIGN TABLE INDEX[1]

Adhesive	Base Material	Threaded Rod Sizes (inch)	Allowable Load Data (steel strength)	Allowable Load Data (bond strength)
AC100+ Gold	Grout-filled Concrete Masonry	3/8, 1/2, 5/8, 3/4	Table 5	Tables 6 and 7
	Hollow Concrete Masonry Units	1/4, 3/8, 1/2, 5/8, 3/4	Table 5	Tables 8 and 9

[1]Design must be in accordance with Section 4.1 of this report and applicable allowable load data for the given conditions, as applicable.

TABLE 4—ALTERNATIVE BASIC LOAD COMBINATION ADJUSTMENT FACTORS[1,2]

Steel Element Type (see Section 3.2.4 of this report for material descriptions and relevant threaded rod type)	**Allowable Load Modification Factors for 2009 IBC**			
	Reductions for Alternate Basic Load Combinations		**Increase Factor for Allowable Loads for Short-term Loading Conditions (i.e. due to wind or seismic loads)**	
	Tension	**Shear**	**Tension**	**Shear**
Standard threaded rods	0.75	0.75	1.33	1.33
High-strength threaded rods	0.75	1	1.33	1
Stainless steel rods	0.75	0.87	1.33	1.14

[1]The above modification factors are applicable under the 2009 IBC only; when using the alternative basic load combinations with the 2018, 2015 and 2012 IBC, the allowable loads or load combinations must not be adjusted.
[2]When using the basic load combinations in accordance with IBC Section 1605.3.1, allowable loads must not be increased for wind or seismic loading.

TABLE 5—ALLOWABLE TENSION AND SHEAR LOADS BASED ON STEEL STRENGTH FOR THREADED RODS (pounds)[1,2,3]

Anchor Diameter (inches)	Tension					Shear				
	ASTM A36, ASTM F1554 Grade 36 F_u = 58 ksi	ASTM A307 [4] F_u = 60 ksi	ISO 898 Class 5.8 F_u = 72.5 ksi	ASTM A193 Grade B7 F_u = 125 ksi	ASTM F593 CW [5] (316/304) F_u = 100 ksi	ASTM A36, ASTM F1554 Grade 36 F_u = 58 ksi	ASTM A307 [4] F_u = 60 ksi	ISO 898 Class 5.8 F_u = 72.5 ksi	ASTM A193 Grade B7 F_u = 125 ksi	ASTM F593 CW [5] (316/304) F_u = 100 ksi
1/4	940	970	1,175	2,025	1,620	485	500	605	1,040	835
3/8	2,115	2,185	2,640	4,555	3,645	1,090	1,125	1,360	2,345	1,875
1/2	3,755	3,885	4,700	8,100	6,480	1,935	2,000	2,420	4,170	3,335
5/8	5,870	6,075	7,340	12,655	10,125	3,025	3,130	3,780	6,520	5,215
3/4	8,455	8,750	10,570	18,225	12,390	4,355	4,505	5,445	9,390	6,385

For **SI:** 1 inch = 25.4 mm; 1 lbf = 0.0044 kN, 1 ksi = 6.894 MPa.

[1]Allowable load used in the design must be the lesser of bond values and tabulated steel element values.
[2]Allowable tension and shear loads for threaded rods to resist short-term loads, such as wind or seismic, must be calculated in accordance with Section 4.1 of this report, as applicable.
[3]Allowable loads for steel strength are calculated using allowable tension and shear equal to 0.33 x F_u x A_{nom} and 0.17 x F_u x A_{nom}, respectively.
[4]ASTM A307, Grade C for unheaded anchor bolts has been replaced by ASTM F1554, Grade 36.
[5]For 3/4-inch-diameter rods applicable to ASTM F593 CW, F_u = 85 ksi.

TABLE 6—ALLOWABLE AC100+ GOLD ADHESIVE BOND TENSION AND SHEAR LOAD CAPACITIES FOR THREADED RODS INSTALLED INTO GROUT-FILLED CONCRETE MASONRY UNITS[1,2,3,4,5,6,7,8,9,10,11,12,13]

TENSION LOAD

Anchor Diameter, *d* (inches)	Minimum Embedment, h_{nom} (inches)	Allowable Load at c_{cr} and s_{cr} (pounds)	Spacing Distance, s			Edge or End Distance, c_2 or c_1 (see Figure 3)		
			Critical Distance, s_{cr} (inches)	Minimum Distance, s_{min} (inches)	Allowable Load Factor at s_{min}	Critical Distance, c_{cr} (inches)	Minimum Distance, c_{min} (inches)	Allowable Load Factor at c_{min}
3/8	3	615	6	3	0.70	3	3	1.00
1/2	4	960	8	4	0.85	12	3	0.75
5/8	5	1,095	10	5	0.85	12	3	0.65
3/4	6	1,160	12	6	1.00	12	4	0.65

SHEAR LOAD

Anchor Diameter, *d* (inches)	Minimum Embedment, h_{nom} (inches)	Allowable Load at c_{cr} and s_{cr}, Direction 1 & 2 (pounds)[14]	Allowable Load at c_{cr} and s_{cr}, Direction 3 & 4 (pounds)[14]	Spacing Distance, s			Edge or End Distance, c_2 or c_1 (see Figure 3)			
				Critical Distance, s_{cr} (inches)	Minimum Distance, s_{min} (inches)	Allowable Load Factor at s_{min}	Critical Distance, c_{cr} (inches)	Minimum Distance, c_{min} (inches)	Allowable Load Factor at c_{min}	
									Load Perpendicular to Edge (II to end)	Load Parallel to Edge (⊥ to end)
3/8	3	275	340	6	3	0.45	3	3	1.00	1.00
1/2	4	1,430	1,760	8	4	0.45	12	3	0.30	0.75
5/8	5	1,530	1,880	10	5	0.45	12	3	0.30	0.75
3/4	6	1,570	1,930	12	6	0.45	12	4	0.40	0.75

For **SI:** 1 inch = 25.4 mm; 1 lbs = 0.0044 kN, 1 psi = 0.006894 MPa.

[1]All values are for anchors installed in fully grouted concrete masonry with minimum masonry strength of 1500 psi (10.3 MPa). Concrete masonry units must be light-, medium, or normal-weight conforming to ASTM C 90. Allowable loads have been calculated using a safety factor of 5.0.
[2]Anchors are recognized to dead, live, seismic and wind tension and shear load applications. See Sections 4.1 and 5.4 and Table 4 of this report for design with load combinations. For combined loading, see Section 4.1 of this report.
[3]Anchors may be installed in any location in the face of the masonry wall (cell, web, bed joint) except within 1 1/2-inch from the vertical mortar joint (head joint) provided the minimum edge and end distances are maintained. Anchors may be placed in the head joint if the vertical joint is mortared full-depth.
[4]A maximum of two anchors may be installed in a single masonry cell in accordance with the spacing and edge or end distance requirements. Embedment is measured from the outside surface of the concrete masonry unit to the embedded end of the anchor. See Figure 2 of this report.
[5]The critical spacing distance, s_{cr}, is the anchor spacing where full load values in the table may be used. The minimum spacing distance, s_{min}, is the minimum anchor spacing for which values are available and installation is permitted. Spacing distance is measured from the centerline to centerline between two anchors.
[6]The critical edge or end distance, c_{cr}, is the distance where full load values in the table may be used. The minimum edge or end distance, c_{min}, is the minimum distance for which values are available and installation is permitted. Edge or end distance is measured from anchor centerline to the closest unrestrained edge. Note: for anchors loaded in tension or shear with more than one edge distance (e.g. corner location), only one edge or end distance load factor need be applied to each anchor, as applicable.
[7]The tabulated values are applicable for anchors in the ends of grout-filled concrete masonry units where minimum edge distances are maintained.
[8]Load values for anchors installed less than s_{cr} and c_{cr} must be multiplied by the appropriate load reduction factor based on actual spacing (s) or edge distance (c). Load factors are multiplicative; both spacing and edge reduction factors must be considered.
[9]Linear interpolation of load values between minimum spacing (s_{min}) and critical spacing (s_{cr}) and between minimum edge or end distance (c_{min}) and critical edge or end distance (c_{cr}) is permitted.
[10]Concrete masonry width (wall thickness) must be equal to or greater than 1.5 times the anchor embedment depth (e.g. 3/8-inch- and 1/2-inch-diameter anchors are permitted in minimum nominally 6-inch-thick concrete masonry). The 5/8- and 3/4-inch-diameter anchors must be installed in minimum nominally 8-inch-thick concrete masonry.
[11]Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel strength values given in Table 5.
[12]Tabulated allowable bond loads must be adjusted for increased in-service base material temperatures in accordance with Figure 1, as applicable.
[13]The tabulated allowable tension and shear load values may be increased by 4 percent (multiplied by 1.04) for installations into fully grouted concrete masonry with minimum masonry strength of 2000 psi (13.8 MPa).
[14]See Figure 5 for illustration of shear load directions.

