

CODE LISTED
ICC-ES ESR-3066



MADE IN THE
USA
WITH GLOBAL MATERIALS

T308TM EPOXY

Adhesive Injection System

T308+™ Epoxy

Adhesive Injection System



PACKAGING

Dual (Side-by-Side) Cartridge
21.5 fl. oz. (630 mL)

STORAGE LIFE & CONDITIONS

Two years in a dry, dark environment with temperatures ranging from 40-95°F.

ANCHOR SIZE RANGE (TYP)

3/8" to 7/8" diameter threaded rod

SUITABLE BASE MATERIALS

Normal-weight concrete
Grouted concrete masonry
Hollow concrete masonry
Brick masonry (URM)

PRODUCT DESCRIPTION

T308+ is a two-component epoxy adhesive anchoring system. The system includes injection adhesive in plastic cartridges, mixing nozzles, dispensing tools and hole cleaning equipment. The T308+ is designed for bonding threaded rod and reinforcing bar into drilled holes in concrete base materials.

GENERAL APPLICATIONS AND USES

- Bonding steel threaded rod into hardened concrete and concrete masonry (CMU)
- Suitable to resist loads in uncracked concrete base materials for cases where anchor design theory and criteria applies
- Evaluated for installation into dry, clean holes only
- Can be installed in a wide range of base material temperatures

FEATURES AND BENEFITS

- Made in the USA
- Cartridge design allows for multiple uses using extra mixing nozzles
- Mixing nozzles proportion adhesive and provide simple delivery method into drilled holes
- Evaluated and recognized for multiple embedments (see installation specifications)

APPROVALS AND LISTINGS

International Code Council, Evaluation Service (ICC-ES) ESR-3066 for concrete
Conforms to requirements of ASTM C 881, Types I, II, IV & V, Grade 3, Class C (with exception of gel time)

Compliant with NSF/ANSI 61 for drinking water system components – health effects; minimum requirements for materials in contact with potable water and water treatment

Department of Transportation listings (see www.powers.com or contact transportation agency)

GUIDE SPECIFICATIONS

CSI Divisions: 03151–Concrete Anchoring, 04081–Masonry Anchorage, 05090–Metal Fastenings.
Adhesive anchoring system shall be T308+ as supplied by Powers Fasteners, Inc. Brewster, NY.
Anchors shall be installed in accordance with published instructions and requirements of the Authority Having Jurisdiction.

CODE LISTED
ICC-ES ESR-3066

This Product Available In



Powers Design Assist
Real Time Anchor Design Software
www.powersdesignassist.com



INSTALLATION SPECIFICATIONS

Installation Specifications for Steel Threaded Rod (Solid Concrete Base Materials)

Dimension/Property	Notation	Units	Nominal Anchor Size									
			3/8"		1/2"		5/8"		3/4"		7/8"	
Nominal anchor diameter	d	in. (mm)	0.375 (9.5)		0.500 (12.7)		0.625 (15.9)		0.750 (19.1)		0.875 (31.8)	
Nominal diameter of drilled hole	d_o	in.	7/16 ANSI		9/16 ANSI		3/4 ANSI		7/8 ANSI		1 ANSI	
Minimum embedment depth ¹	h_{ef}	in. (mm)	2 (50)	3-3/8 (86)	2-1/2 (62)	4 (102)	3-1/4 (83)	5-5/8 (143)	3-3/8 (86)	6-3/4 (171)	4 (102)	7-7/8 (200)
Minimum concrete member thickness ¹	h_{min}	in. (mm)	4 (102)	5 (127)	5 (127)	6 (153)	6 (153)	9 (229)	7 (178)	10-1/8 (257)	8 (203)	12 (305)
Minimum spacing distance ¹	s_{min}	in. (mm)	3 (76)		3-3/4 (95)		4-7/8 (124)		5 (127)		8 (203)	
Critical edge distance	c_{ac}	in. (mm)	4 (102)	6-3/4 (171)	5 (127)	9-1/2 (241)	6-1/2 (165)	12 (305)	6-3/4 (171)	14-1/2 (368)	8 (203)	15-3/4 (400)
Maximum torque (only possible after curing)	T_{max}	ft.-lbs. (N-m)	14 (19)		25 (34)		70 (95)		120 (163)		140 (190)	

1. For use with the design provisions of ACI 318 Appendix D and ICC-ES AC308 Appendix A, Section 3.3.

Installation Specifications for Threaded Rod (Hollow Base Materials)

Dimension/Property	Notation	Units	Nominal Anchor Size	
			3/8"	1/2"
Nominal threaded rod diameter	d	in. (mm)	0.375 (9.5)	0.500 (12.7)
Nominal stainless steel tube size	-	in.	3/8	1/2
Nominal diameter of drilled hole	d_{or} (d_{bit})	in.	1/2 ANSI	5/8 ANSI
Maximum torque (only possible after full cure time of adhesive)	T_{max}	ft.-lbs. (N-m)	10 (8)	10 (8)

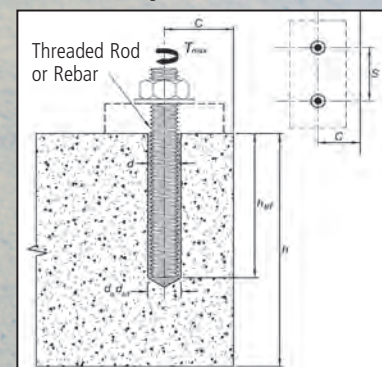
1. For unreinforced masonry (URM) see page 12.

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	A 36 or F1554 Grade 36	3/8 through 7/8	36.0	58.0
High strength carbon rod	A193, Grade B7	3/8 through 7/8	105.0	120.0
Stainless rod (Alloy 304/316)	F593, (Condition CW)	3/8 through 5/8	65.0	100.0
		3/8 through 7/8	45.0	85.0
Grade 60 reinforcing bar	A 615, A 706 ¹ A767, or A996	3/8 through 7/8 (#3 through #7)	60.0	90.0

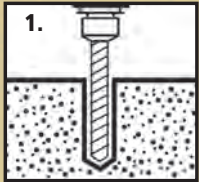
1. ASTM A706 reports a minimum ultimate strength of 80,000 PSI (80.0 ksi)

Detail of Steel Hardware Elements used with Injection Adhesive System

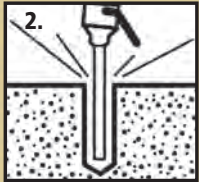


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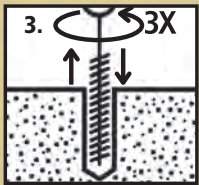
INSTALLATION INSTRUCTIONS (SOLID BASE MATERIALS)



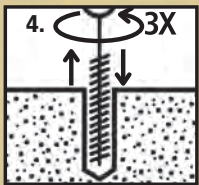
1. Drill hole into the concrete using a rotary-percussion power drill and a carbide-tipped SDS or SDS-Plus type bit. Drill bit size should be 1/16" larger than the anchor rod for sizes up to 1/2" diameter; and 1/8" larger for anchor rods 5/8" through 7/8" diameter.



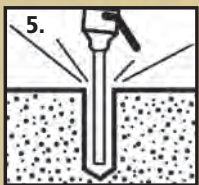
2. Blow out hole using oil-free compressed air at a minimum of 70 psi with a nozzle. While blowing air, insert the nozzle into the hole until in contact with the bottom, and then withdraw; whereby the blowing procedure takes at least one full second.



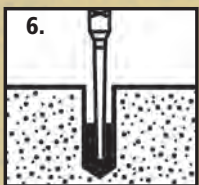
3. Insert an appropriate size nylon cleaning brush into the hole with a thrusting, twisting motion. Once the brush is in contact with the bottom of the hole, turn the brush three full revolutions. Then quickly withdraw the brush with a vigorous, twisting pull.



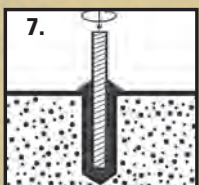
4. Repeat brushing of hole as per Step 3 above.



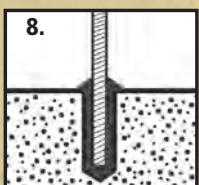
5. Repeat blow out of hole with air as per Step 2 above.



6. Screw the supplied mixing nozzle on to the cartridge, insert cartridge into an approved dispensing tool supplied by Powers Fasteners, and dispense epoxy on a disposable surface until a uniform color is achieved. Then insert the cartridge nozzle into the borehole until in contact with the bottom. Then, dispense the adhesive while slowly withdrawing the nozzle until borehole is approximately two-thirds full, and then withdraw the nozzle.



7. Slowly insert a clean and oil-free rod into the adhesive in the hole with a counter-thread, turning motion until it contacts the bottom of the hole.



8. Immediately adjust the alignment of the anchor rod in the hole. Check that the anchor remains fully in the hole. An air bubble in the hole could cause the anchor rod to rise after insertion. If this occurs, immediately turn the anchor with downward pressure to work the air out. Do not disturb, torque or load the anchorage until the adhesive is fully cured.

INSTALLATION INSTRUCTIONS (HOLLOW BASE MATERIALS)

Drilling



1- Drill a hole into the base material with a rotary drill tool to the size and embedment for the required screen size. The tolerances of the drill bit used should meet the requirements of ANSI B212.15.

Precaution: Wear suitable eye and skin protection. Avoid inhalation of dusts during drilling and/or removal.

Hole Cleaning - Blow 2x, Brush 2x, Blow 2x



2 - Blow out hole using oil-free compressed air at a minimum of 70 psi with a nozzle. While blowing air, insert the nozzle into the hole until in contact with the bottom for not less than one second, and then withdraw. Repeat.

Insert an appropriate size nylon cleaning brush into the hole with a thrusting, twisting motion. Once the brush is in contact with the bottom of the hole, turn the brush three revolution, and then quickly withdraw the brush with a vigorous, twisting pull.

- Repeat brushing of the hole
- Repeat blow out of hole with compressed air as per above.

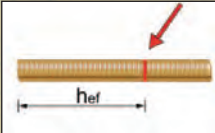
When finished the hole should be clean and free of dust, debris, ice, grease, oil or other foreign material.

Preparing

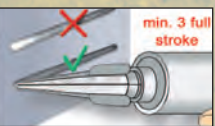


3 - Check adhesive expiration date on cartridge label. Do not use expired product. Review Material Safety Data Sheet (MSDS) before use. Cartridge temperature must be between 40°F - 95°F (0°C - 35°C) when in use. Review gel (working) time and curing time table. Consideration should be given to the reduced gel (working) time of the adhesive in warm temperatures.

Attach a supplied mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool. A new mixing nozzle must be used for every working interruption longer than published working time (see *gel time and curing time table*) as well for new cartridges.