TABLE 7—ALLOWABLE AC100+ GOLD ADHESIVE BOND TENSION AND SHEAR LOADS FOR THREADED RODS INSTALLED INTO THE TOPS OF GROUT-FILLED CONCRETE MASONRY UNITS[1,2,3,4,5,6,7,8,9,10]

Anchor Diameter *d* (inches)	Minimum Embedment h_{nom} (inches)	Minimum Spacing Distance	Minimum Edge Distance, (inches)	Minimum End Distance, (inches)	Tension Load (pounds)	Shear Load (pounds)	
						Load Perpendicular to Edge of Masonry Wall (II to end)	Load Parallel to Edge of Masonry Wall (⊥ to end)
1/2	4	1 anchor per cell	1 3/4	3	520	190	300
	10	1 anchor per block[11]	1 3/4	10 1/2	1,670		
5/8	5	1 anchor per cell	1 3/4	3	745	240	300
	12 1/2	1 anchor per block[11]	2 3/4	10 1/2	2,095		
3/4	6	1 anchor per cell	2 3/4	4	1,260	410	490

For **SI:** 1 inch = 25.4 mm; 1 lbs = 0.0044 kN, 1 psi = 0.006894 MPa.

[1]All values are for anchors installed in fully grouted concrete masonry with minimum masonry strength of 1500 psi (10.3 MPa). Concrete masonry units must be light-, medium, or normal-weight conforming to ASTM C 90. Allowable loads have been calculated using a safety factor of 5.0.
[2]The tabulated allowable load values may be increased by 4 percent (multiplied by 1.04) for installations into fully grouted concrete masonry with minimum masonry strength of 2000 psi (13.8 MPa).
[3]Embedment is measured from the surface of the concrete masonry unit to the embedded end of the anchor.
[4]The edge and end distance is measured from the anchor centerline to the closest unrestrained edge and end of the CMU block, respectively. See Figure 3 of this report for an illustration of the top of grouted masonry walls.
[5]Spacing distance is measured from the centerline to centerline between two anchors.
[6]Anchors must be installed into the grouted cell; anchors are not permitted to be installed in a head joint, flange or web of the concrete masonry unit.
[7]Allowable shear loads parallel and perpendicular to the edge of a masonry wall may be applied in or out of plane. See Figure 4.
[8] Anchors are recognized to dead, live, seismic and wind tension and shear load applications. See Sections 4.1 and 5.4 and Table 4 of this report for design with load combinations. For combined loading, see Section 4.1 of this report.
[9]Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel strength values given in Table 5.
[10]Tabulated allowable bond loads must be adjusted for increased in-service base material temperatures in accordance with Figure 1, as applicable.
[11]Anchors with minimum spacing distance of one anchor per block may not be installed in adjacent cells (i.e. one cell must separate the anchor locations).

TABLE 8—ALLOWABLE AC100+ GOLD ADHESIVE BOND TENSION AND SHEAR LOADS FOR THREADED RODS INSTALLED WITH STAINLESS STEEL SCREEN TUBES IN THE FACE OF HOLLOW CONCRETE MASONRY UNITS[1,2,3,4,5,6,7,8,9,10,11,12,13]

TENSION LOAD

Anchor Diameter, *d* (inches)	Minimum Embedment, h_{nom} (inches)	Allowable Load at c_{cr} and s_{cr} (pounds)	Spacing Distance, s			Edge or End Distance, c (see Figure 5)		
			Critical Distance, s_{cr} (inches)	Minimum Distance, s_{min} (inches)	Allowable Load Factor at s_{min}	Critical Distance, c_{cr} (inches)	Minimum Distance, c_{min} (inches)	Allowable Load Factor at c_{min}
1/4	1 1/4	350	4	2	0.60	3	1 1/2	0.80
3/8	1 1/4	400	6	3	0.60	3 3/4	1 7/8	0.80
1/2	1 1/4	400	8	4	0.60	11 1/4	3 3/4	0.95
5/8	1 1/4	400	8	4	0.60	11 1/4	3 3/4	0.95
3/4	1 1/4	400	8	4	0.60	11 1/4	3 3/4	0.95

SHEAR LOAD

Anchor Diameter, *d* (inches)	Minimum Embedment, h_{nom} (inches)	Allowable Load at c_{cr} and s_{cr}, Direction 1 & 2 (pounds)[14]	Allowable Load at c_{cr} and s_{cr}, Direction 3 & 4 (pounds)[14]	Spacing Distance, s			Edge or End Distance, c (see Figure 5)		
				Critical Distance, s_{cr} (inches)	Minimum Distance, s_{min} (inches)	Allowable Load Factor at s_{min}	Critical Distance, c_{cr} (inches)	Minimum Distance, c_{min} (inches)	Allowable Load Factor at c_{min} Load Perpendicular or Parallel to Edge (II or ⊥ to end)
1/4	1 1/4	275	465	4	2	0.45	3	1 1/2	0.50
3/8	1 1/4	290	490	6	3	0.45	3 3/4	1 7/8	0.50
1/2	1 1/4	430	730	8	4	0.45	11 1/4	3 3/4	0.50
5/8	1 1/4	430	730	8	4	0.45	11 1/4	3 3/4	0.50
3/4	1 1/4	430	730	8	4	0.45	11 1/4	3 3/4	0.50

For **SI:** 1 inch = 25.4 mm; 1 lbs = 0.0044 kN, 1 psi = 0.006894 MPa.

[1]All values are for anchors installed in hollow concrete masonry with minimum masonry strength of 1500 psi (10.3 MPa). Concrete masonry units must be light-, medium, or normal-weight conforming to ASTM C 90. Allowable loads have been calculated using a safety factor of 5.0.
[2]Anchors must be installed into the hollow cell; anchors are not permitted to be installed in a mortar joint, flange or web of the concrete masonry unit.
[3]A maximum of two anchors may be installed in a single masonry cell in accordance with the spacing and edge distance requirements, except as noted in the table. Embedment is measured from the outside surface of the concrete masonry to the inside surface of the cell (i.e face shell thickness).
[4]The edge distance and end distance is measured from the anchor centerline to the unrestrained edge of the CMU block. See Figure 4 of this report.
[5]The critical spacing distance, s_{cr}, is the anchor spacing where full load values in the table may be used. The minimum spacing distance, s_{min}, is the minimum anchor spacing for which values are available and installation is permitted. Spacing distance is measured from the centerline to centerline between two anchors.
[6]The critical edge distance, c_{cr}, is the edge distance where full load values in the table may be used. The minimum edge distance, c_{min}, is the minimum edge distance for which values are available and installation is permitted. Edge distance is measured from anchor centerline to the closest unrestrained edge.
[7]Load values for anchors installed less than s_{cr} and c_{cr} must be multiplied by the appropriate load reduction factor based on actual spacing (s) or edge distance (c). Load factors are multiplicative; both spacing and edge reduction factors must be considered.
[8]Linear interpolation of load values between minimum spacing (s_{min}) and critical spacing (s_{cr}) and between minimum edge distance (c_{min}) and critical edge distance (c_{cr}) is permitted.
[9]Concrete masonry width (wall thickness) may be minimum nominal 6-inch-thick provided the minimum embedment (i.e. face shell thickness) is maintained.
[10]The tabulated values are applicable for anchors in the ends of hollow concrete masonry units where minimum face shell thickness, minimum edge and end distances are maintained.
[11] Anchors are recognized to dead, live and wind tension and shear load applications. See Sections 4.1 and 5.5 and Table 4 of this report for design with load combinations.
[12]Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel strength values given in Table 5.
[13]Tabulated allowable bond loads must be adjusted for increased in-service base material temperatures in accordance with Figure 1, as applicable.
[14]See Figure 5 for illustration of shear load directions.