4 - Prior to inserting the clean and oil free anchor rod. Verify anchor element is straight and free of surface damage.



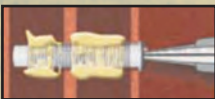
5 - For new cartridges and nozzles; Prior to dispensing adhesive into the drilled hole, squeeze out separately a minimum three full strokes of the mixed adhesive. Discard non-uniform adhesives until the mixed shows a consistent **gray** color.

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.

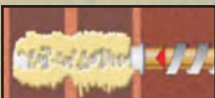
Installing



6 - Insert a screen tube of suitable length into the cleaned anchor hole.



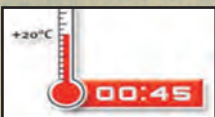
7 - Fill the screen tube full with adhesive starting from the bottom or back of the tube. Slowly withdraw the mixing nozzle as the screen fills to avoid creating air pockets or voids. A plastic extension tube supplied by Powers Fasteners must be used with the mixing nozzle if the back of the screen tube cannot be reached.



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 the back of the tube is reached.

Curing and Fixing



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 concrete base material*) by using a calibrated torque wrench.

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

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REFERENCE TABLES FOR INSTALLATION

Gel (working) Time and Curing Table

Temperature of base material		Gel (working) time	Full curing time
°F	°C		
50	10	35 minutes	48 hours
60	15	20 minutes	36 hours
70	20	10 minutes	24 hours
80	25	7 minutes	24 hours
90	32	5 minutes	24 hours
100	37	3 minutes	12 hours

Hole Cleaning Equipment Selction Table for T308+

Threaded rod Diameter (inch)	ANSI Drill Bit Diameter (inch)	Nylon Brush (Cat. #)	Nylon Brush Length (in)
3/8	7/16	07931	8-1/2
1/2	9/16	07932	8-1/2
5/8	3/4	07933	12
3/4	7/8	07933	13
7/8	1	07934	13
Compressed air nozzle (all hole size)		08292	1



PERFORMANCE DATA

Tension Design Information for Steel Threaded Rod in Normal-Weight Concrete (For use with load combinations taken from ACI 318 Section 9.2)^{1,2}

AC308 Criteria	Symbol	Units	Anchor Nominal Diameters										
			3/8		1/2		5/8		3/4		7/8		
Anchor diameter	d	in.	0.375		0.500		0.625		0.750		0.875		
ANSI Drill bit diameter	d _o	in.	7/16		9/16		3/4		7/8		1		
Minimum embedment	h _{ef}	in. (mm)	2 (50)	3-3/8 (86)	2-1/2 (62)	4 (102)	3-1/4 (83)	5-5/8 (143)	3-3/8 (86)	6-3/4 (171)	4 (102)	7-7/8 (202)	
Minimum concrete member thickness ²	h _{min}	in. (mm)	4 (102)	5 (127)	5 (127)	6 (153)	6 (153)	9 (229)	7 (178)	10-1/8 (257)	8 (203)	7-7/8 (200)	
Minimum spacing distance ²	S _{min}	in. (mm)	3 (76)		3-3/4 (95)		4-7/8 (124)		5 (127)		8 (203)		
Critical edge distance ²	C _{ac}	in. (mm)	4 (102)	6-3/4 (171)	5 (127)	9-1/2 (941)	6-1/2 (165)	12 (305)	6-3/4 (171)	14-1/2 (368)	8 (203)	15-3/4 (400)	
Minimum edge distance ²	C _{min}	in. (mm)	3 (76)		3-3/4 (95)		4-7/8 (124)		5 (127)		6 (153)		
Maximum torque ³	T _{max}	in. (mm)	14 (19)		25 (34)		73 (95)		119 (163)		144 (190)		
Effective tensile area	A _{se}	in. ²	0.0775		0.1419		0.2260		0.3345		0.4617		
Anchor Steel Yield Strength	F1554 Grade 36	f _y	lb/in ²		36,000								
	A193 Grade B7	f _y	lb/in ²		105,000								
Anchor Steel Ultimate Strength	F1554 Grade 36	f _{ut}	lb/in ²		58,000								
	A193 Grade B7	f _{ut}	lb/in ²		125,000								
Nominal steel strength of single anchor, tension	G1554 Grade 36	N _{sa}	lbf	4,495		8,230		13,110		19,400		26,780	
	A193 Grade B7			9,685		17,735		28,250		41,810		57,710	
Reduction factor for steel strength in tension	-	-	0.75										
Nominal steel strength of single anchor, shear	F1554 Grade 36	V _{sa}	lbf	2,695		4,940		7,865		11,640		16,070	
	A193 Grade B7			4,845		10,640		16,950		25,085		34,625	
Reduction factor for steel strength in shear	-	-	0.65										
Effectiveness factor for uncracked concrete	k _{c, uncr}	-	24										
Strength reduction factor for tension, concrete failure modes, Condition B	Ø	-	0.65										
Strength reduction factor for shear, concrete failure modes, Condition B	Ø	-	0.70										
Anchor category, periodic inspection	-	-	2	2	2	2	3	3	3	3	3	3	
Strength reduction factor for bond strength, dry concrete, with Periodic Inspection	Ø _d	-	0.55	0.55	0.55	0.55	0.45	0.45	0.45	0.45	0.45	0.45	
	κ _d	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.70	0.70	
Anchor category, periodic inspection	-	-	1	1	1	1	2	2	2	2	3	3	
Strength reduction factor for bond strength, dry concrete, with Continuous Inspection	Ø _d	-	0.65	0.65	0.65	0.65	0.55	0.55	0.55	0.55	0.45	0.45	
	κ _d	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.70	0.70	
Characteristic bond strength, uncracked concrete, Temperature Range A	τ _{k, uncr}	psi	676		681		418		523		645		
Characteristic bond strength, uncracked concrete, Temperature Range B	τ _{k, uncr}	psi	406		409		251		314		288		

1. The data presented is applicable to use with uncracked, normal weight, structural concrete having a compressive strength of between 2,500 and 8,500 psi.

2. The T308+ is recognized for applications in wet or dry concrete, non-acidic environment, minimum base material temperature of 50°F, and in holes drilled with a carbide drill bit used with a hammer drill.

3. Characteristic bond strength is dependent on temperature:

Temperature Range A: Maximum short term temperature = 110°F and Maximum long term temperature = 75°F.

Temperature Range B: Maximum short term temperature = 162°F and Maximum long term temperature = 110°F.

Short term elevated concrete temperatures are those that occur over brief intervals, such as due to diurnal cycling, and long term concrete temperatures are roughly constant over significant periods of time.

4. For short-term loads such as due to wind, and for Temperature Range B only, the listed bond strength may be increased 40 percent.

5. The T308+ anchor system is suitable for installation in vertical down or horizontal installation applications.

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FACTORED DESIGN STRENGTH (ϕN_u AND ϕV_u) IN ACCORDANCE WITH ACI 318 APPENDIX D AND ICC-ES AC308 ANNEX A:

- 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_{a2} is greater than or equal to 1.5 times c_{a1} .
- Calculations were performed according to ACI 318-05 Appendix D and ICC-ES AC308 Annex A, Section 3.3. The load level corresponding to the failure mode is listed (e.g. For tension: steel, concrete breakout or bond strength; For shear: steel, concrete breakout or pryout strength). The lowest load level controls.
- Strength reduction factors (ϕ) for steel strength and concrete breakout strength are based on ACI 318 Section 9.2 for load combinations. Condition B was assumed.
- 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.
- 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 or the Authority Having Jurisdiction (AHJ). See ICC-ES AC308 Annex A, Section 14.4 and ESR-2582.
- Tabular values are not permitted for anchors subjected to tension resulting from sustained loading. Please see ICC-ES AC308 Annex A, Section 3.3 for the supplement design requirement for this loading condition.
- For designs that include combined tension and shear, the interaction of tension and shear loads must be calculated in accordance with ACI 318-05 Appendix D.
- Interpolation is not permitted to be used with the tabular values. For intermediate base material compressive strengths, please see ACI 318-05 Appendix D, ICC-ES AC308 Annex A, Section 3.3 and information included in this product supplement. For other design conditions including seismic considerations please see ACI 318-05 Appendix D and ICC-ES AC308 Annex A, Section 3.3 and ESR-2582.
- 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 Strength for T308+ Installed into Uncracked Concrete in Dry Hole Condition for Temperature Range A Maximum long term temperature = 75°F (24°C), Maximum short term temperature = 110°F (43°C)

Nominal Anchor Size (in.)	Embed. Depth h_e (in.)	Min. Concrete Compressive Strength, f'_c (psi)		Steel Threaded Rod and Rebar Elements			
		2,500 to 8,000		A 307, Grade C	F 593 (SS), CW	A 193, Grade B7	Grade 60 Rebar
		ϕN_u or ϕN_s , Tension (lbs.)		ϕN_u , Tension (lbs.)	ϕN_s , Tension (lbs.)	ϕN_u , Tension (lbs.)	ϕN_s , Tension (lbs.)
3/8	2	1,035		3,395	5,850	7,315	7,425
	3-3/8	1,745					
1/2	2-1/2	1,740		6,175	10,650	13,315	13,500
	3-1/4	2,260					
	4	2,780					
5/8	3-1/4	1,465		9,830	16,950	21,190	20,925
	4-1/2	2,030					
	5-5/8	2,540					
3/4	3-3/8	2,285		14,575	21,355	31,405	29,700
	5-1/4	3,555					
	6-3/4	4,575					
7/8	4	2,870		20,095	29,455	43,315	40,500
	6	4,305					
	7-7/8	5,655					

Bond Strength
 Concrete Breakout Strength
 Steel Strength

Shear Design Strength for T308+ Installed into Uncracked Concrete in Dry Hole Condition for Temperature Range A Maximum long term temperature = 75°F (24°C), Maximum short term temperature = 110°F (43°C)

Nominal Anchor Size (in.)	Embed. Depth h_e (in.)	Min. Concrete Compressive Strength, f'_c (psi)					Steel Rod and Rebar Elements			
		2,500	3,000	4,000	6,000	8,000	A 307, Grade C	F 593 (SS), CW	A 193, Grade B7	Grade 60 Rebar
		ϕV_u or ϕV_p Shear (lbs)	ϕV_u or ϕV_p Shear (lbs)	ϕV_u or ϕV_p Shear (lbs)	ϕV_u or ϕV_p Shear (lbs)	ϕV_u or ϕV_p Shear (lbs)	ϕV_u Shear (lbs.)	ϕV_s Shear (lbs.)	ϕV_u Shear (lbs.)	ϕV_s Shear (lbs.)
3/8	2	1,115	1,115	1,115	1,115	1,115	1,765	3,040	3,805	3,860
	3-3/8	2,775	3,020	3,490	3,765	3,765				
1/2	2-1/2	2,495	2,730	3,155	3,745	3,745	3,210	5,540	6,925	7,020
	4	4,530	4,965	5,735	5,990	5,990				
5/8	3-1/4	3,735	3,735	3,735	3,735	3,735	5,110	8,815	11,020	10,880
	5-5/8	6,465	6,465	6,465	6,465	6,465				
3/4	3-3/8	4,865	5,330	5,825	5,825	5,825	7,580	11,105	16,330	15,445
	6-3/4	11,575	11,645	11,645	11,645	11,645				
7/8	4	4,920	5,390	6,225	7,620	8,800	10,450	15,315	22,525	21,060
	7-7/8	15,440	16,915	19,530	19,550	19,550				