TABLE 9—ALLOWABLE AC100+ GOLD ADHESIVE BOND TENSION AND SHEAR LOADS FOR THREADED RODS INSTALLED WITH PLASTIC SCREEN TUBES IN THE FACE OF HOLLOW CONCRETE MASONRY UNITS[1,2,3,4,5,6,7,8,9,10]

Anchor Diameter, *d* (inches)	Minimum Embedment, h_{nom} (inches)	Minimum Spacing Distance, s_{min}	Edge or End Distance, c (see Figure 5)		Tension Load (pounds)	Shear Load (pounds)
			Minimum Edge Distance, c_{min} (inches)	Minimum End Distance, c_{min} (inches)		
3/8	1 1/4	1 anchor per cell	3	3	140	235
1/2	1 1/4		3	3	150	215
5/8	1 1/4		3	3	150	215

For **SI:** 1 inch = 25.4 mm; 1 lbs = 0.0044 kN, 1 psi = 0.006894 MPa.

[1]All values are for anchors installed hollow concrete masonry with minimum masonry strength of 1500 psi (10.3 MPa). Concrete masonry units must be light-, medium, or normal-weight conforming to ASTM C 90. Allowable loads have been calculated using a safety factor of 5.0.
[2]Anchors must be installed into the hollow cell; anchors are not permitted to be installed in a mortar joint, flange or web of the concrete masonry unit.
[3]Embedment is measured from the outside surface of the concrete masonry to the inside surface of the cell (i.e. face shell thickness).
[4]The edge distance is measured from the anchor centerline to the closest unrestrained edge of the CMU block. See Figure 5 of this report.
[5]Spacing distance is measured from the centerline to centerline between two anchors.
[6]Concrete masonry width (wall thickness) may be minimum nominal 6-inch-thick provided the minimum embedment (i.e. face shell thickness) is maintained.
[7]The tabulated values are applicable for anchors in the ends of hollow concrete masonry units where minimum face shell thickness, minimum edge and end distances are maintained.
[8]Anchors are recognized to dead, live and wind tension and shear load applications. See Sections 4.1 and 5.5 and Table 4 of this report for design with load combinations. For combined loading, see Section 4.1 of this report.
[9]Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel strength values given in Table 5.
[10]Tabulated allowable bond loads must be adjusted for increased in-service base material temperatures in accordance with Figure 1, as applicable.

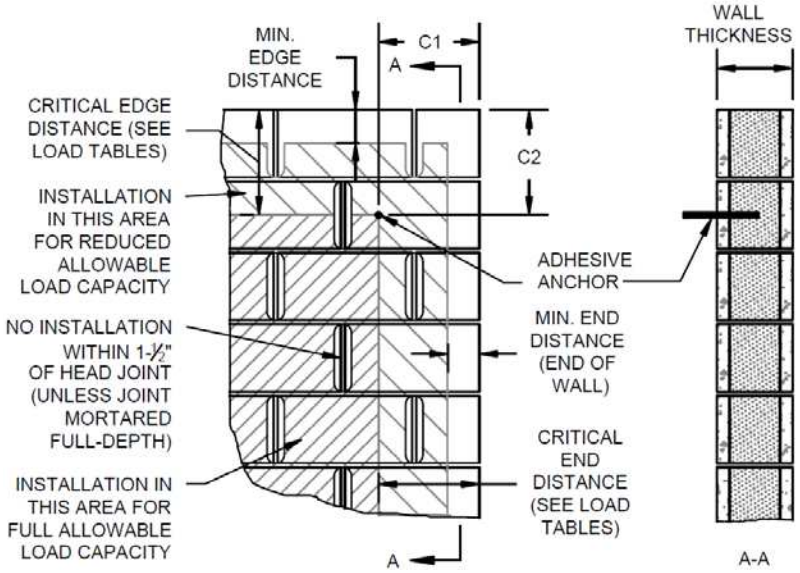
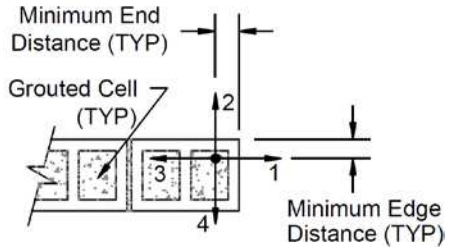


FIGURE 3—ILLUSTRATION OF AC100+ GOLD ADHESIVE ANCHORS INSTALLED INTO GROUTED CONCRETE MASONRY WALL



(1) Shear load parallel to Edge and perpendicular to End
(2) Shear load parallel to End and perpendicular to Edge
(3) Shear load parallel to Edge and perpendicular away from End
(4) Shear load parallel to End and perpendicular to opposite Edge

FIGURE 2—AC100+ GOLD ADHESIVE ANCHORS INSTALLED INTO THE TOP OF GROUTED CONCRETE MASONRY

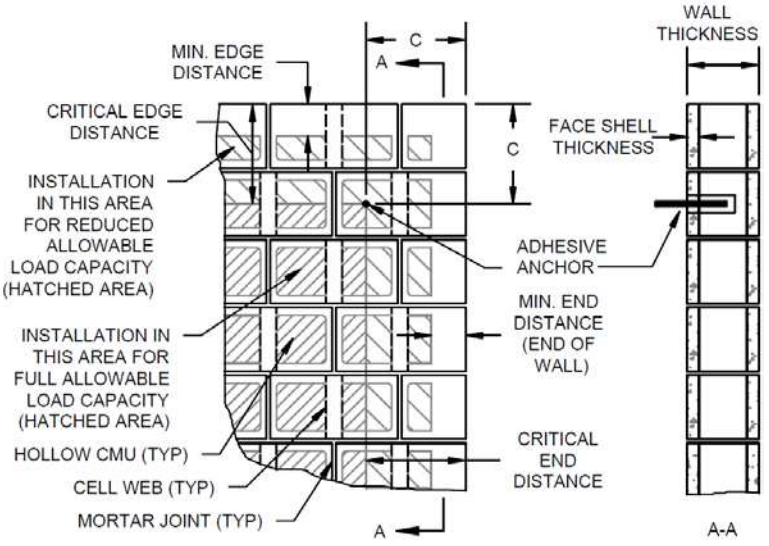
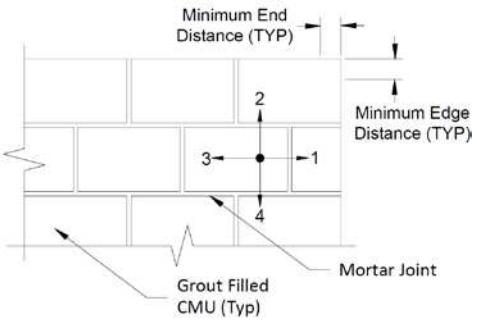


FIGURE 5—ILLUSTRATION OF AC100+ GOLD ADHESIVE ANCHORS INSTALLED INTO HOLLOW CONCRETE MASONRY WALL (WITH SCREEN TUBES)

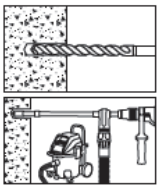


(1) Shear load parallel to Edge and perpendicular to End
(2) Shear load parallel to End and perpendicular to Edge
(3) Shear load parallel to Edge and perpendicular away from End
(4) Shear load parallel to End and perpendicular away from Edge

FIGURE 4—DIRECTION OF SHEAR LOADING IN RELATION TO EDGE AND END OF MASONRY WALL

INSTALLATION INSTRUCTIONS (SOLID BASE MATERIALS)

DRILLING

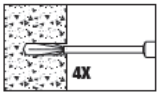


1- Drill a hole into the base material with rotary hammer drill (i.e. percussion drill) and a carbide drill bit to the size and embedment required by the selected steel hardware element (reference installation specifications for threaded rod and reinforcing bar). The tolerances of the carbide drill bits, including hollow bits, must meet ANSI Standard B212.15.