Bond Strength
 Concrete Breakout Strength
 Steel Strength

FACTORED DESIGN STRENGTH (ϕN_u AND ϕV_u) IN ACCORDANCE WITH ACI 318 APPENDIX D AND ICC-ES AC308 ANNEX B:

- Tabular values are provided for illustration and are applicable for single anchors installed in uncracked normal-weight concrete with minimum slab thickness, $h_{sa} = h_{min}$, and with the following conditions:
 - C_{cr1} is greater than or equal to the critical edge distance,
 - C_{cr2} is greater than or equal to 1.5 times C_{cr1} .
- Calculations were performed according to ACI 318-05 Appendix D and ICC-ES AC308 Annex A, Section 3.3. The load level corresponding to the failure mode is listed (e.g. For tension: steel, concrete breakout or bond strength; For shear: steel, concrete breakout or pryout strength). The lowest load level controls.
- Strength reduction factors (ϕ) for steel strength and concrete breakout strength are based on ACI 318 Section 9.2 for load combinations. Condition B was assumed.
- 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.
- 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 or the Authority Having Jurisdiction (AHJ). See ICC-ES AC308 Annex A, Section 14.4 and ESR-2582.
- Tabular values are not permitted for anchors subjected to tension resulting from sustained loading. Please see ICC-ES AC308 Annex A, Section 3.3 for the supplement design requirement for this loading condition.
- For designs that include combined tension and shear, the interaction of tension and shear loads must be calculated in accordance with ACI 318-05 Appendix D.
- Interpolation is not permitted to be used with the tabular values. For intermediate base material compressive strengths, please see ACI 318-05 Appendix D, ICC-ES AC308 Annex A, Section 3.3 and information included in this product supplement. For other design conditions including seismic considerations please see ACI 318-05 Appendix D and ICC-ES AC308 Annex A, Section 3.3 and ESR-2582.
- 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 Strength for T308+ Installed into Uncracked Concrete in Dry Hole Condition for Temperature Range B Maximum long term temperature = 110°F (43°C), Maximum short term temperature = 162°F (72°C)

Nominal Anchor Size (in.)	Embed. Depth h_{ef} (in.)	Min. Concrete Compressive Strength, f'_c (psi)		Steel Threaded Rod and Rebar Elements			
		2,500 to 8,000		A 307, Grade C	F 593 (SS), CW	A 193, Grade B7	Grade 60 Rebar
		ϕN_u or ϕN_s Tension (lbs.)		ϕN_u Tension (lbs.)	ϕN_s Tension (lbs.)	ϕN_u Tension (lbs.)	ϕN_s Tension (lbs.)
3/8	2	620		3,395	5,850	7,315	7,425
	3-3/8	1,050					
1/2	2-1/2	1,045		6,175	10,650	13,315	13,500
	3-1/4	1,360					
	4	1,670					
5/8	3-1/4	880		9,830	16,950	21,190	20,925
	4-1/2	1,220					
	5-5/8	1,525					
3/4	3-3/8	1,375		14,575	21,355	31,405	29,700
	5-1/4	2,135					
	6-3/4	2,745					
7/8	4	1,730		20,095	29,455	43,315	40,500
	6	2,590					
	7-7/8	3,400					

Bond Strength
 Concrete Breakout Strength
 Steel Strength

Shear Design Strength for T308+ Installed into Uncracked Concrete in Dry Hole Condition for Temperature Range B Maximum long term temperature = 110°F (43°C), Maximum short term temperature = 162°F (72°C)

Nominal Anchor Size (in.)	Embed. Depth h_{ef} (in.)	Min. Concrete Compressive Strength, f'_c (psi)					Steel Rod and Rebar Elements			
		2,500	3,000	4,000	6,000	8,000	A 307, Grade C	F 593 (SS), CW	A 193, Grade B7	Grade 60 Rebar
		ϕV_u or ϕV_p Shear (lbs)	ϕV_u or ϕV_p Shear (lbs)	ϕV_u or ϕV_p Shear (lbs)	ϕV_u or ϕV_p Shear (lbs)	ϕV_u or ϕV_p Shear (lbs)	ϕV_u Shear (lbs.)	ϕV_s Shear (lbs.)	ϕV_u Shear (lbs.)	ϕV_s Shear (lbs.)
3/8	2	670	670	670	670	670	1,765	3,040	3,805	3,860
	3-3/8	2,260	2,260	2,260	2,260	2,260				
1/2	2-1/2	2,250	2,250	2,250	2,250	2,250	3,210	5,540	6,925	7,020
	4	3,600	3,600	3,600	3,600	3,600				
5/8	3-1/4	2,240	2,240	2,240	2,240	2,240	5,110	8,815	11,020	10,880
	5-5/8	3,880	3,880	3,880	3,880	3,880				
3/4	3-3/8	3,495	3,495	3,495	3,495	3,495	7,580	11,105	16,330	15,445
	6-3/4	6,990	6,990	6,990	6,990	6,990				
7/8	4	4,920	5,390	5,975	5,975	5,975	10,450	15,315	22,525	21,060
	7-7/8	11,760	11,760	11,760	11,760	11,760				