- Precaution: Use suitable eye and skin protection. Avoid inhalation of dust during drilling and/or removal (see dust extraction equipment by DEWALT to minimize dust emission).
- Note! In case of standing water in the drilled hole (flooded hole condition), all the water has to be removed from the hole (e.g. vacuum, compressed air, etc.) prior to cleaning.

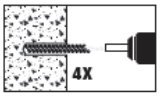
Drilling in dry base material is recommended when using hollow drill bits (vacuum must be on).

HOLE CLEANING DRY (BLOW 4X, BRUSH 4X, BLOW 4X)



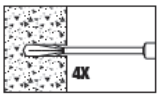
2a- Starting from the bottom or back of the anchor hole, blow the hole clean using a compressed air nozzle (min. 90 psi) or a hand pump (supplied by DEWALT) a minimum of four times (4x).

- Use a compressed air nozzle (min. 90 psi) or a hand pump (min. volume 25 fl. oz.) for anchor rod 3/8" to 3/4" diameter or reinforcing bar (rebar) sizes #3 to #6.
- Use a compressed air nozzle (min. 90 psi) for anchor rod 7/8" to 1-1/4" diameter and rebar sizes #7 to #10. A hand pump shall not be used with these anchor sizes.



2b- Determine wire brush diameter (see installation specifications) and attach the brush with adaptor to a rotary drill tool or battery screwgun. Brush the hole with the selected wire brush a minimum of four times (4x). A brush extension (supplied by DEWALT, Cat. #08282) should be used for holes drilled deeper than the listed brush length.

- The wire brush diameter should be checked periodically during use. The brush must be replaced if it becomes worn and does not come into contact with the sides of the drilled hole.



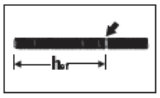
2c- Finally, blow the hole clean again a minimum of four times (4x).

- Use a compressed air nozzle (min. 90 psi) or a hand pump (min. volume 25 fl. oz.) for anchor rod 3/8" to 3/4" diameter or reinforcing bar (rebar) sizes #3 to #6.
- Use a compressed air nozzle (min. 90 psi) for anchor rod 7/8" to 1-1/4" diameter and rebar sizes #7 to #10. A hand pump shall not be used with these anchor sizes.
- When finished the hole should be clean and free of dust, debris, ice, grease, oil or other foreign material.

PREPARING

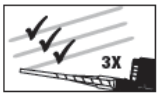
3- Check adhesive expiration date on cartridge label. Do not use expired product. Review Safety Data Sheet (SDS) before use. Cartridge temperature must be between 23°F - 95°F (-5°C - 35°C) when in use unless otherwise noted. Review gel (working) and cure time table. Consideration should be given to the reduced gel time of the adhesive in warm temperatures.

- Attach a supplied mixing nozzle to the cartridge. Do not modify the mixer in any way and make sure the mixing element is inside the nozzle. Load the cartridge into the correct dispensing tool.
- Note: Always use a new mixing nozzle with new cartridges of adhesive and also for all work interruptions exceeding the published working time of the adhesive.



4- Prior to inserting the anchor rod or rebar into the filled bore hole, the position of the embedment depth has to be marked on the anchor

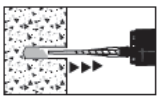
- Verify anchor element is straight and free of surface damage.



5- Adhesive must be properly mixed to achieve published properties. Prior to dispensing adhesive into the drilled hole, separately dispense at least three full strokes of adhesive through the mixing nozzle until the adhesive is a consistent GRAY color. Do not attach a used nozzle when changing to a new cartridge.

- Review and note the published working and cure times (see gel time and curing time table) prior to injection of the mixed adhesive into the cleaned anchor hole.

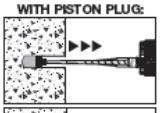
INSTALLATION

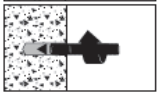


6- Fill the cleaned hole half to two-thirds full with mixed adhesive starting from the bottom or back of the anchor hole. Slowly withdraw the mixing nozzle as the hole fills to avoid creating air pockets or voids. For embedment depth greater than 7-1/2" an extension nozzle must be used with the mixing nozzle.

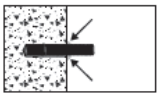
- Piston plugs (see installation specifications) must be used with and attached to the mixing nozzle and extension tube for horizontal and overhead installations in concrete except with anchor rod 3/8" and rebar size #3. Insert piston plug to the back of the drilled hole and inject as described in the method above. During installation the piston plug will be naturally extruded from the drilled hole by the adhesive pressure.
- **Attention!** Do not install anchors overhead without proper training and installation hardware provided by DEWALT. Contact DEWALT for details prior to use.

WITH PISTON PLUG:



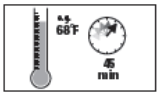


7- The anchor should be free of dirt, grease, oil or other foreign material. Push clean threaded rod or reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. Observe the gel (working) time.



8- Be sure that the anchor is fully seated at the bottom of the hole and that some adhesive has flowed from the hole and all around the top of the anchor. If there is not enough adhesive in the hole, the installation must be repeated. The anchor shall not be moved after placement and during cure.

CURING AND LOADING



9- Allow the adhesive anchor to cure to the specified full curing time prior to applying any load (reference gel time and curing time table).

- Do not disturb, torque or load the anchor until it is fully cured.

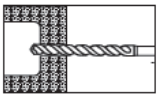
10- After full curing of the adhesive anchor, a fixture can be installed to the anchor and tightened up to the maximum torque (reference gel time and curing table) by using a calibrated torque wrench.

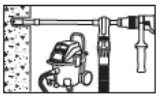
- Take care not to exceed the maximum torque for the selected anchor.

FIGURE 6—AC100+ GOLD ADHESIVE ANCHORS INSTALLED INTO GROUTED CONCRETE MASONRY, MPII FOR SOLID BASE MATERIAL

INSTALLATION INSTRUCTIONS (HOLLOW BASE MATERIALS)

DRILLING



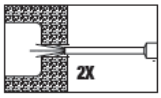


1- Drill a hole into the base material with a rotary drill tool to the size and embedment required by the selected screen tube size and steel anchor element (see installation specifications for threaded rod in hollow base material with screen tube supplied by DEWALT). The tolerances of the drill bit, including hollow drill bits, must meet the requirements of ANSI B212.15.

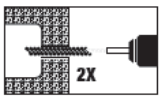
- Precaution: Wear suitable eye and skin protection. Avoid inhalation of dust during drilling and/or removal (see dust extraction by DEWALT to minimize dust emission).

Drilling in dry base materials is recommended when using hollow drill bits (vacuum must be on).

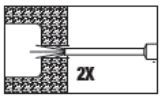
HOLE CLEANING (BLOW 2X, BRUSH 2X, BLOW 2X)



2- Starting from the bottom or back of the anchor hole, blow the hole clean with a hand pump (min. volume 25 fl.oz. supplied by DEWALT) or compressed air nozzle a minimum of two times (2x).



- Determine the wire brush diameter (see installation specifications) and attach the brush with adaptor to a rotary drill tool or battery screw gun. Brush the hole with the selected wire brush a minimum of two times (2x). A brush extension (supplied by DEWALT, Cat #08282) should be used for holes drilled deeper than the listed brush length.
- The wire brush should be checked periodically during use. The brush must be replaced if it becomes worn and does not come in contact with sides of the drill hole.

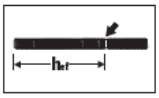


- Finally, blow the hole clean again a minimum of two times (2x)
- When finished the hole should be clean and free of dust, debris, ice, grease, oil or other foreign material.

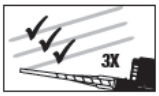
PREPARING

3- Check adhesive expiration date on cartridge label. Do not use expired product. Review Safety Data Sheet (SDS) before use. Cartridge temperature must be between 23°F - 95°F (-5°C - 35°C) when in use unless otherwise noted. Review gel (working) time and curing time table. Consideration should be given to the reduced gel (working) time of the adhesive in warm temperatures.

- Attach a supplied mixing nozzle to the cartridge. Do not modify the mixer in any way and make sure the mixing element is inside the nozzle. Load the cartridge into the correct dispensing tool.
- Note: Always use a new mixing nozzle with new cartridges of adhesive and also for all work interruptions exceeding the published working time of the adhesive.



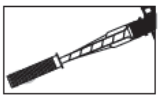
4- Prior to inserting the anchor into the filled screen tube, the position of the embedment depth has to be marked on the anchor. Verify anchor element is straight and free of surface damage.



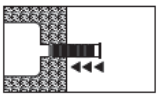
5- Adhesive must be properly mixed to achieve published properties. Prior to dispensing adhesive into the drilled hole, separately dispense at least three full strokes of adhesive through the mixing nozzle until the adhesive is a consistent GRAY color. Do not attach a used nozzle when changing to a new cartridge.

- Review and note the published working and cure times (see gel time and curing time table) prior to injection of the mixed adhesive into the screen tube.

INSTALLATION

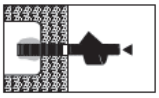


6- Select a screen tube of suitable length (supplied by DEWALT). Fill the screen tube full with adhesive starting from the bottom or back of the tube. Slowly withdraw the mixing nozzle as the screen fills to avoid creating air pockets or voids. A plastic extension tube supplied by DEWALT must be used with the mixing nozzle if the back of the screen tube cannot be reached.



7- Insert the screen tube filled with adhesive into the cleaned anchor hole. Inject additional adhesive into the screen tube as necessary to ensure the screen tube is completely filled.

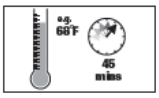
- Note: Overfilling the screen tube is acceptable but not required.



8- Prior to inserting the anchor rod into the screen tube inspect it to ensure that it is free of dirt, grease, oil or other foreign material.

- Push the threaded rod into the screen tube while turning slightly to ensure positive distribution of the adhesive until back of the tube is reached.
- Note: In cases where the drilled hole size is larger than specified due to rotary drilling (e.g. an elongated opening), the annular space between the screen tube and the hole at the base material surface must be filled with adhesive.

CURING AND FIXTURE



9- Allow the adhesive anchor to cure to the specified full curing time prior to applying any load.

- Do not disturb, torque or load the anchor until it is fully cured (see gel time and curing time table).

10- After full curing of the adhesive anchor, a fixture can be installed to the anchor and tightened up to the maximum torque (see installation specifications for threaded rod in hollow base material) by using a calibrated torque wrench.

- Take care not to exceed the maximum torque for the selected anchor.

FIGURE 7—AC100+ GOLD ADHESIVE ANCHORS INSTALLED INTO HOLLOW CONCRETE MASONRY, MPII FOR HOLLOW BASE MATERIAL

ICC-ES Evaluation Report

ESR-3200 LABC and LARC Supplement

Reissued December 2018

This report is subject to renewal December 2019.

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DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:

DEWALT

EVALUATION SUBJECT:

AC100+ GOLD® ADHESIVE ANCHOR SYSTEM IN MASONRY (DEWALT / POWERS)

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that AC100+ Gold adhesive anchor system in masonry, described in ICC-ES master evaluation report ESR-3200, has also been evaluated for compliance with the codes noted below as adopted by Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2017 *City of Los Angeles Building Code* (LABC)
- 2017 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The AC100+ Gold adhesive anchor system in masonry, described in Sections 2.0 through 7.0 of the master evaluation report ESR-3200, complies with LABC Chapter 21, and LARC, and is subjected to the conditions of use described in this report.

3.0 CONDITIONS OF USE

The AC100+ Gold adhesive anchor system described in this evaluation report must comply with all of the following conditions:

- All applicable sections in the master evaluation report ESR-3200.
- The design, installation, conditions of use and labeling of the anchor system are in accordance with the 2015 *International Building Code®* (2015 IBC) provisions noted in the master evaluation report ESR-3200.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, and Section 2114, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.
- The allowable and strength design values listed in the master evaluation report and tables are for the connection of the anchor system to masonry substrate. The connection between the anchor system and the connected members shall be checked for capacity (which may govern).

This supplement expires concurrently with the master report, reissued December 2018.

ICC-ES Evaluation Report

ESR-3200 FBC Supplement

Reissued December 2018

This report is subject to renewal December 2019.

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DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:

DEWALT

EVALUATION SUBJECT:

AC100+ GOLD® ADHESIVE ANCHOR SYSTEM IN MASONRY (DEWALT / POWERS)

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the AC100+ Gold® Adhesive Anchor System in Masonry, recognized in ICC-ES master evaluation report ESR-3200, has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2017 *Florida Building Code—Building*
- 2017 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The AC100+ Gold® Adhesive Anchor System in Masonry, described in Sections 2.0 through 7.0 of the master evaluation report ESR-3200, complies with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, provided the design and installation are in accordance with the 2015 *International Building Code®* (IBC) provisions noted in the master report, and under the following conditions:

- Design wind loads must be based on Section 1609 of the *Florida Building Code—Building* or Section 301.2.1.1 of the *Florida Building Code—Residential*, as applicable.
- Load combinations must be in accordance with Section 1605.2 or Section 1605.3 of the *Florida Building Code—Building*, as applicable.

Use of the AC100+ Gold® Adhesive Anchor System with stainless steel threaded rod materials has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential*, when the following conditions are met:

- The design wind loads for use of the anchors in a High-Velocity Hurricane Zone are based on Section 1620 of the *Florida Building Code—Building*.

Use of AC100+ Gold® Adhesive Anchor System with carbon steel threaded rod materials for compliance with the High-velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential* has not been evaluated, and is outside the scope of this supplemental report.

For products falling under Florida Rule 9N-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the master report, reissued December 2018.

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ESR-4105

Reissued 08/2018
Revised 10/2018
This report is subject to renewal 08/2019.

DIVISION: 04 00 00—MASONRY

SECTION: 04 05 19.16—MASONRY ANCHORS

REPORT HOLDER:

DEWALT

EVALUATION SUBJECT:

AC100+ GOLD® ADHESIVE ANCHORING SYSTEM IN UNREINFORCED MASONRY (DEWALT / POWERS)

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ICC-ES Evaluation Report

ESR-4105

Reissued August 2018
Revised October 2018
This report is subject to renewal August 2019.

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DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:

DEWALT

ADDITIONAL LISTEE:

POWERS FASTENERS

EVALUATION SUBJECT:

AC100+ GOLD® ADHESIVE ANCHORING SYSTEM IN UNREINFORCED MASONRY (DEWALT / POWERS)

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012, 2009 and 2006 *International Building Code®* (IBC)
- 2018, 2015, 2012, 2009 and 2006 *International Residential Code®* (IRC)
- 2018, 2015, 2012, 2009 and 2006 *International Existing Building Code®* (IEBC)

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see ESR-4105 LABC, LARC and LAEBC Supplement.

Property evaluated:

Structural

2.0 USES

Adhesive anchors installed using the AC100+ Gold Adhesive Anchoring System are post-installed adhesive anchors used for anchoring threaded steel rods or deformed steel reinforcement bars in unreinforced brick masonry. Adhesive anchors installed in unreinforced masonry with the AC100+ Gold adhesive anchoring system are designed to resist short-term loads imposed by earthquake or wind, as noted in Section 4.0 of this report.

The adhesive anchors are an alternative to anchors described in Section 8.1.3 of TMS 402 (-16 and -13), as referenced in Section 2107 of the 2018 and 2015 IBC and Section 2.1.4 of TMS 402 (-11, -08 and -05) as referenced in Section 2107 of the 2012, 2009 and 2006 IBC, respectively. The adhesive anchors are an alternative to bolts described in Section A107.4 and Section A113.1 of the IEBC. The anchoring system may also be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 General:

The AC100+ Gold Adhesive Anchoring System is comprised of a two-component adhesive filled in cartridges, static mixing nozzles, dispensing tools, hole cleaning equipment, a steel anchor element, and steel mesh screen tubes.

Product names for the report holder and the additional listee are presented in the following table of this report.

Company Name	Adhesive Product Name
DEWALT	AC100+ Gold®
	AC100-PRO (outside North America)
Powers Fasteners	AC100+ Gold®
	AC100-PRO (outside North America)

The adhesive is used with continuously threaded steel rods and deformed reinforcing bars; the adhesive, screen tubes, and steel elements are installed in pre-drilled holes into masonry walls as described in this report.