Bond Strength
 Concrete Breakout Strength
 Steel Strength

T308+™ Epoxy



Ultimate Load Capacities for T308+ Installed with ASTM A 193 Grade B7 Threaded Rod into Normal-weight Concrete^{1,2,3,4} (Based on Bond Strength/concrete capacity)

Rod Diameter in.	Drill Bit Diameter in.	Minimum Embedment Depth in.	Minimum Concrete Compressive Strength (f'c)	
			2,500 psi	4,000 psi
			Tension lbs	
3/8	7/16	2	3,830	4,060
		2-1/2	5,605	6,065
		3	7,380	8,075
		3-3/8	8,710	9,580
1/2	9/16	2-1/2	6,470	6,890
		3	9,090	9,735
		3-1/4	10,400	11,155
		3-1/2	11,710	12,575
5/8	3/4	4	14,330	15,420
		3-1/4	8,190	8,810
		3-1/2	9,965	10,705
		4	13,510	14,495
3/4	7/8	4-1/2	17,060	18,285
		5-5/8	25,040	26,810
		3-3/8	9,480	10,160
		4	13,270	13,980
7/8	1	4-1/2	16,300	17,035
		5-1/4	20,845	21,620
		6	25,395	26,205
		6-3/4	29,940	30,790
7/8	1	4	13,560	14,600
		5	17,490	18,695
		6	21,420	22,785
		7	25,350	26,880
7/8	1	7-7/8	28,790	30,460

1. The values listed above are ultimate load capacities which should be reduced by a minimum safety factor of 4.0 or greater to determine the allowable working load. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety.
2. Allowable bond strength/concrete capacity must be checked against allowable steel strength to determine the controlling allowable load. Shear capacity is controlled by allowable steel strengths for the given conditions.
3. The tabulated data is applicable to single anchors at critical edge distance in uncracked concrete, normal-weight concrete having a compressive strength as listed. Values are for dry concrete in holes drilled with a hammer drill and an ANSI carbide drill bit. Application is limited to vertical down or horizontal installation direction. Minimum base material temperature shall be 50°F and may not exceed 110°F.
4. Linear interpolation may be used to determine ultimate loads for intermediate compressive strengths.

Ultimate Load Capacities for T308+ Installed with ASTM A 193 Grade B7 Steel Threaded Rod Into Normal-Weight Concrete with an 1-3/4" Edge (Based on bond strength/concrete capacity)

Rod Diameter d in.	Drill Diameter dbit in.	Minimum Embedment Depth in.	Minimum Edge Distance in.	Minimum Concrete Compressive Strength, f'c
				3,000 psi
				Tension lbs.
5/8	3/4	8	1-3/4	19,525

1. The values listed above are ultimate load capacities which should be reduced by a minimum safety factor of 4.0 or greater to determine the allowable working load. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety.
2. The tabulated data is applicable to single anchors at critical spacing in uncracked, normal-weight concrete having compressing strength as listed.
3. Values are for dry concrete in holes drilled with a hammer drill and an ANSI carbide drill bit.
4. Application is limited to vertical down or horizontal installation direction.
5. Minimum base material temperature shall be 50°F and may not exceed 110°F.

Ultimate Load Capacities for Steel Threaded Rod Installed with T308+ into the Block Face of Grouted-Filled Concrete Masonry Walls^{1,2}

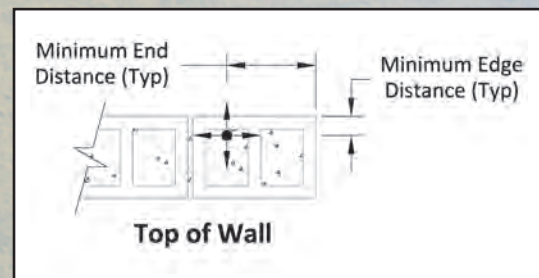
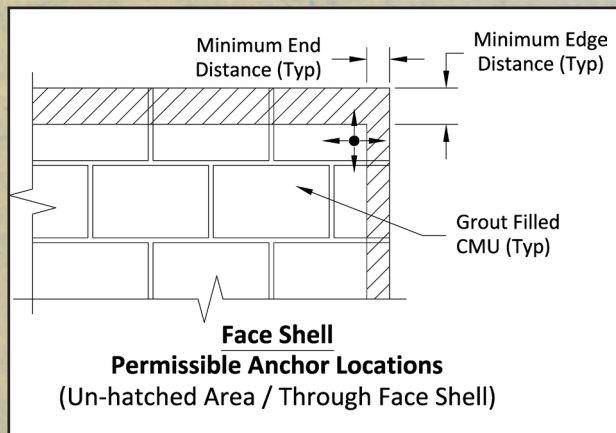
Rod Diameter d in. (mm)	Drill Diameter d _{bit} in.	Minimum Embedment Depth in. (mm)	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	Ultimate Load ³		Allowable Load	
					Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/2 (12.7)	9/16	4 (101.6)	3-3/4 (95.2)	4 (101.6)	3,525 (15.6)	2,950 (13.0)	705 (3.1)	590 (2.6)
5/8 (15.9)	3/4	5 (127)	3-3/4 (95.2)	4 (101.6)	5,150 (22.8)	2,950 (13.0)	1,030 (4.5)	590 (2.6)

1. Tabulated load values are for anchors installed in minimum 8" wide, minimum Grade N, Type II, lightweight, medium-weight or normal-weight concrete masonry units conforming to ASTM C 90 that have reached a designated minimum compressive strength at the time of installation ($f'_m \geq 1,500$ psi). Mortar must be type N, S or M.
2. Anchor installations are limited to one per masonry cell. Shear loads may be applied in any direction.
3. The values listed are ultimate load capacities which should be reduced by a minimum safety factor of 5.0 or greater to determine the allowable working load. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety.

Ultimate Load Capacities for Steel Threaded Rod Installed with T308+ into the Top of Grouted-Filled Concrete Masonry Walls^{1,2}

Rod Diameter d in. (mm)	Drill Diameter d _{bit} in.	Minimum Embedment Depth in. (mm)	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	Ultimate Load ³		Allowable Load	
					Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/2 (12.7)	9/16	4 (101.6)	1-3/4 (44.5)	4 (101.6)	3,525 (15.6)	1,400 (6.2)	705 (3.1)	280 (1.2)
5/8 (15.9)	3/4	5 (127)	1-3/4 (44.5)	4 (101.6)	5,150 (22.8)	1,400 (6.2)	1,030 (4.5)	280 (1.2)

1. Tabulated load values are for anchors installed in minimum 8" wide, Grade N, Type II, lightweight, medium-weight or normal-weight masonry units conforming to ASTM C 90 that have reached a designated ultimate compressive strength at the time of installation ($f'_m \geq 1,500$ psi). Mortar must be type N, S or M.
2. Anchor installations are limited to one per masonry cell. Shear loads may be applied in any direction.
3. The values listed are ultimate load capacities which should be reduced by a minimum safety factor of 5.0 or greater to determine the allowable working load. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety.

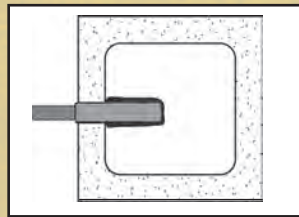


T308+™ Epoxy

Capacities for Steel Threaded Rod Installed with T308+ Into Hollow Concrete Masonry Walls with Stainless Steel Screen Tubes^{1,3,4}

Rod Diameter d in. (mm)	Drill Diameter d _{bit} (in.)	Screen Tube Length in. (mm)	Minimum End Distance in. (mm)	Minimum Edge Distance in. (mm)	Ultimate Load ²		Allowable Load	
					Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
3/8 (9.5)	1/2	3-1/2 (88.9)	3-3/4 (95.2)	3-3/4 (95.2)	1,400 (6.2)	1,725 (7.6)	280 (1.2)	345 (1.5)
1/2 (12.7)	5/8	3-1/2 (88.9)	3-3/4 (95.2)	3-3/4 (95.2)	1,500 (6.6)	1,725 (7.6)	300 (1.3)	345 (1.5)

1. Tabulated load values are for anchors installed in minimum Type II, Grade N, lightweight concrete masonry units conforming to ASTM C90.
2. The values listed are ultimate load capacities which should be reduced by a minimum safety factor of 5.0 or greater to determine the allowable working load. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety.
3. Anchor installations are limited to one per masonry cell. Shear loads may be applied in any direction.
4. The consistency of hollow concrete block masonry base materials can vary greatly. Consideration of job site testing should be given to verify conformance of base materials and anchor performance in actual conditions.



PERFORMANCE DATA

Allowable Bond Strength Capacities for Threaded Rods and Reinforcing Bars for T308+ Epoxy Installed in Unreinforced Masonry^{1,2}

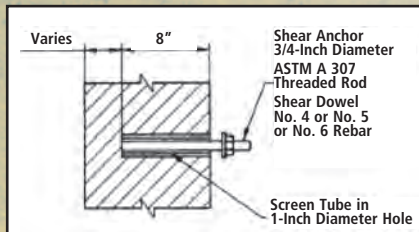


Figure 1

Shear Anchor – Configuration A (See Figure 1)					
Rod Dia. or Rebar Size d in. (mm)	Minimum Embed. h _v in. (mm)	Minimum Wall Thickness in. (mm)	Allowable Tension lbs. (kN)	Allowable Shear lbs. (kN)	Maximum Torque ft.-lbs. (Nm)
3/4 (19.1)	8 (203.2)	13 (330.2)	-	1,000 (4.5)	60 (81.3)
No. 4	8 (203.2)	13 (330.2)	-	500 (2.3)	40 (54.2)
No. 5	8 (203.2)	13 (330.2)	-	750 (3.4)	50 (67.8)
No. 6	8 (203.2)	13 (330.2)	-	1,000 (4.5)	60 (81.3)