3.2 Materials:

3.2.1 AC100+ Gold adhesive: The AC100+ Gold adhesive is a two-component adhesive that is packaged in dual-cylinder plastic cartridges to keep the adhesive components separate and allow for multiple uses. The components combine and react when dispensed with a manual or powered tool through a disposable injection mixing nozzle containing an internal mixing element supplied by DEWALT / Powers. The mixing nozzle may be replaced to permit multiple uses of the plastic cartridges. AC100+ Gold adhesive is available in 9.5-ounce (280 mL), 11.5-ounce (345 mL) and 28-ounce (825 mL) cartridges. Each cartridge label is marked with the adhesive expiration date. A shelf life of eighteen months, as indicated by the expiration date, applies to an unopened cartridge when stored in accordance with the manufacturer's recommendations.

3.2.2 Steel Anchor Rods and Reinforcing Bars: Threaded steel rods must be $^3/_4$-inch (19.1 mm) diameter and must comply with ASTM A36, ASTM F1554, Grade 36 or ASTM A307. The $^3/_4$-inch (19.1 mm) diameter threaded rods may also be used in a pre-bent $22^1/_2$-degree configuration (threaded rods must not be bent after installation). Threaded rods must be supplied with hex nuts conforming to ASTM A563 Grade A. Material types of the nuts and washers must be matched to the threaded rods.

Deformed steel reinforcing bars must be No. 4, No. 5 or No. 6 and must comply with ASTM A615, A706, A767 or A996, Grade 60.

3.2.3 Steel Screen Tubes: Steel mesh screen tubes are used in the unreinforced masonry with the adhesive and threaded steel anchor rods or deformed reinforcing bars. The screen tubes hold the adhesive in position in unreinforced masonry wall during the installation of the steel anchor elements.

3.3 Unreinforced Masonry:

The existing unreinforced masonry walls must have a minimum nominal thickness of 13 inches (330 mm) [3 wythes of brick]. The average in-place mortar shear strength of the building's unreinforced masonry determined in accordance with IEBC Section A106.2.3 must be no less than 40 psi (275 kPa) net.

4.0 DESIGN AND INSTALLATION

4.1 General:

Two types of anchor assemblies are available: these assemblies are described as Configuration A (shear anchor or rebar dowel) and Configuration B ($22^1/_2$-degree combination anchor).

4.1.1 Configuration A, Threaded Rods or Steel Reinforcing Bars in Shear (Shear Anchor or Rebar Dowel): Configuration A is the anchor assembly resisting shear loads only, where the outside face of the wall is inaccessible. Configuration A consists of a $^3/_4$-inch-diameter (19.1 mm) threaded rod or a No. 4, 5 or No. 6 reinforcing bar and a $^{15}/_{16}$-inch-diameter-by-8-inch-long (23.8 mm by 203 mm) steel screen tube. Figure 1 shows details of an anchor installed in Configuration A.

4.1.2 Configuration B, Threaded Rods in Tension and Shear ($22^1/_2$-degree Combination Anchor): Configuration B is the anchor assembly resisting a combination of tension and shear loads where the outside face of the wall is not accessible. The anchor must be installed in the wall at an angle of $22^1/_2$ degrees in the vertical plane (upward or downward from the horizontal). Configuration B consists of a $^3/_4$-inch-diameter (19.1 mm), prebent threaded rod used with a $^{15}/_{16}$-inch-by-13-inch-long (23.8 mm by 330 mm) steel screen tube. The threaded rod must be embedded a minimum of 13 inches (330 mm) at the $22^1/_2$-degree downward angle. Figure 2 shows details of an installed Configuration B.

4.2 Design:

Adhesive anchors installed using the AC100+ Gold Adhesive Anchoring System are intended to resist only short-term loads imposed by wind or earthquake. The adhesive anchors must be approved by a registered design professional and installed under special inspection in accordance with Section 4.5 of this report. The edge distance and vertical and horizontal spacing for the anchor assemblies described in Section 4.1 must comply with Table 2.

Conditions of acceptance for threaded rods and reinforcing bars in unreinforced brick masonry are as follows:

4.2.1 Configuration A, Threaded Rods or Steel Reinforcing Bars in Shear (Shear Anchor or Rebar Dowel):

a. Installation of assemblies using threaded rods or reinforcing bars in Configuration A intended to resist shear loads only must comply with Sections 4.1.1 and 4.3, and Figure 1 of this report.

b. The allowable shear load for the $^3/_4$-inch-diameter (19.1 mm) threaded rod is 1,000 pounds (4,450 N), as shown in Table 3. For the No. 4, No. 5 and No. 6 reinforcing bars, the allowable shear loads are 500, 750 and 1,000 pounds (2,225, 3,338, and 4,450 N), respectively, as shown in Table 3. No adjustment for wind or earthquake loading is permitted.

c. The allowable shear loads noted above are applicable only to anchors installed in walls where in-place shear tests indicate a minimum mortar strength of 40 psi (275 kPa) net in accordance with IEBC Section A106.2.3.

4.2.2 Configuration B, Threaded Rods in Tension and Shear ($22^1/_2$-degree Combination Anchor):

a. Installation of assemblies using threaded rods in Configuration B intended to resist a combination of tension and shear loads must comply with Sections 4.1.2 and 4.3, and Figure 2 of this report.

b. The maximum allowable tension load for the $^3/_4$-inch-diameter (19.1 mm) prebent threaded rod (Configuration B) is 1,200 pounds (5,340 N), as shown in Table 3. No adjustment for wind or earthquake loading is permitted.

c. The maximum allowable shear load for the $^3/_4$-inch-diameter (19.1 mm) prebent threaded rod is 460 pounds (2,045 N), as shown in Table 3. No adjustment for wind or earthquake loading is permitted.

d. For the $^3/_4$-inch-diameter (19.1 mm) prebent threaded rod subjected to combined tension and shear, the allowable combined load must be determined using the following equation:

$$(P_s/P_t) + (V_s/V_t) \leq 1$$

where:

P_s = Applied service tension load.

P_t = Allowable service tension load.

V_s = Applied service shear load.

V_t = Allowable service shear load.

e. The allowable tension and shear values as determined above are applicable only to anchors installed in walls where in-place shear tests indicate minimum mortar strength of 40 psi (275 kPa) net in accordance with IEBC Section A106.2.3.

4.3 Installation:

4.3.1 General: Adhesive anchors must be installed in accordance with this report and the manufacturer's published installation instructions (MPII) as represented in Figure 3. The drill bit size, hole diameter, embedment depth, spacing, edge distance and base material must comply with the requirements of this report. Gel and curing times for the AC100+ Gold adhesive and the respective masonry temperature during installation and cure are shown in Table 1. The adhesive anchors must be installed under special inspection in accordance with Section 4.5 of this report.

4.3.2 Configuration A, Threaded Rods or Steel Reinforcing Bars in Shear (Shear Anchor or Rebar Dowel): For Configuration A, vertical and horizontal anchor spacing and edge distances must comply with Table 2 of this report. 1-inch-diameter (25.4 mm) holes must be drilled using standard carbide-tipped masonry drill bits complying with ANSI Specification B212.15-1994. The holes must be drilled 8 inches (203 mm) deep and

perpendicular to the wall. A rotary drill, or a rotary hammer drill set on "rotation only," must be used to drill the holes. Figure 1 illustrates an anchor installed in Condition A. Figure 3 illustrates the MPII including drilling, hole cleaning, adhesive injection with screen tubes, anchor insertion, curing and attachment.

4.3.3 Configuration B, Threaded Rods in Tension and Shear ($22^1/_2$-degree Combination Anchor): For Configuration B, anchor spacing and edge distances must comply with Table 2 of this report. 1-inch-diameter (25.4 mm) holes must be drilled using standard carbide-tipped masonry drill bits complying with ANSI Specification B212.15-1994. Holes must be at a $22^1/_2$-degree downward angle (measured from horizontal) to within 1 inch (25.4 mm) of the opposite wall surface, to a minimum depth of 13 inches (330 mm). A rotary drill, or a rotary hammer drill set on "rotation only," must be used to drill the holes. Figure 2 illustrates an anchor installed in Condition B. Figure 3 illustrates the MPII including drilling, hole cleaning, adhesive injection with screen tubes, anchor insertion, curing and attachment.

4.4 Field Tests:

a. Tests for in-place mortar shear strength of the building must be conducted in accordance with Section A106.2.3 of the IEBC. In-place mortar shear strengths shall indicate a minimum mortar strength of 40 psi (275 kPa).

b. Adhesive anchors resisting tension forces or a combination of tension and shear forces must be tested in accordance with Section A107.4 of the IEBC. The test report must include:

   1. Test location(s)
   2. Brick/mortar condition
   3. Bolt movement/elongation
   4. Embedment depth and masonry wall thickness
   5. Applied load, loading procedure, load increments, and rate of loading.

4.5 Special Inspection:

4.5.1 IBC and IRC: Continuous special inspection must be conducted in accordance with Sections 1704 and 1705 of the IBC.

4.5.2 IEBC: Periodic inspection, direct-tension tests, and calibrated torque wrench tests must be conducted in accordance with Section A107.4 of the IEBC. In lieu of testing and periodic inspection, the IEBC permits continuous special inspection during installation of anchors resisting shear forces only.

5.0 CONDITIONS OF USE

Adhesive anchors installed using the AC100+ Gold Adhesive Anchoring System in Unreinforced Masonry described in this report comply with, or are a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Use and installation must be as set forth in this evaluation report and the manufacturer's printed installation instructions (MPII) illustrated in Figure 3 of this report. In case of conflict, this report governs.

5.2 Calculations and details must be submitted to the code official for approval.

5.3 Special inspection must be in accordance with Section 4.5 of this evaluation report.

5.4 Use of the anchor system must be approved by the registered design professional.

5.5 The existing mortar shall have a minimum in-place shear strength of 40 psi (275kPa) in accordance with Section 3.3 of this report prior to installation of the adhesive anchors.

5.6 Adhesive anchors must be limited to resisting transient or short-term (wind or seismic) loads only.

5.7 Anchors are installed in holes predrilled with a carbide-tipped masonry drill bit complying with ANSI B212.15-1994. Holes must be drilled using a rotary drill, or a rotary hammer drill set on "rotation only" (non-impact). Impact tools must not be used for drilling holes or for tightening steel anchors or nuts.

5.8 The AC100+ Gold Adhesive Anchoring System is manufactured under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Adhesive Anchors in Unreinforced Masonry Elements (AC60), dated December 2009 (editorially revised October 2018); and quality-control documentation.

7.0 IDENTIFICATION

AC100+ Gold adhesive cartridges are identified by labels on the cartridge or packaging bearing the company name (DEWALT), product name, the batch number, the expiration date and the evaluation report number (ESR-4105). The screen tubes are identified by packaging label displaying the company name and product name. Threaded rods, nuts, washers and deformed reinforcing bars are standard elements and must conform to applicable national or international specifications.

7.1 The report holder's contact information is the following:

DEWALT
701 EAST JOPPA ROAD
TOWSON, MARYLAND 21286
(800) 524-3244
www.dewalt.com
anchors@dewalt.com

7.2 The Additional Listee's contact information is the following:

POWERS FASTENERS
701 EAST JOPPA ROAD
TOWSON, MARYLAND 21286
(800) 524-3244
www.powers.com
anchors@dewalt.com

The DEWALT drilling systems shown below collect and remove dust with a HEPA dust extractor during the hole drilling operation in dry base materials using hammer-drills set to "rotation only" (non-impact). See step 1 of the manufacturer's printed installation instructions.

FIGURE A—EXAMPLES OF DEWALT DUST REMOVAL DRILLING SYSTEMS WITH HEPA DUST EXTRACTORS FOR ILLUSTRATION

TABLE 1—GEL AND CURING TIMES FOR AC100+ GOLD ADHESIVE[1]

Temperature of base material		Approximate gel (working) time	Full curing time
14°F	-10°C	90 minutes	24 hours
23°F	-5°C	90 minutes	14 hours
32°F	0°C	45 minutes	7 hours
41°F	5°C	25 minutes	2 hours
68°F	20°C	6 minutes	45 minutes
86°F	30°C	4 minutes	25 minutes
104°F	40°C	1.5 minutes	15 minutes

[1]Linear interpolation to determine approximate gel and full curing times for intermediate base material temperatures is allowed. For installations in masonry temperatures between 14°F and 23°F the cartridge temperature must be conditioned to between 68°F and 95°F (20°C - 35°C).

TABLE 2—SPACING AND EDGE DISTANCE REQUIREMENTS FOR AC100+ GOLD ADHESIVE INSTALLED IN UNREINFORCED MASONRY

ANCHOR ASSEMBLY	Minimum Vertical Spacing (inches)	Minimum Horizontal Spacing (inches)	Minimum Edge Distance (inches)
Shear anchor or rebar dowel, Configuration A (see Figure 1)	16	16	16
$22^{1}/_{2}$° combination anchor, Configuration B (see Figure 2)	16	16	16

For **SI:** 1 inch = 25.4 mm

TABLE 3—ALLOWABLE LOAD CAPACITIES FOR THREADED RODS AND REINFORCING BARS FOR AC100+ GOLD ADHESIVE INSTALLED IN UNREINFORCED MASONRY[1,2]

SHEAR ANCHOR OR REBAR DOWEL – CONFIGURATION A (FIGURE 1)				
Anchor Rod Dia. (inch) or Rebar Size	**Minimum Embedment (inches)**	**Minimum Wall Thickness (inches)**	**Allowable Tension Load (pounds)**	**Allowable Shear Load[3] (pounds)**
3/4	8	13	-	1,000
No. 4	8	13	-	500
No. 5	8	13	-	750
No. 6	8	13	-	1,000
22 1/2° COMBINATION ANCHOR – CONFIGURATION B (FIGURE 2)				
Anchor Rod Dia. (inch)	**Minimum Embedment**	**Minimum Wall Thickness (inches)**	**Allowable Tension Load[3] (pounds)**	**Allowable Shear Load[3] (pounds)**
3/4	Within 1 inch of opposite wall surface	13	1,200	1000

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 foot-pound = 1.356 N-m, 1 psi = 6.89 Pa.

[1]Allowable load values are applicable only to anchors where in-place shear tests indicate minimum mortar strength of 40 psi (275 kPa), net.
[2]No increase for lateral loading is permitted, such as loading induced by wind or earthquake.
[3]Anchors must be tested in accordance with Section 4.4 for use with the IEBC.

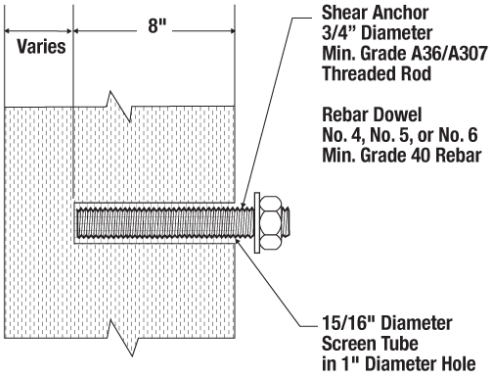


FIGURE 1—CONFIGURATION A (SHEAR ANCHOR OR REBAR DOWEL)[1]
[1]Screen tubes are nominally 8 inches long in accordance with Section 4.1.1 of this report.

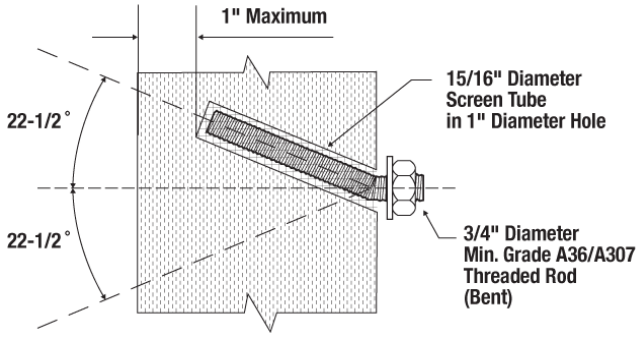
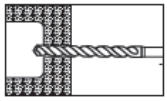
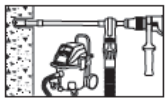


FIGURE 2—CONFIGURATION B (22 1/2-DEGREE COMBINATION ANCHOR)[1]
[1]Screen tubes are nominally 13 inches long in accordance with Section 4.2.1 of this report.