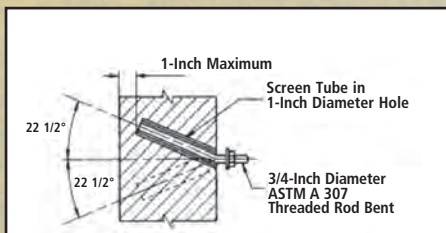


Figure 2

22-1/2° Combination Anchor – Configuration B (See Figure 2)					
Rod Dia. or Rebar Size d in. (mm)	Minimum Embed. h _v in. (mm)	Minimum Wall Thickness in. (mm)	Allowable Tension lbs. (kN)	Allowable Shear lbs. (kN)	Maximum Torque ft.-lbs. (Nm)
3/4 (19.1)	Within 1 inch of opposite wall surface	13 (330.2)	1,200 (5.4)	1,000 (4.5)	60 (81.3)

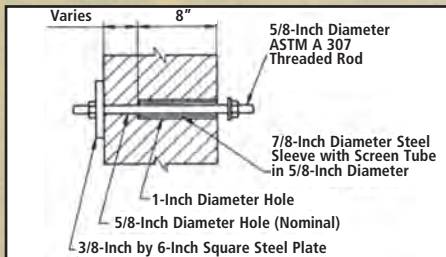


Figure 3

Through Anchor – Configuration C (See Figure 3)					
Rod Dia. or Rebar Size d in. (mm)	Minimum Embed. h _v in. (mm)	Minimum Wall Thickness in. (mm)	Allowable Tension lbs. (kN)	Allowable Shear lbs. (kN)	Maximum Torque ft.-lbs. (Nm)
5/8 (15.9)	8 inches from interior wall surface	13 (330.2)	1,200 (5.4)	750 (3.4)	50 (67.8)

1. Allowable shear values are applicable only to anchors where in-place shear tests indicate minimum mortar strength of 50 psi net.
2. No increase for lateral loading is permitted, such as loading induced by wind or earthquake.

Anchor Description	Minimum Vertical Spacing in.	Minimum Horizontal Spacing in.	Minimum Edge Distance in.
Shear Anchor Configuration A – (See Figure 1)	18	18	24
22-1/2° Combination Anchor Configuration B – (See Figure 2)	18	24	16
Through-bolt Anchor Configuration C – (See Figure 3)	18	18	24

T308+™ Epoxy

ORDERING INFORMATION

T308+ Cartridge

Cat No.	Description	Std. Box	Std. Carton
8523SD	21.5 fl. oz. Side-by-Side Cartridge (38.5 in ³)	12	-

Cartridge System Mixing Nozzles

Cat No.	Description	Std. Box	Std. Carton
08294	Extra Mixing Nozzle (with an 8" extension)	1	10

Dispensing Tools for Injection Adhesive

Cat No.	Description	Std. Box	Std. Carton
08409	21.5 oz. Standard All-Metal Manual Tool	1	10
08442	21.5 oz. Battery Tool	1	1

Nylon Brushes for Hole Cleaning

Cat No.	Description	Brush Length	Std. Qty.
07931	1/2" Diameter Nylon Brush	8-1/2"	1
07932	3/4" Diameter Nylon Brush	8-1/2"	1
07933	1" Diameter Nylon Brush	12"	1
07934	1-1/4" Diameter Nylon Brush	13"	1



PRODUCT SUBMITTAL / SUBSTITUTION REQUEST

TO:

PROJECT:

SPECIFIED ITEM:

Section	Page	Paragraph	Description
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PRODUCT SUBMITTAL / SUBSTITUTION REQUESTED:

T308+ Adhesive anchoring system from Powers Fasteners, Inc.

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:

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FOR US CUSTOMER SERVICE

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Alabama	5405 Buford Hwy Suite 410 Norcross, GA 30071-3984	678-966-0000	678-966-9242
Atlanta	5405 Buford Hwy Suite 410 Norcross, GA 30071-3984	678-966-0000	678-966-9242
Boston	2 Powers Lane, Brewster, NY 10509	800-524-3244	877-871-1965
Charlotte	349 L West Tremont Avenue, Charlotte, NC 28203	704-375-5012	704-376-5517
Chicago	2472 Wisconsin Avenue, Downers Grove, IL 60515	630-960-3156	630-960-3912
Dallas	1300 IH 35 North, Suite #118, Carrollton TX 75006	972-446-5985	972-446-3674
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Seattle	14221 NE 190th St., Suite 125, Woodinville, WA 98072	714-731-2500	714-731-2566
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New Zealand	PO Box 302 076 North Harbour Auckland	Clay Sesto	+64 9415 2425	+64 9415 2627
Quebec	721 Meloche Avenue, Dorval, Quebec H9P 2S5	Allan Hill	514-631-4216	514-631-2583

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Costa Rica	Tecnofijaciones de Costa Rica, La Uruca, costado Este del Banco Nacional, Condominio Horizontal JW, Bodega #21, San Jose, Costa Rica Cel Internacional s.a., Alajuela, Costa Rica, Apartado 674-4050	alguerak@tecnofijacionescr.com	00-506-2256-8115/8117	00-506-2256-8149
Dominican Republic	Calle Estancia Nueva #17 E Esquina Cul-De-Sac 9, San Geronimo, Santo Domingo	ventas@celcr.com	00-506-2432 5868	00-506-2440-1839
Ecuador	Acero Comercial Ecuatoriano S.A., Av. La Prensa N45-14 y Telégrafo 1 – Quito Av. Juan Tanca Marengo Km. 1.7 – Guayaquil	Rodfor Team info@acero.comercial.com infogy@acero.comercial.com	809-224-5615 (593-2) 2454 333 (593-4) 2683 060	809-472-8640 (593-2) 2454 455 (593-4) 2683 059
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www.powers.com

Cat. No. 49069 4/14

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