INSTALLATION INSTRUCTIONS (HOLLOW BASE MATERIALS AND UNREINFORCED MASONRY [URM])

DRILLING



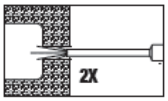


1- Drill a hole into the base material with a rotary drill tool to the size and embedment required by the selected screen tube size and steel anchor element (see installation specifications for threaded rod in hollow base material with screen tube supplied by DEWALT). The tolerances of the drill bit, including hollow drill bits, must meet the requirements of ANSI B212.15.

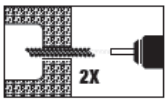
- Precaution: Wear suitable eye and skin protection. Avoid inhalation of dust during drilling and/or removal (see dust extraction by DEWALT to minimize dust emission).

Drilling in dry base materials is recommended when using hollow drill bits (vacuum must be on).

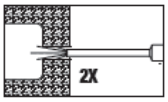
HOLE CLEANING (BLOW 2X, BRUSH 2X, BLOW 2X)



2- Starting from the bottom or back of the anchor hole, blow the hole clean with a hand pump (min. volume 25 fl.oz. supplied by DEWALT) or compressed air nozzle a minimum of two times (2x).



- Determine the wire brush diameter (see installation specifications) and attach the brush with adaptor to a rotary drill tool or battery screw gun. Brush the hole with the selected wire brush a minimum of two times (2x). A brush extension (supplied by DEWALT, Cat #08282) should be used for holes drilled deeper than the listed brush length.
- The wire brush should be checked periodically during use. The brush must be replaced if it becomes worn and does not come in contact with sides of the drill hole.

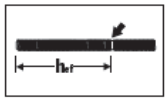


- Finally, blow the hole clean again a minimum of two times (2x)
- When finished the hole should be clean and free of dust, debris, ice, grease, oil or other foreign material.

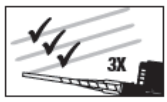
PREPARING

3- Check adhesive expiration date on cartridge label. Do not use expired product. Review Safety Data Sheet (SDS) before use. Cartridge temperature must be between 23°F - 95°F (-5°C - 35°C) when in use unless otherwise noted. Review gel (working) time and curing time table. Consideration should be given to the reduced gel (working) time of the adhesive in warm temperatures.

- Attach a supplied mixing nozzle to the cartridge. Do not modify the mixer in any way and make sure the mixing element is inside the nozzle. Load the cartridge into the correct dispensing tool.
- Note: Always use a new mixing nozzle with new cartridges of adhesive and also for all work interruptions exceeding the published working time of the adhesive.



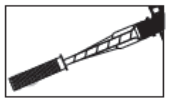
4- Prior to inserting the anchor into the filled screen tube, the position of the embedment depth has to be marked on the anchor. Verify anchor element is straight and free of surface damage.



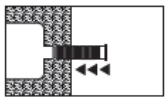
5- Adhesive must be properly mixed to achieve published properties. Prior to dispensing adhesive into the drilled hole, separately dispense at least three full strokes of adhesive through the mixing nozzle until the adhesive is a consistent GRAY color. Do not attach a used nozzle when changing to a new cartridge.

- Review and note the published working and cure times (see gel time and curing time table) prior to injection of the mixed adhesive into the screen tube.

INSTALLATION

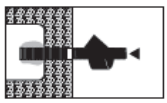


6- Select a screen tube of suitable length (supplied by DEWALT). Fill the screen tube full with adhesive starting from the bottom or back of the tube. Slowly withdraw the mixing nozzle as the screen fills to avoid creating air pockets or voids. A plastic extension tube supplied by DEWALT must be used with the mixing nozzle if the back of the screen tube cannot be reached.



7- Insert the screen tube filled with adhesive into the cleaned anchor hole. Inject additional adhesive into the screen tube as necessary to ensure the screen tube is completely filled.

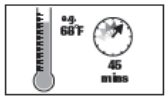
- Note: Overfilling the screen tube is acceptable but not required.



8- Prior to inserting the anchor rod into the screen tube inspect it to ensure that it is free of dirt, grease, oil or other foreign material.

- Push the threaded rod into the screen tube while turning slightly to ensure positive distribution of the adhesive until back of the tube is reached.
- Note: In cases where the drilled hole size is larger than specified due to rotary drilling (e.g. an elongated opening), the annular space between the screen tube and the hole at the base material surface must be filled with adhesive.

CURING AND FIXTURE



9- Allow the adhesive anchor to cure to the specified full curing time prior to applying any load.

- Do not disturb, torque or load the anchor until it is fully cured (see gel time and curing time table).

10- After full curing of the adhesive anchor, a fixture can be installed to the anchor and tightened up to the maximum torque (see installation specifications for threaded rod in hollow base material) by using a calibrated torque wrench.

- Take care not to exceed the maximum torque for the selected anchor.

FIGURE 3—AC100+ GOLD ADHESIVE ANCHORS INSTALLED INTO UNREINFORCED MASONRY AND HOLLOW BASE MATERIALS, MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII)

ICC-ES Evaluation Report

ESR-4105 LABC, LARC, and LAEBC Supplement

Reissued August 2018
Revised October 2018
This report is subject to renewal August 2019.

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DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:

DEWALT

EVALUATION SUBJECT:

AC100+ GOLD® ADHESIVE ANCHORING SYSTEM IN UNREINFORCED MASONRY (DEWALT / POWERS)

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that adhesive anchors installed using the AC100+ Gold Adhesive Anchoring System in unreinforced masonry, described in ICC-ES master evaluation report ESR-4105, have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2017 *City of Los Angeles Building Code* (LABC)
- 2017 *City of Los Angeles Residential Code* (LARC)
- 2017 *City of Los Angeles Existing Building Code* (LAEBC)

2.0 CONCLUSIONS

Adhesive anchors installed using the AC100+ Gold Adhesive Anchoring System in unreinforced masonry, described in Sections 2.0 through 7.0 of the master evaluation report ESR-4105, comply with the LABC Chapters 21 and 88, LAEBC Appendix A Chapter A1, and the LARC, and are subjected to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

Adhesive anchors installed using the AC100+ Gold Adhesive Anchoring System in unreinforced masonry described in this evaluation report must comply with all of the following conditions:

- All applicable sections in the master evaluation report ESR-4105.
- The design, installation, conditions of use and identification of the anchors are in accordance with the 2015 *International Building Code®* (2015 IBC) and the 2015 *International Existing Building Code®* (2015 IEBC) provisions noted in the master evaluation report ESR-4105.
- The design, installation, testing and inspection are in accordance with additional requirements of LABC Chapters 16, 17, 21, 88 and LAEBC Appendix A Chapter A1, as applicable, including LABC Sections 1704, 1705, and 2107, and LAEBC Sections A106, A107 and A108.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 and additional requirements noted in this supplement must be submitted.
- The allowable strength design values listed in the master evaluation report and tables are for the connection of the anchors to the masonry. The strength of the connection between the anchors and the connected members must also be checked for capacity (which may govern).

This supplement expires concurrently with the master report, reissued August 2018 and revised October 2018.

The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Monday, September 15, 2014** at 12:15 a.m. Eastern Time. Please contact NSF International to confirm the status of any Listing, report errors, or make suggestions.

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http://info.nsf.org/Certified/PwsComponents/Listings.asp?Company=4M370&Standard=061&

NSF/ANSI 61
Drinking Water System Components - Health Effects

NOTE: Unless otherwise indicated for Materials, Certification is only for the Water Contact Material shown in the Listing. Click here for a list of Abbreviations used in these Listings.

Powers Fasteners, Inc.
2 Powers Lane
Brewster, NY 10509
United States
914-235-6300

Facility : # 1 Germany

Joining and Sealing Materials

Trade Designation	Size	Water Contact Temp	Water Contact Material
Adhesives			
AC100+ Gold	[1]	D. HOT	VE
AC100-PRO	[1]	D. HOT	VE
PE 1000+	[1]	D. HOT	EPOXY
PF PRO	[1]	D. HOT	EPOXY
PURE150-PRO	[1]	D. HOT	EPOXY
V12	[1]	D. HOT	VE

[1] Certified or use as an anchoring adhesive for installing thread rods (less than or equal to 1.3 inches in diameter) in concrete or masonry for water treatment applications.
